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**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**Economy wide Impact of Direct Tax Reform in Ethiopia:
A Recursive Dynamic Computable General Equilibrium Analysis**

By

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Addis Ababa, Ethiopia

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This is to certify that the thesis prepared by Belayneh Asmare, entitled as: *The Economic Wide Impact of Direct Tax Reform in Ethiopia by Using a Recursive Dynamic Computable General Equilibrium Model*, and submitted in partial fulfillment of the requirements for the degree of Master of Science in Economics (International Economics) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

Since at the end of 2016, employment income tax (PIT), rental income tax and corporate income tax has been undergone a policy reform in Ethiopia. With the tax policy reforms in 2016, the rates of direct tax bracket on average reduced by 40%. In this study, we aim to analyze the effects of direct tax reductions on macroeconomic variables, income and expenditures of the government and income distribution and welfare of households. Since a major tax policy change can have considerable impacts on the economic agents, the economic impacts of these changes should be evaluated by taking economy-wide effects into account. For this study, the researcher employed a recursive dynamic computable general equilibrium model developed by IFPRI. The impact of the direct tax reform is different among households and factors. For households, a decrease in the direct tax causes to a higher disposable incomes, especially for urban non-poor households that involve in the labor market. Benefits to rural poor households were lower; because their income is depend on subsistence farming. Due to a reduction in the import and GDP reduction relative to the baseline, households affected by the rise in consumption prices, but for rural and urban non-poor households the disposable income increment out ways the price increment and thus experiencing improvements in their consumption patterns, as a result, their welfare is improved. The reduction in the direct tax creates income variation among factors of production. The sectoral analysis shows that the manufacturing sector tended to benefit more from the reforms than other sectors. Therefore, for countries like Ethiopia, which collects tax revenue below their capacity and unable to cover all the expenditures by their own capacity; increasing the tax base is a good policy measure.

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“The LORD hath done great things for us; [whereof] we are glad” Psalm 126:3

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List of Acronyms and abbreviations

CES	Constant Elasticity of Substitution
CGE	Computable General Equilibrium
DRM	Domestic Resource Mobilization
DTR1	Direct Tax Reduction by 40%
DTR2	Direct Tax Reduction by 15%
DTI3	Direct Tax Increment by 15%
ECA	Economic Commission for Africa
EDRI	Ethiopia Development and Research Institute
EPA	Ethiopian Privatization Agency
EPRDF	Ethiopian Peoples Revolution Democratic Front
ERCA	Ethiopian Revenue and Customs Authority
GDP	Gross Domestic Product
GTP II	The second Growth and Transformation Plans
IFIs	International Financial Institutions
ILO	International Labor Organization
IMF	International Monetary Fund
ISID	Inclusive and Sustainable Industrial Development
LDCs	Less Developed Countries
MDGs	Millennium Development Goals
MOFEC	Ministry of Finance and Economic Cooperation
MRA	Meta-Regression Analysis
NBE	National Bank of Ethiopia
NTR	Non-Tax Revenue
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
PAYE	Pay As You Earn
PCP	Program for Country Partnership
PIT	Personal Income Tax
SSA	Sub-Sahara African
SAM	Social Accounting Matrix
TIN	Tax Identification Numbers
TTR	Total Tax Revenue
UN	United Nation
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nation Development Program
UNIDO	United Nations Industrial Development Organization
VAT	value added tax
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The government, in all over the world, desires tax to finance and control their economic activities and one of the sources of income is taxation. Taxation is a compulsory levy on income while the decision to pay tax is not that of the taxpayers. According to Amaechina (1998:9), taxation has been defined as a charge which governments impose on the earnings of the society or corporation in a state. The government cannot give access to infrastructure personally for somebody for those who paid his taxes; however, the funds realized are used to finance general government expenditures. Collecting tax revenue is one means of transferring resources from the private to the public sector (Wawire, 2011). Most of the least developed countries governments have a plan to inspiring and guiding their economic and social development.

The governments of every country use various methods of raising funds like; borrowing, foreign aid, printing of money and taxation to stir their economic performance, from them taxation is the main source of government revenue (Chaudhry and Munir, 2010). The gradual declining on the amount of Official Development Assistance (ODA), for least developing countries raises the need to look an efficient internal resource mobilization system. Accordingly, many developing countries had taken different reform programs; for example, to increase the tax base they introduce the value-added tax (Haque, 2009). SSA countries are characterized by their low tax to GDP ratio performance. Half of SSA countries collect 16.8% of GDP from tax revenue and which is below the UN standard, 20% to achieve the millennium development goal (MDGs) UNDP (2014). During 2010 Ethiopia's tax to GDP ratio was 12.2% and it also does not improved till now. It was the lowest of its neighboring countries such as Kenya (17.7%) and Rwanda (14.1%) (Tilahun, 2014).The Ethiopian revenue system development history, it tells that a discretionary change has played a major role in the determination of the existing level and structure of revenue. Among the changes that were introduced in the rate structures are the dominant (Eshetu and Makonnen 1992). In Ethiopia, various tax systems have been introduced at different times with the principal objectives of enhancing revenue mobilization, economic improvement and financing development plans. For example, the imperial government had introduced modern taxes and the socialist government had done its part with a view to supporting their respective economic programs. The current government, since the transitional period in the

early 1990's, initiated tax reform as part of the development reform process against the long-lived economic crisis. The 2016's tax reform that widens the employment and rental income tax brackets was also among the recent one.

1.2 Statement of the problem

Domestic resource mobilization (DRM) refers to the procedure in which countries increase domestic resources that are used to supply goods and services to the society. For developing countries, domestic resource mobilization is the only dependable and long-term source of development financing in terms of sustainability and reliability (Fossat and Bua, 2013; Stiglitz, 2010; Keen, 2012). The 2008 global financial and economic crisis creates the awareness that is international sources like ODA, remittances and other inflows are not reliable and insufficient to finance development plans and stimulate development in developing countries and it causes a country to become aid-dependence. As a result, they need to pay more attention to domestic resource mobilization (Wilford, 1978; IMF, 2011; UNDP, 2016; ECA, 2010).

Mobilizing more revenue is a priority agenda for LDCs in order to finance their development plans, and puny revenue mobilization is the origin for fiscal imbalances in several countries (Drummond et al., 2012). The governments must be careful to design tax reforms in ways that take proper account of their distributional impact, in particular, their impact on the poor (Sahn and Younger, 2002). Many studies have investigated how tax policies affect a country's economic growth rate. For example, Gemmell (1988) examined effects of taxation on economic growth in least developed countries, and he concluded that the correlation between taxation, savings, and growth was complex, and the theory that taxation significantly affects economic growth is unrealistic. On the other hand, Engen and Skinner (1996) analyzed the effect of taxes on economic growth and they concluded that the design of the tax system was likely to apply a modest, but cumulatively it has significant effect on long-run growth rates. Nevertheless, it is undoubtedly that countries whose tax structures are more efficiently administered and legally enforced are more likely to enjoy faster economic growth rates than countries without.

Ethiopia used direct taxes as one of the principal sources of domestic government revenue since the beginning of modern taxation in the 1940s. In Ethiopia history, the year 1991 marked the end of the socialist regime, and the Ethiopian Peoples Revolution Democratic Front (EPRDF), came to power. Starting from 1992, the EPRDF has instigated a broad policy reform including the tax system (Geda & Shimeles, 2005). In the past, Ethiopia has made encouraging progress in

mobilizing more revenues from domestic sources, particularly in tax revenue. Tax collection increased from Birr12.4 billion in 2005 to Birr 165.3 billion in 2015 indicating over thirteen fold increases within the decade. Similarly, the share of domestic revenue in the total public revenue increased from 77 % to 94 % in the same period, and the share of tax revenue stands at 83 % in 2015 and from which direct tax covers 36%. But, the tax to GDP ratio remained low at 13.4 % in 2015 which is still below the Sub Saharan Average of about 18%, over 20% for emerging economies and above 30% for developed economies. In 2005 Ethiopia's tax to GDP ratio was 12.5 % after a decade of robust and strong economic growth this ratio came to 13.4%, which has very little growth (UNDP, 2016). Given the above reality and that enhancing the DRM is very essential to economic growth especially for LDCs and particularly for Ethiopia; however by 2016 the governments of Ethiopia make reform on tax policy by broadening the income tax brackets and tax thresholds. On the one hand, government has an objective to achieve over 17 % of the tax-to-GDP ratio by 2019/20, on the other hand, government reduce the direct tax. Therefore the main motivation of this paper is to explore the real economic impacts of the reduction in the direct tax instead of increasing it for the success of GTP II.

Many studies conducted on the areas of tax policy; however, the methodology that they used to analyze the effect of the tax reform is panel data, time series econometrics or a computable general equilibrium. To study the economic wide effect of a tax reform, using computable general equilibrium model is more appropriate method than any others (Shoven and Whalley, 1992). All the studies even researches done by using a CGE models in the earlier on the effect of tax reform do not consider the impact of the change in direct tax alone on the macroeconomic variables, socio-economic activities, distribution of income. For instance Takele (2017) analyze the economy wide impact of tax reform on Ethiopian economy using dynamic CGE model. He conducted different simulations (direct reduction, increase sales tax and decrease tariff) and he concluded that, encouraging direct tax reform and consumption tax reform, protecting the home country from external sector are the major policy option recommended to bring a good economic performance. This review also asserted that the existing literature on the economy wide-impact of Ethiopia's direct tax reform is practically inadequate. Thus, the present study looked into the economic wide impact of direct tax reform at different percent of reduction by including most recent data to update the 2009/10 Ethiopia SAM in order to get the current performance of the economy and applying a dynamic computable general equilibrium model.

1.3. Objective of the paper

1.3.1 General Objective

In view of the above mentioned, the main objective of this study is to examine the economy wide impact of the Ethiopian government's recent direct tax policy reforms.

Generally this study examines the effects of change in direct tax reform on economic performance and households' living standard. The paper evaluates the impact of direct tax policy reform at macro level. The macro level would include impact on aggregate variables like economic growth, government revenue, investment, employment level, and international trade, whereas the micro level would include sectoral impacts such as impacts of direct tax reform on households and firms income, saving, consumption and expenditure decision.

1.3.2 Specific Objective

Specifically, the study tries to address the issue

- ❖ Estimate the macroeconomic impacts of change in direct tax,
- ❖ Analyze the effect of change in direct tax on household and Government income and expenditure decision,
- ❖ Investigate the real impacts of direct tax reform on factor utilization, output growth and welfare of the households.

1.4 Scope of the Study

The scope of the study is restricted with its title (the economy wide impact of direct tax reform in Ethiopia) conceptually, geographically, duration and methodologically which is described as follows. The geographical scope of the study is restricted to the political boundary of Ethiopia, areas and countries other than this boundary are not subject of this study. Since the study is a dynamic macro and micro simulation of variables that are affected by the tax reform, the time period that covered under this study span from the time after the reform and up to the coming 2025. The conceptual Scope of the study; as it can be easily understood from the title of the research; the study would focus on the relationship between direct tax reform and its effect on all the economic variables in Ethiopia. Above all the study would give emphasis on analyzing the economic wide impact of tax reform on the economy by using the updated comprehensive national SAM of Ethiopian economy in 2009/10. The study would incorporate all the economic wide impact of tax reform on Ethiopian economy performance, saving-investment decision,

household consumption, international trade, government budget, factor utilization and welfare of household.

1.5 Significance of the Study

Since tax is very important mechanism for government to finance the overall economic activities of the country, therefore conducting research on the area of taxation is more productive in order to develop the suitable tax policy which takes into account all actors in the economy.

As a result, this study is important in such that:

- The outcome of this study will improve the capacity of the students offering course associated with taxation to understand the concept appropriately and help to the researcher to get the reward of Master Decree in International Economics.
- The study will provide information for future research in the area of taxation.
- The result of this research will assist government officials use taxation in efficient way to achieve desired goals.
- It shall also provide an option to the government, that taxation can be used as economic instrument to manage money in circulation in order to avoid inflation, control high cost of living and low standard of living.

In addition this research will contribute more for the creation of comprehensive tax policy, which can generate sufficient amount of revenue for government and to minimize the distortion in the economy by taking in to account the economy wide impact of tax policies reform and employing a computable general equilibrium model as the method of analysis.

1.6 Organization of the Paper

The paper is organized as follows: chapter one presents the overall purpose of the paper. The second chapter reviews theoretical and empirical literatures on the tax reform and economic variables. The third chapter is all about the history of taxation in Ethiopia and the over view of the country's economy. Chapter four introduces the data base (SAM) and specifies the theoretical and economic framework for the Dynamic CGE model used in this study. The fifth chapter discusses the results and findings of the dynamic CGE models. The last chapter is the conclusion part and it provides policy implications for the responsible body.

CHAPTER TWO

RELATED LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1 Definition and Concepts of taxation

Tax: is the money paid by the societies, based on their income and value of goods purchased to the government for public purposes. The word “Tax” has also been defined by different authors and different organizations. Tax, is a payment levied by the government from households, business, product or activity so as to funding government spending (TJNA, 2011). The Organization for Economic Cooperation and Development (OECD) in 2015 also defines tax as “compulsory unreturned payments to the government. According to Agyei (1983), tax is the shift of resources from the private sector to public sector with the aim of achieves the country’s economic and social objectives. Tax is defined as a financial charge or levy imposed upon an individual or legal entity by a state, to support government expenditure or defined tax as a monetary charge imposed by the government on persons, entities, transactions or properties to yield revenue and can be collected without any direct benefits attached with it (Gale et al, 2014).

Taxation: it refers to obligatory charge imposed on private, individual, institutions or groups by the government.

Tax payer: is a person, group of persons or an entity that pays or responsible to tax.

Tax Effort: Tax effort measures the ratio of actual tax collection to the potential tax expected from the economy. Traditionally tax potential has been considered by gross domestic product (GDP) of a country; hence tax effort is simply the ratio of actual tax revenue to GDP.

Tax policy: is defined as all the sets and main instructions that determine the structures of a tax system and manage it in order to finance public spending and support the overall activities.

Tax reform: is defined as the increases or decreases in tax rates, brackets or thresholds and changes in the tax base; the introduction of new taxes and the elimination of old taxes; changes in the tax mix; change in administrative practices and procedures etc. However, not all changes in taxes (like change in tax collection periods) should be called tax reform and we would do well to reserve this term for significant changes (Raghbendra and Jha, 2009). It is the procedure of shifting the current tax system to a new level of tax system with the intention that the tax system

can serve the main objective of financing government expenditure and meet other objective (Delesa, 2014; Desalegn, 2014; Cliche,2012).

Direct tax: is a tax which is evaluated and collected directly from the individuals who are intended to bear it. Usually it is collected through an intermediary; and the most popular example is employment income tax. It is possible that you have no contact with tax authorities; it can depend on individual circumstances; it is possible to change the average tax rate. Direct taxes are these taxes that are based on income of individual or groups of individual, corporate bodies and institutions (Ajyel, 1983).

2.1.2 Theories of Taxation

There are different theories of taxation which have been developed by different scholars on the bases of making the tax system good and favorable for the society.

The **first** theory of taxation is socio political theory of taxation which suggests that social and political objectives should be the pivotal factors in choosing the types of taxes. This theory is in support of progressive taxation by using taxation to reduce income inequalities and it stated that a tax system should not be planned to support a single person from the society however it should be used to alleviate the problems of a society as a whole. Generally according to this theory taxation should be used effectively for overcoming the problem of economy which emanates from market failure (Jhon and Daberchi, 2016).

The **second** theory of taxation is expediency theory which proclaims that each tax proposal should pass the assessment of practicability. This theory proposes tax structure should not be designed to achieve ambitions pressure groups which protect and promote members interest, if then the practicability of the tax will be in doubt (Ogbonna and Appah 2012).

The **third** theory of taxation is cost of service theory of taxation which focus on the citizens of a State must pay for the cost of any State in accordance with service they receive (Bhatia, 2009).

The **fourth** theory of taxation is the ability to pay theory, which is based on the assumption that a citizen is to pay taxes just because he can and his relative share in the total tax burden is to be determined by his relative paying capacity and argued that this theory of taxation is just, equitable and the most accepted theory of taxation because theory favor's the income redistribution function and it is a progressive form of tax system as well as it is practicable in indirect taxes as people with greater ability will pay more (Bhatia 2009; Jhingan 2011).

The **fifth** and the last theory of tax is optimal tax theory and the dominant approach in optimal tax theory is to use the standard welfarist framework in which the government sets taxes and

transfers to maximize a social welfare function which is an explicit function of individual utilities. Social welfare is maximized subject to a government budget constraint and taking into account how individuals respond to taxes and transfers (Mirrles, 1971).

2.1.3 Principles/canons of Taxation

Principles of taxation describe the proper criteria to be used in formulating and evaluating a good tax system of a country. Tax authority should follow certain code of conduct in the form of principles of taxation when determining the type and amount of tax. Adam Smith first pointed out the principle of taxation and most other economists also believe that a good tax system should be based on the following principles of taxation (Misrak, 2008:23).

1. Principle of Equity/Fairness: This principle describes that, equally placed tax payers should be taxed similarly. Equity in taxation states the idea that taxes should be fair as one of the principles that guide tax policy. This principle has two forms, those are; horizontal equity and vertical equity. Horizontal equity shows that tax payers with equal ability must pay the same amount of tax. On the other hand, vertical equity states that tax payers with higher capacity should pay more amount of tax. Vertical Equity answer the questions of how people at dissimilar income levels should be taxed, given that their relative abilities to pay. In the case of vertical equity it is estimated that large income earners pay a higher percentage of their income as tax than lesser income earners.

2. Principle of Certainty: This principle in tells that taxes should not be illogical and based on relationship rather it should be based on legal bases. Adam Smith describe that “the tax which each individual is bound to pay ought to be certain, and not arbitrary”. An expected tax system is from other reasons which are crucial to plan economic and business activities. Business entities choose to plan costs well ahead in advance and tax liabilities are among those costs. By the way, an expected tax system makes business planning easy. Therefore an expected tax system is a significant element to create attractive investment in an economy. While a tax system varies overtime because of changes in the local economy, these changes in the tax system should be timely and inclusive. As a result, taxes not to be random and not to be based on relationship. A tax law should specify,

- ✓ The way that the amount of tax is determined,
- ✓ The method that tax is to be paid, and
- ✓ The period which the tax is to be paid.

3. **Principle of Simplicity:** which states that as difficult tax system may result in error, tax evasion¹ and disrespect for tax law, so tax laws should be uncomplicated and clear to know by the tax payers and they should not be confronted with accounting, managing or other difficulties. The tax evaluation and determination should be simple to understand by an average taxpayer. Normally taxpayers find it easy to comply when a tax system is easy to deal with. When taxpayer's for example find it easy and suitable to make a tax payment, the probability to obey the rules is high. The principle of simplicity is one of principles of taxation and it advocates that tax system should be clear and simple to understand by the common taxpayers. It should not be difficult to understand how to compute and ultimately determine.

4. **Principle of Convenience:** this is also called convenient for payment principle, the principle describes that the taxes should be due at a time and in a manner which is most likely convenient for tax payers. For instance, the government of Ethiopia collects employment income tax from employees as a source, and the time they taxed is when they receive salaries from their employers. Likewise, the best time for the collection of land tax should be the time for the collection of land tax should be at the time of harvest.

5. **Principle of Efficiency/economy of collection:** This principle tells that a tax is efficient if it distorts market processes as little as possible since economic agents attempt to limit, avoid and evade tax liability as much as possible. This principle states that the costs incurred to collect taxes should be kept at the smallest amount as much as possible for both the government and tax payers. Governments incur administrative costs whereas; tax payers also incur cost of taxation to comply with the tax system. Therefore, efficiency theory entails that government administrative costs and tax payers cost of taxation should be minimum as small as possible.

6. **Neutrality principle:** This principle states that a tax system must be free from bias. One of the key purposes of taxation is to increase revenue; as a result, taxation should seek to be neutral and equitable between forms of business activities. A neutral tax will contribute to efficiency by ensuring that optimal allocation of the means of production is achieved. A distortion, and the corresponding deadweight loss, will occur when changes in price cause different changes in supply and demand than would occur in the absence of tax. In this case, neutrality also requires that the tax system raises revenue while minimizing discrimination against any particular economic choice. So a tax system should be free from bias for,

¹ Tax evasion is violation of tax laws.

- The decisions of tax payers to undertake transactions should not significantly be affected by the tax system;
- The tax system should not create distortion on economy.
- The government should not collect too much tax just to finance its operations or should not collect too little tax just to favor tax payers.

7. Principle of Economic growth/Buoyancy: This principle describes the fact that a tax system should not hinder or reduce the productive ability of an economy by overtaxing. For example, a tax system should not much affect international competitiveness, investment, and production like labor supply. On the other hand, a tax system should be in line with the economic growth policy of a country and should have an inherent tendency against the economy goals and policies of the government. Economic growth principle highly reflects the theory of neutrality. Tax buoyancy measures the total response of tax revenues to changes in national income or gross domestic product and also policy changes by tax authorities. Tax buoyancy is usually measured by regressing the log of tax revenue on the log of GDP, sometimes with additional variables to control for other factors influencing revenue performance. A tax is said to be buoyant if the tax revenue increases more than proportionately in response to a rise in output (Belinga et. al, 2014).

8. Principle of Transparency and Visibility: This principle entails that tax payers should be familiar about the question why tax exists, and how tax is imposed on them. When tax payers are aware of a tax and the change in their liabilities that result from specific transaction or events, they can compute the true cost of the transaction and identify who ultimately pays the tax. Also, it is the responsibility of the government to let execute its important services, and one means to acquire those funds is through the collection of tax revenue.

9. Principle of Appropriate government revenue: This implies that taxes should be predictable by government, which means; a tax system should make possible a government to determine how much tax revenues will likely be collected and when so as to undertake its budgeting and appropriation process exactly.

10. Principle of Minimum Tax gap/non-compliance: This refers to the difference between actual tax revenues collected and estimated tax revenue based on prevailing characteristics of an economy and income level. The tax gap is the difference between tax collected and the tax that should be collected. This aggregate gap is the sum of individual tax gaps, or components of the aggregate tax gap (Mascagni, et al, 2014). The reasons for tax gap are policy choices by

government to administrative problems such as tax avoidance and weak administrative systems and capacities. A tax system should be structured to minimize tax gap. Tax gap exists if the actual tax imposed is not the same as the tax voluntarily paid by tax payers. Mathematically, it is expressed as follows:

Tax Gap = Tax actually Imposed - Tax voluntarily paid (Or)

Tax Gap = Tax that should have been paid - Tax already paid.

Tax gap may occur due to, **i)** Intentional errors such as overestimate of expenses, understatement of taxable revenues, omission of taxable transactions, not declaring total taxable revenues, etc. **ii)** Unintentional error such as mathematical mistakes, failure to understand tax rules and regulation, error in tax assessment, etc. In order to avoid or at least minimize tax gap, a tax system should certain, simple, neutral and transparent; clear penalties should be set in the tax laws if tax gap exists.

2.1.4 Objective of Taxation

Government imposes taxes for many reasons. The main reason is the need to raise revenue to support the provision of public goods such as national defense and education. A government sometimes uses taxes to redress market failure such as externalities. For example the government may impose carbon taxes to reduce the harm to public health that is associated with air pollution by private industry. Government may impose sin taxes on goods or activities such as alcohol, tobacco and gambling to avoid discourage private behaviors deemed to be socially offensive or costly. Most governments taxed imported commodities to protect selected domestic industries and in some cases they may tax exports. Government may also use taxes to achieve social goals, such as income equality. In this case government redistribute income by imposing higher taxes on high income households yet giving tax credits or income transfer for low income households.

Tax should be raised depending up on reasonable objective; and among those objectives,

The first one is mobilizing the necessary revenue to finance government expenditure. The ultimate goal of any tax system is to raise revenues to fund government expenditure on public services and investments and there is no other reason to raise tax rates or adoption of new taxes except the need to raise additional government revenue (David et al, 2016).

The second objective is redistribution of income. Taxes redistribute resources through both reducing the wealth and income of the rich by transferring funds directly to the poor through

government expenditure allocation and transferring income resource endowed to resource limited area through taxation (Fantahun, 2013).

The third objective is to encouraging or discouraging of specific activities and production. Whenever there is tax reform, for sure there is positive and negative value attached to it and can encourage or discourage certain activities. For instance, a tax on pollution may correct market failure by imposing extra cost on polluting agents and in addition excise taxes on goods that have bad effects on health, moral and social setting of the community, would discourage the consumption and production of such goods. Tax provisions related to encouraging the production and consumption of basic goods as well as healthier and basic services are treated positively. In this context high tariff on import duty serves to protect domestic infant industries from foreign competition. Furthermore, tax policies are designed to support industrial development, export promotion, rural development and development of back ward regions of a country. Generally an obviously in developing country, where government intervention in providing social goods and service as well as infrastructure is substantial, raising more revenue is critical. Similarly in these countries there is uneven distribution of income and a high percentage of the population affected by severe poverty is a serious problem, thus redistributing income and wealth in these countries is very important in curbing the problem (Fantahu, 2013).

2.1.5 Types of tax

According to Samuelsson (1980) and Ajyel (1983) based on the nominal source of taxation or by the way of collecting taxes, it can be classified as direct and indirect taxes.

A. Direct Taxes: direct tax evaluated and collected directly from the individuals who are intended to bear it. Usually it is collected through an intermediary; and the most popular example is employment income tax. It is possible that you have no contact with tax authorities; it can depend on individual circumstances; it is possible to change the average tax rate. Direct taxes are these taxes that are based on income of individual or groups of individual, corporate bodies and institutions. In Ethiopia, direct tax is progressive, that is, it is graduated accordingly to the level of income. Examples of direct taxes include personal income tax, company's income tax, dividend income tax, capital transfer and tax on income from games of chance.

Personal Income Tax: It is a tax imposed on a person's income. Income includes wages, salaries, interest earned by savings accounts and certain type of bonds; rents; royalties earned on sales of patented or copy righted items, such as inventions and books; and dividends from stock.

Income also includes capital gains, which are profits from the sale of stock, real estate. Even if income tax enjoys a common support because income is considered as a good indicator of an individual's ability to pay, but income taxes are hard to administer because measuring income is often difficult. For example, some people receive part of their income "in-kind" in the form of goods and services rather than in cash. Farmers provide field hands with food, and corporation may give employee's access to company cars and free parking space. If governments tax cash income but not in-kind compensation, then people can avoid taxation by taking a higher proportion of their income as in-kind compensation.

Based on the Ethiopian Negarit Gazeta of proclamation No. 286/1994/20 [286/2002 G.C] Income tax proclamation defines the applicable tax rate for monthly employment earning. The first 150 birr from employment shall be exempt from payment of income tax in all cases. New federal income tax proclamation (proclamation No. 979/2016) was issued by replacing income tax proclamation No. 286/2002. In Ethiopia Employment income include any payments either in cash or in kind received from employment by an individual. Employers have an obligation to withhold the tax from each payment to an employee, and return the amount withheld during each calendar month to the Tax Authority. In applying the procedure, income attributable to the months of *Nehassie* and *Pagume* shall be combined and treated as the income of one month.

Corporate or Company Tax: This is a tax imposed on the profits of companies. The corporate income tax is one of the most controversial types of taxes. Although the law treats corporations as if they have an independent ability to pay a tax, many economists note that only real people—such as the shareholder who own corporations can bear a tax burden. Besides, the corporate income tax leads to double taxation² of corporate income. Thus, corporate income faces a higher tax burden than any other tax types. In Ethiopia context corporate businesses are required to pay 30% flat rate of business income tax. For unincorporated or individual businesses the business income tax ranges from 10% - 35%.

Tax on Income from Rental of Buildings: This is the tax imposed on the income from rental of buildings. If the taxpayer leased furnished quarters, the amounts received attributable to the lease of furniture and equipment would be included in the income and taxed. The tax payable on rented houses would be charged at the following rates:

² Since income is taxed once when it is earned by the corporation, and at the second time when it is paid out to the shareholders in the form of dividends; the corporate income tax causes a double taxation.

Tax on Interest Income on Deposits: Every person getting income from interest on deposits shall pay tax at the rate of 5%. The payers are required to withhold the tax and account to the Tax Authority

Tax on Income from Games of Chance: Every person getting income from lotteries, tombola's, and other similar activities, shall be subject to paid a tax at the rate of 15%, except for winning of less than 100 Birr. The payer shall withhold or collect the tax and return to the Tax Authority.

Agricultural Income Tax: In Ethiopia history according to Proclamation No. 152 of 1978 individual farmers and agricultural producer-cooperatives earning up to Birr 600 per annum are required to pay 10 Birr. The tax rates on every additional income vary from 10% to 89% for income above 600 Birr. In line with the economic policy and structural set up of the Federal Democratic Republic of Ethiopia, the former tax on income from agricultural activities and the land use rent was revised in 1995. Since income tax from this source is allocated to Regional States in consonance with the provisions of the new constitution of 1994, each Regional State is entitled to issue a Proclamation providing for such a tax and rent.

Capital Transfer Tax: this type of taxes is imposed on property and other capital assets. For example when a person dies, his assets are subject to capital tax. In this case, the term “death duty” or estate duty is used before the asset could be transferred to the relatives who will inherit the assets. These taxes are paid either yearly or at particular time.

B. Indirect Taxes: indirect taxes are **not** collected directly from the individuals who are intended to stand for it. It is paid by one person, but collected from another; and it included in the price, but not always visible on a bill. It cannot depend on individual circumstances; and also it can depend on the object you buy. These are taxes that can be shifted either partially or entirely to someone other than individual or firm originally, indirect taxes are levied on consumption of goods or services and each person pays according to the level and the rate of consumption. Very often the payer of such a tax does not know how much tax he/she paid. Example of indirect taxes is custom duties, excise duties, sales tax and value added tax:

Custom Duties/ Tariffs: These are taxes levied on goods that are internationally tradable. In Ethiopia context there is no any tax levied on export items; therefore they are sometime referred to as import duties. Import duties are considered as consumption taxes because they are levied on goods to be consumed. Import duties also have the advantage to protect domestic infant

industries from foreign competition by making imported goods more expensive than their domestic counter parts.

Value Added Tax: This type of tax is imposed based on the value of commodity generally collected at the whole sale stage. The favored form of consumption taxation is a value-added tax (VAT) and it is a tax on consumer expenditure. It is collected on business transactions and imports. A taxable person can be an individual, firm, company, as long as such a person is required to be registered for VAT. In this system, the seller pays the government a percentage of the value added to goods or services at each stage of production. The value added at each stage of production is the difference between the seller's costs for materials and the selling price. In essence, a VAT is just a general sales tax that is collected at multiple stages. At every stage, the producer adds value to the commodity by processing it using machines and labor. However, they can each claim a credit to recover the tax they paid on purchases related to their commercial activities. In the tax history of Ethiopia VAT substitutes the old business tax system of commodity and service taxes including the sales tax and the withholding tax. The VAT rate is 15 % of the value of every taxable transaction by a registered person and all imports of goods and services other than those VAT exempted items in Ethiopia³. There are two types of value added tax; (a) Input Value Added Tax: this refers to as the charges on sales of good and service paid to the federal Inland Revenue Service Department after deduction. (b) Output Value Added Tax: this means the value added tax paid on goods and services by another person. However, there are some goods and services that are zero rated, that is, they are taxed at zero percent. Zero rating is similar in VAT treatment like exempted goods and services. The major difference between the two is that whole input VAT is refused in respect of zero-rated goods, they are not under exempted goods and services. Up to 1995, all exported goods are noted as zero-rated and not as exempted items.

Excise Tax: this is payable on a range of consumer goods, whether produced locally or imported. Example of excise taxes are, a tax imposed on alcohol, tobacco, salt, fuel, television cars, carpets and toys. Its rates vary from 10% percent on receivers, garments and textiles of any type and fabrics to 100 percent on perfumes, vehicles above 1,800 cc and alcoholic drinks and it is payable besides to VAT.

³ In Ethiopia export of goods and services are exempted from VAT, because they are provided in the regulation charged with zero percent.

Turn over Tax: the turnover tax likely payable on goods sold and services rendered by persons not registered for VAT. The rate of Turnover Tax is 2% on goods sold locally and for services rendered locally: 2% on contractors, grain mills, tractors and combine harvesters and 10% on others. In Ethiopia according to the turnover tax proclamation No. 308/2002 the base of computation of the turnover tax is the gross receipts in respect of goods supplied or services rendered. The obligation to collect the turnover tax is for the person who sells goods and services and it is collected from the buyer and finally the amount collected is transferred to the Tax Authority.

2.1.6 Tax and economic growth

Economic growth is defined as the expansion of the supply side of the economy and of potential GDP. The way of financing the tax cuts has much effect on the long-term economic growth. If tax cuts financed by directly cutting the unproductive government spending, it may raise output, but tax cuts financed by decreases in government investment could reduce production. In other words, if they are not financed by spending cuts, tax cuts will lead to an increase in federal borrowing, which in sequence; may reduce long-term economic growth of a country. The historical evidence and simulation analyses suggest that tax cuts that are financed by debt for an extended period of time will have little positive impact on long-term growth and could reduce growth. The decrease in income tax affect the behavior of individuals and businesses, then the overall economy, through both income and substitution effects. The lower tax raises the after-tax return to working, saving, and investing, and this has a positive effect on the size of the economy. The higher after-tax return encourage workers to work more and this in turn increase saving and investment through substitution effects. An additional positive effect of pure tax rate cuts is that if the existing tax rate is higher, they reduce the value of existing tax distortions and induce an efficiency-improving shift in the composition of economic activity away from currently tax-favored sectors, such as health and housing. But pure rate cuts may also provide positive income effects, by reducing the need to work, save, and invest.

The Effects of Taxation

Let us now introduce taxation. Let us say capital income and labor income be taxed at the same rate ψ . This reduces disposable income by $1 - \psi$ and this in turn affects the level of investment. That is,

$$I = s (1 - \psi) Y \dots\dots\dots (2.1)$$

Where Y is income of individual and s is saving rate. Tax income is used by the state to provide some public good. This public good has no direct productive effect. This assumption is made by analytical convenience and should empirically probably not be true. Due to the assumption of fixed supply of labor, taxation of labor income has no distortionary effect.

2.1.7 Models of Economic Growth

Exogenous Growth: this is the growth theory of the 1950s and 1960s, which is demonstrated by Solow (1956) and Swan(1956), and the model was based on a production function that had capital and labor as the inputs into production. The model assumed that there is constant return to scale and diminishing marginal productivity for both inputs. Growth occurred in the model through the accumulation of capital but, without any exogenous changes, there had to be a limit to this process. To observe this, they consider an economy with a fixed population in which each person works a fixed number of hours and capital depreciates fully when used. Any output, Y , produced is divided between consumption, C , and replacement of the capital stock, K , with fixed labor supply L . To model the economy Solow (1956) used the Cobb-Douglas type of technology. As a result the production function is given by,

$$Y = AF(K, L) \dots \dots \dots (2.2)$$

this shows the level of output as capital is increased, and its shape is a consequence of diminishing marginal productivity. In Solow growth model saving becomes a constant fraction of output. For Solow an economy is best described by its technology, its factor endowment and by preferences of households. Households decide how much of total output they want to consume, and the remainder is become saved.

$$S = sY \dots \dots \dots (2.3)$$

Capital is the only repository input for saving, and this is also the level of investment. Since the amount of what we save is that we invest we assume that saving decisions of households imply an aggregate investment of

$$I = sY \dots \dots \dots (2.4)$$

The equilibrium for the economy occurs when net additions to the capital stock are zero and investment matches depreciation.

Endogenous Growth: models that allow both sustained growth and determine its level are said to be endogenous growth. In order to achieve this, the model requires circumventing the decreasing marginal product of capital in a way that is determined by choices made by the agents in the

economy. The development of endogenous growth theory investigates about how taxation affects growth. These new models explicitly model the processes in which growth is generated and, can outline the effects of taxation upon the individual decision-making.

There have emerged in the literature four basic methods by which this can be achieved. All of these approaches achieve the same end that of sustained growth but by different routes. The simplest method, called the ‘AK model’, and it is assume that capital is the only input into production and that there are constant returns to scale. Under these assumptions, the production function is given by;

$$Y=AK..... (2.5)$$

Hence the model’s name also derived from its equation. Output will then grow at the same rate as net investment in capital. Whilst simple, this model is limited due to the fact that it overlooks the obviously important role of labor. The second approach is to match increases in capital with equal growth in other inputs. One interpretation of this idea is that; consider human capital as the second input rather than just raw labor. Alternatively, output can be assumed to depend upon labor use and a range of other inputs. Technological progress then takes the form of the introduction of new inputs into the production function without any of the old inputs being dropped (Romer, 1987 and 1990). This allows production to increase since the expansion of the input range prevents the level of use of any one of the inputs becoming too large relative to the labor input. An alternative view of technological progress is that it takes the form of an increase in the quality of inputs (Aghion and Howitt, 1992). Expenditure on research and development results in better-quality inputs which are more productive. The last approach to ensure sustained growth is to assume that there are externalities among firms. The mechanism through which this externality operates is learning by doing (Arrow, 1962; Romer, 1986): investment by a firm leads to parallel improvements in the productivity of labor as new knowledge and techniques are acquired.

2.1.8 Tax reform and developing countries

Tax reform is the system of changing the presented tax system to a new level of tax system in order that the tax system can meet the main objective of financing government expenditure. The main objective of tax reforms is similar between different countries, principally among developing countries. Many studies show that in developing countries tax systems are used to serve to meet several objectives which include mobilization of resources to finance government

expenditure; promoting saving and investment; encouraging the use of labor intensive techniques mostly the small and medium scale enterprises, whereby bringing about greater equity in distribution of income (Islam, 2001; Roa, 2000). Reforms in the tax administration have been considered as one of the most important and a major ingredient to economic development of a nation (Sohota, 1961). The immediate reason for reforms in the tax administration in many developing countries has been the need to enhance revenue (Rao,2000). Reforms measures in the tax administration are mainly undertaken in order to, among others, restore buoyancy to revenues (World Bank, 1990). Increasing revenue is a major consideration in reforms in the tax administration (Morrissey, 2013b). Generally, reforms in the tax administration in developing countries entail broad issues of economic policy with particular problems of tax structure design and administration (Musgrave, 1987).

The mobilization of domestic resource depends on the level of political commitment (Bhattacharya and Akbar, 2013), showing how important is political will to implement the needed reforms for higher revenues. It may also depend on the change in macroeconomic policies, as a rapid change may induce a much more difficult situation for tax reforms to have important and identifiable revenue effects (Tanzi, 1988). Some authors have indicated theoretically that reforms in the tax administration may indeed affect tax revenue performance. For instance, reforms related to changes in tax legislation, tax administration and minimal tax evasion are among the main factors contributing to an improved revenue performance (Morrisset and Izquierdo, 1993). Increasing tax-to-GDP ratio requires growth in the tax base combined with reforms to improve tax administration (Morrissey, 2013a). Weak tax administration tends to be associated with low tax revenue collection (IMF, 2011; Morrissey, 2013a; Bhattacharya and Akbar, 2013), suggesting that reforms to strengthen the tax administration contribute to raise revenues.

2.1.9 Relationship between Tax Reform and Economic Performance

The problem of fiscal imbalance is exist everywhere in the world in general and developing country are predominantly disposed to such problem as a result of inability to generate sufficient revenue for government expenditure due to extensive administrative problems and constraints connected with tax systems, such as widespread tax evasion and enforcement problems (Tanzi & Zee, 2000). In developing countries the establishment of effective and efficient tax system basically faces difficulties and one of the difficulties is the structure of their economy which is

characterized by a large share of traditional agriculture both in terms of total output generation and employment opportunity creation, large informal sector activities and occupations and difficulty is lack of good tax administrations. Therefore, many developing countries end up with too many small tax sources, too heavy reliance on foreign trade taxes, and a relatively insufficient use of personal income taxes (Endeg and Wondaferahu, 2016).

2.1.10 Tax reform and income inequality

Many studies have been analyzed how economic growth offers the optimal impact for poverty reduction or income distribution. In the 1990s and 2000s, the analyses of developing countries highlighted the significance of a high level of economic growth in hurrying poverty reduction (Bourguignon, 2003; Dollar and Kraay, 2002; EssamaN., 2005; Kraay, 2006; Ravallion and Chen, 1996; Son, 2004; Son and Kakwani, 2008; Timmer, 2007). Levels of inequality are also a factor which is must take in to consider. It has been found that economic growth is less efficient in reducing poverty in countries with high levels of inequality (Persson and Tabellini, 1994; Ravallion, 1997, 2001). The term 'pro-poor growth' became popular due to the argument that poverty reduction needs both rapid economic growth and an equal distribution of income. (Auerbach, 1996; Eicher et al., 2003) analyzed the issues of tax policy, economic growth, and income distribution and they concluded that the relationships are complex.

2.1.11 History of Taxation across the World

The history of tax was related to the existence of state throughout the world. Taxation is the major important source of income for modern governments, on average it accounts about 70-90% or more of their income whereas the rest of government revenue comes through borrowing from both domestic and external sources. Countries may be different in their economy considerably due to the amount of taxes they collect. As IMF reports of 2005 indicate, in the United States, about 30% of the GDP is spending on tax payment. In France this figure is 45% and in Sweden the tax to GDP ratio accounts 51%. In developed countries, individual's pay income taxes when they earn money, consumption taxes when they spend it and property taxes when they own a home or land. Taxes on people incomes pay vital role in the revenue system of all developed countries. In the United States, personal income taxation is the single largest sources of revenue for the government. In 2006 it accounted for nearly 50% of all Federal Revenue. From the previous non-oil revenue especially tax has been core for most developed countries in contrast to

developing countries that still depend on primary products. Also, indirect taxes appear to be in vogue in developed countries due to higher return, lower administration cost and higher compliance rate; however, most developing countries still rely on direct taxes with low compliance rate. Tax on personal income in Australia started in 1915 and other states followed. Between 1915 and 1941, income tax was levied by both state and Federal Government. Control of personal tax shifted to the common wealth during the Second World War and stayed there by agreement of the state which take their shares by way of grants. PAYE was introduced in Australia in 1942, in the US in 1943 and in the UK in 1944.

2.1.12 History of Taxation in Africa

Taxation in Africa was an early action that started long before colonialism. Ancient Kings and Chiefs in the continent would demand to collect some portion of farmer's crop and livestock as a form of tax. Historical records show that many once power empires or kingdoms that existed in Africa had a tax which is whether in the form of cash or in kind that supported these kingdoms to expand. The Zulu empire in southern Africa lead by powerful kings such as Shaka Zulu and Axumite kingdom in Ethiopia is a classic example. Zulu chiefs demanded steadily increasing tribute or taxes from their subjects in order to operate a mighty army that subjugated neighboring chiefdoms confiscating livestock and other valuable products. Taxation is therefore needed to underpin the contemporary African version of humanity as one of the fundamental responsibilities of every citizen (TJNA, 2011). Related with the coming of colonialism, the colonial masters had to launch a number of tax laws so as to raise income to control the colonial territories. In Northern Rhodesia now called Zambia, the British South African Company seemingly a representative of Queen Victoria introduced a hut tax in 1900 and 1904. This tax was payable in cash, labor and grain which is benefited the colonial authorities in different ways; it became a source of money and enlarge the cash economy, which in turn aiding further economic development. Normally, taxation is not a latest thing in many societies of the world.

2.1.13 Tax revenue in Ethiopia context

According to the constitution of Ethiopia, regional states have a power to impose income tax on employees of the state government, agricultural tax from farmers, tax on individual traders, houses and other property owned by private persons or regional government, sales tax from public enterprises owned by the state government, and from forest products. This regional

system of taxation creates important inequalities of resources between regions. Vertical imbalances are generated by the limited tax bases in the country. Moreover, there is inequality between federal and regional state, and between the regional states themselves, in the share taxes. For instance the Addis Ababa city administration, estimated to generate a quarter of national GDP. In Ethiopia, the personal income tax rate is a tax collected from individuals and is imposed on different sources of income which includes income from labor, pensions, interest and dividends. Revenues from the personal income tax rate are an essential basis of income for the government of Ethiopia. Ethiopian government disclosed the draft income tax proclamation that has been the subject of speculation for long. The 2002 Income Tax Proclamation governs income tax from employment, from rental of buildings and from business. The law applies a progressive tax rate, except for corporate tax, which is flat 30%. In July 2016 the government of Ethiopia makes some reform on the income tax brackets and the thresholds.

Driving Factors of Tax reform in Ethiopia

The question of tax reform in most of the developing nations has grown due to the fact that the recent fiscal crises. Bird (1993), concluded that the fiscal crises have been verified to be the mother of tax reforms in most of the developing countries. Since developing countries are faced with declining external assistance in general and Africa in particular, it is advisable to undertake tax reform to mobilize tax revenues. As highlighted by African Economic Report (2012), tax reform issues have grown in importance in Africa as recent external capital inflows and trade financing have generally declined after the global financial and economic crisis.

Even if the role of foreign assistance is significant in public finance of developing countries, there is no doubt that domestic resources in financing government expenditure have a lion share in the historical development of a country. Developing countries in general and African countries in particular dawdle in domestic revenues mobilization from their taxes and are forced to look for external resources that are tied to a number of conditionality. It is generally agreed that African economies need to sustain high economic growth to reduce acute poverty from which most of the citizens have been suffering. Poverty reduction requires sustainable economic growth per annum for a considerably long period (UNCTAD, 2005). The high rate of sustainable economic growth in turn needs large investments on physical infrastructures and other social goods and services. Whereas domestic resource capacities of tax revenues are low to finance the capital accumulation effort, these countries are forced to depend on foreign sources to finance

economic growth. But economic literature bears evidence to the fact that the dependency of developing countries on foreign sources has not led to economic growth over a long period of time. Therefore, tax reforms in developing countries is important to raise adequate tax revenue and considered as a fiscal instrument to reduce dependency on foreign sources and to achieving sustainable economic growth over the long run. As most of the developing countries in sub Saharan Africa, Ethiopia is among the highly dependent on foreign assistance for poverty reduction and economic development. Ethiopia is the most foreign resource dependent nation for financing government expenditure in general, and capital expenditure in particular than other developing nations (Geda, 2005). In contrast, foreign funds are mostly tied with a number of conditionality that might not align with the country's economic and social priorities, which resulted in unsuccessful implementation of national plans due to financial constraints. In Ethiopia the major reform on tax system have been taking place for the last two decades. There were internal and external driving factors for the recent Ethiopian tax reforms. The major internal driving factors for the tax is changes of the economic policy from centrally planned economy to market oriented economic system. This necessitated the country to undertake a series of systematic changes in the tax system to raise tax revenues so as to finance public expenditures. As pointed out by Demerew (2004), the current account deficit necessitated an economic reform program of which tax reform is the main focus of the government public finance; whereas the external driving factors were the requirement of International Financial Institutions (IFIs) to meet the standard of loan and aid.

Recent Major Tax Reforms in Ethiopia

Following the overthrow of the socialist regime in 1991, there have been broad reforms undertaken by the government including tax reforms. Most important tax reform in the regime includes decrease of the marginal tax rate and import duties. Significant reforms were made in the tax policy in 2002 and the VAT was introduced and replaced sales tax since 2003. For instance, the marginal income tax rate was decreased to 35% and business profit tax to 30%. In 2016 the government also renewed the income tax brackets and tax exempted thresholds. In terms of institutional reforms the governments of Ethiopia tried to combine the three institutions⁴ and established the Ethiopian Revenue and Customs Authority (ERCA) in 2006. ERCA which

⁴ Before the establishment of ERCA in 2006, government of Ethiopia collects tax through the three institutions namely the Ministry of Revenue, Inland Revenue Authority and the Ethiopian Customs Authority.

has an authorized authority for revenue collection and tax administration in Ethiopia has formulated a multi-sector change and tax modernization framework. The Authority has adopted strategic directions and has been actively engaged and committed for its implementation. Registration of tax payers and issuance of Tax Identification numbers (TIN), broadening the VAT tax base, personal income tax reforms, improvement in tax administration and trade facilitation were some of the measures taken by ERCA. As a result, government has made strong efforts to improve its domestic resource mobilization over the past decade mainly by transforming its tax regime. These efforts have started to pay off as revenue from taxation has reached 83 percent of total domestic resources in 2015. It is also well understood by the government that there is a greater need to maximize domestic resources to finance a number of development projects outlined in the medium term plan at the forefront of declining Official Development Assistance (ODA). The government further envisages for revenue from taxation to increase to 17 % of GDP by the end of the second Growth and Transformation Plan, 2020 from the current level of 13.4 percent.

2.2 Empirical Literature Review

The empirical approach chosen follows a large tress on the established literature on the area of taxation and economic variables. In this study most of the literatures are done by using a computable general equilibrium model and in some extent there were a literature done by using cross-country panels of macroeconomic data and a time series econometrics in order to show the empirical relationship between tax rates and economic growth.

2.2.1 Effects of Tax Reform on Macroeconomic Performance

According to Odd and Lise (2003), an effective tax policy is one that raises enough to fund the desired level of public spending, while causing the fewest harmful distortions to the economy, and distributing the burden of funding that spending across society in the way that is thought reasonable. That is, a good tax system is both economically and administratively efficient and equitable. All countries face challenges in designing and operating such an effective system of taxation but, these challenges are particularly acute in low and middle income countries, where the pressing need to raise revenue for increased investment in public services to enhance business environments, such as mobilization of resource for investment, increasing employment opportunities, price stability, and minimization of the inequalities of income and wealth for rapid

and sustainable economic growth whereas, in developed country fiscal policy is mainly used to maintain full employment and stabilize economic infrastructure (David et al., 2016, WB, 1990). Many empirical literatures also support this argument. For example, Willi et al (1997), showed that the effects of taxation on economic performance in OECD countries. The result expose that, in open OECD economies, taxes may have affected economic performance via their effects on capital and labor markets, and on human capital formation.

Sigtas and Igor (2008), conducted analysis on the economic impact of the 2006–2008 personal income tax (PIT) reform in Lithuania economy by applying CGE model-based simulations. The result that they get is proved that personal income tax reform is unsustainable as it leads to permanent government budget deficits and ever increasing public debt. Gerali and Pisano, (2015) assess the macroeconomic effects of simultaneously implementing fiscal consolidation and competition-friendly reforms in a country of the euro zone and simulating by using a large-scale dynamic general equilibrium model. They concluded that the joint implementation of reforms had additional expansionary effects on long-run economic growth. Cecelia et al (2016), assessing the impacts of a major tax reform in Uruguay by using CGE analysis and assessed the joint effects of tax changes on macroeconomic and labor outcomes. They find substantial general equilibrium effects of the full implementation of the reform that tend to reinforce the reduction of poverty indicators, exclusively due to the modifications of the direct personal income tax without considering behavioral responses. Overall, they estimate a one-point reduction of the gini coefficient due to the reform. Duarte (2001), make an analysis on the performance of Brazilian tax reform, under a fiscal adjustment restriction and fiscal federalist restriction. He analyzed the short and long run macroeconomic effects of this reform subject to the fiscal adjustment restriction and the redistributive effects of this reform among generations as a way to infer about public opinion's reaction to the reform. The reform consists of replacing indirect taxes on corporate revenues. The reform presented positive macroeconomic effects both in the short and long-run. Despite a large increase in the average VAT rate in the first years after the reform, a majority of cohorts experienced an increase in their lifetime Welfare, being potentially in favor of the reform.

Amir *et al.* (2013) studied the effects of the latest tax reforms on the key macroeconomic variables and distribution of assets and incomes in Indonesia. They found that, under the assumption of the balanced budget, reductions in the income tax of individuals and that of

companies might affect economic growth, slight decrease in the tax incidence of the assets, and increase income inequality. Blessing and Ronald (2015) analyze and compute the economy-wide impact and distributional effects of Namibia's income tax policy reforms introduced in 2013 by using computable general equilibrium (CGE) model. The simulation result showed that reductions in personal and corporate taxes are different between institutions and markets. For households, a reduction in the effective tax rate directly resulted in higher disposable incomes, especially for urban households that participate in the labor market. Rural households were get lower benefits, mainly due to their dependence on subsistence farming and mixed incomes. Households also benefited from a reduction in the consumer price index, and this improves their consumption patterns. Additionally, households experienced increasing returns to labor, however their employment in primary and service sector became decrease. Given Namibia's high unemployment rates, especially unskilled labor, the tax cut enhanced inequality between skilled and unskilled labor. The tax reforms also resulted in exchange rate depreciation, thus increasing export competitiveness. The sectoral analysis shows that the manufacturing sector tended to benefit more from the reforms than other sectors. Output from manufacturing activities increased, together with manufacturing exports. Takele (2017) analyze the economy wide impact of tax reform on Ethiopian economy using dynamic CGE model. In order to investigate the impact of tax reform on Ethiopian economy he conducted different simulations. The result show that, encouraging direct tax reform and consumption tax reform, protecting the home country from external sector influence to encourage domestic production are the major policy option recommended to bring a good economic performance with lower distortion since we cannot abolish distortion when we conduct tax reform.

2.2.2 The Impact of Tax Reform on Factor market

Adjustment on the rates and structures of both direct taxes and indirect tax can influence individual's labor supply decisions. Tax policy reforms affect the amount of factor- utilization in the economy through labor and capital by the amount of gain from the factor supplied. If the amount of tax paid outweighed the amount of benefit from the factor, then factor supply reduced. So tax policies produce important effects in the labor market and, consequently, in the whole economy through changing the labor supply by changing opportunity-cost of working and choosing the employment sector. General equilibrium effects on wages is produced through labor choices, both at the individual level and at the macro level, depend on the yearly net wage

(Laura et al 2010). Birk and Michaelis (2004) investigate how tax reform affects employment and economic growth by using the endogenous growth model and explore frictions on the labor market. They evaluate how savings and incentive to create new jobs are affected by tax substitutions between wage income taxes, payroll taxes and capital income taxes. The result they found indicates that the payroll tax is neutral and if it is used to finance a cut in the capital income tax; however, the result imply a trade-off between employment and growth.

Yoonseok and Sunghyun (2013), study the dynamic revenue effects of a permanent tax reduction on labor and capital income by using a dynamic general equilibrium model to calculate long-run as well as transitional effects on fiscal revenue when a tax reduction is financed by either a lump-sum tax or consumption tax. The simulation results prove that the revenue loss from an income tax reduction becomes significantly smaller when agents can use international financial markets compared to the case of the closed economy.

2.2.3 Relation between tax reform and welfare of households

The distribution of income is very important concept, keep in mind that the equity of the cost of taxation can be meaningfully assessed in conjunction with the spending that taxes finance and tax systems have often been an important redistributive instrument. Analysts have questioned how much redistribution in fact resulted from such tax policies (Willi, et al 1997). Rudolf M. (2014) concluded that tax is the most significant part of state income and it is the basic tool for economic policy implementation. The current globalized society needs the existence of redistribution processes due to the fulfillment of basic state's functions. Julia (2008) conducted a CGE model from the German Socio-Economic Panel and considers tax benefit reform anticipated by Dieter Althaus. The simulation result shows that the introduction yields a very high budgetary deficit. Also they simulate the effects in general equilibrium using the linked Micro simulation CGE Model and imposing a balanced budget rule. The simulation results show that there is almost equal income distribution; however it has negative effects on labor supply and on macro level. Amir et al (2015), conducted research on modeling of growth and welfare effects of tax reform in Iran using CGE analysis and the result show that a reduction in capital income tax and the wage tax leads to the enhancement of the economic growth and welfare of Iranian households.

2.2.4 The Impact of Tax Reform on the Economic Growth

According to (Solow, 1956), Economic growth is the source of increased prosperity. Growth comes from the accumulation of capital⁵ and from innovations which lead to technical progress. The accumulation of capital and innovation in return raise the productivity of and increase the potential level of output. The rate of growth can be affected by policy; among them the effect taxation has significant effect on economic decisions. Many empirical studies had been conducted on how tax and economic growth respond to each other. For instance, Yakita (2001) showed that the flat-rate wage tax elevates the growth rate and the flat-rate income tax does not stimulate economic growth. Kneller et al. (1999) find that some personal income taxes reduce growth, while for example taxation of consumption does not seem to affect growth. Widmalm (2001) also estimates the effects of various forms of taxation on GDP in the OECD. She finds a negative relationship between personal income taxation and economic growth. However, taxation of consumption has the least negative impact on economic growth. Arnold (2008) also found the existence of negative impact of personal and corporate income taxes on economic growth and he concludes that taxes on immovable property and consumption are the ones with the least negative impact on growth. Lee and Gordon, (2005) concluded that a cut in corporate tax rate by 10% will raise economic growth from 1% to 2%, whereas the personal tax rates have no clear evidence. Angelopoulos *et al.*, (2007) recognized that some kinds of taxes such as labor income tax are negatively related to growth, temporarily capital income and corporate income taxes are positively related to growth. Muhammad M. (2013), analyzed the long and short-run relationships between tax rate and economic growth of Pakistan. He examined the dynamic effect of tax rate, capital stock, exports, and health expenditures on real GDP per capita by using Johansen's co-integration approach. The results showed a negative effect of tax rate on real per capita GDP, thus adverse impacts on the overall economic growth. Dasalegn J. (2014) investigated empirical evidence on contributions of tax revenue for economic growth of Ethiopia using time series data from 1993 to 2012 and he used both descriptive statistical tools and simple regression methods. His finding indicates that the ratio of total tax revenue (TTR) to GDP was 8.1% on average. In addition, TTR on average contributes for the compositions of GDP by 5.16%, and contributions of non tax revenue (NTR) averaged 4.11%. Likewise, the average growth rate of TTR was 16%, while GDP growth rates become 8.97% on average.

⁵ Accumulation of capital includes both human and physical capital.

Conceptual Framework

The conceptual framework tried to assess and show how the change in the direct tax affects the overall economy. In this regard the researcher tries to link all the direct and indirect linkages of the impact of direct tax policy reform. On the one hand since direct tax is one component of the government revenue it affects the government balance, and finally output level; on the other hand direct tax determines the income of the household and in turn it determines the level of household saving and consumption expenditure. Therefore some adjustment in the direct tax has forward and back ward effect on the overall economy level. The details of the conceptual framework are presented in chapter four of this paper.

CHAPTER THREE

ETHIOPIAN 2009/10 SAM AND TAX HISTORY

3.1. Social Accounting Matrix (SAM)

A social accounting matrix is a broad, economy wide data framework; typically representing the economy of a nation. It captures all income and expenditure flows among producers, consumers, the government, and the rest of the world during a particular year. As defined by Round (1981), a Social Accounting Matrix (SAM) is defined as a single entry accounting system whereby each macroeconomic account is represented by a column for outgoing and a row for incomings. The SAM has three main features. First, the accounts are represented as square matrix; where the incomings and out goings for each account are shown as corresponding row and column of the matrix. The transactions are shown in the cells, so that the matrix displays the interconnections between agents in an explicit way. Second, it is comprehensive, in the sense that it portrays all the economic activities. Thirdly, the SAM is flexible, in that, although it is usually set up in a standard basic frame work, there is a large measure of flexibility both in the degree of desegregation and in the emphasis placed on different parts of the economic system.

As it is an accounting framework the SAM is not only square but also the corresponding row and column total must be equal. Any set of macroeconomic aggregates can be set out in a matrix format. But, this would not be a social accounting matrix in the sense in which the term is usually used. An overriding feature of SAM is that households and household groups are at the heart of the framework. SAM typically shows much more detail about the circulars flow of income, including transactions between production activities, and in particular recording the transactions between both these sets of agents via the factors and product market (Round, 1981). Sancho (1995) pointed out that SAM have been used to study (i) growth strategies in developing economics, (ii) income distribution and redistribution, and (iii) fiscal policies and decomposition of activity multipliers that shed lights on the circular flow of income.

Thorbecke (1970), also further argued that SAM could be used to address poverty and income distribution in developing country. SAM can be used for macro-economy planning in two ways: first, a SAM can provide a framework for the organization of information related to economic and social structures of a country's economy. Second, a SAM can serve as a data base for a model of the economy under consideration. Therefore, the most important features of a social

accounting matrix is that it provides a consistent and convenient approach to organizing economic data for a country and it can provide a basis for descriptive analysis and economic modeling in order to answer various economic policy question. SAM is broader than an input-output table and typically national account, showing more detail about all kind of transactions within an economy. However, an input output table records economic transaction alone irrespective of the social background. A SAM, attempts to classify various institutions to their socioeconomic backgrounds instead of their economic or functional activities (Sen, 1996).

3.1.1 The 2009/2010 Ethiopian SAM Key Features and Structures

A SAM is a square table describing quantitatively the transactions taking place in an economy during a specified period of time. Each account in the SAM is represented by a row and column of the table; by convention, each cell of the matrix represents expenditures by the column account and income to the row account. The underlying principle of double-entry accounting requires that total revenue (row total) must equal total expenditure (column total) for each account in the SAM. The SAM integrates national income, input-output, flow-of funds, and foreign trade statistic into a comprehensive and consistent data set.

The 2009/2010 Ethiopian SAM is a 225x225 matrix and contains an account each for 113 production activities and 16 factors of production, 13 institutions including government, 64 commodities, 17 different types of taxes, transaction cost, saving -investment and rest of the world accounts. To apply a CGE model, the 113 activities are aggregated into 3 broad activities groups such as industrial, agricultural and services activities. In addition the 17 tax types also aggregated in to 2 (direct and indirect tax), institutions also aggregated in to five (government, rural poor, rural non-poor, urban poor and urban non-poor). Now let as describe the SAM accounts described in the 2009/10 Ethiopian SAM.

a. Activities: In the activity row, goods and non-factor services are produced for sale in the commodity market. This is a receipt for activities account .In the activity column, activity account pays to intermediate input use and it also pays to factors of production their reward in form of wage rate to labor and profits to capital and land.

b. Commodities account: Commodities are supplied in the column (to the commodity market) by activities in the form of marketed production and from the rest of the world in the form of imports of goods and non-factors services. Domestic agents demand commodities valued in the

row for intermediate consumption, private consumption of marketed commodities, government consumption, and investment (both governmental and non-governmental).

c. Factors account: Factors typically include labor, capital, livestock and land. Total payments to factors from productive activities (in the row) comprise value added at factor cost. Factor income is distributed (in the column) as dividend and wages to households and as capital income net of dividend to enterprises. For the current CGE model, the factors skilled labor, semi-skilled labor unskilled labor, agricultural labor, capital, land and livestock are take in to consideration.

d. Institutions account: SAM used to capture the characteristics of different socio-economic groups of the population. Households differ principally in terms of factor endowments owned and consumption patterns. Total income (in the row) consists of wage, including income from informal enterprises, dividend from formal enterprises, intra-transfers between households and transfers from government and abroad. Income is allocated to (in the column) consumption of commodities, taxes to government, savings and transfers to other institutions. In this SAM, five institutions namely rural poor households, rural non-poor households, urban poor households, urban non-poor households and government are identified. The government levies a variety of taxes to obtain receipts (in the row) and spends it (in the column). The difference between total spending and total revenue represents government savings.

e. Saving- investment account: The capital account is the balance between investment (in the column) and total saving (in the row). They include retaining earnings by enterprises (enterprises saving), government savings, household savings and foreign savings (net capital inflow).

f. Rest of the world account (ROW): Rest of the world account shows the balance between foreign exchange receipts (in the column) and imports of goods, non-factor services from the rest of the world (in the row). Finally, for the SAM used in a CGE model, transaction costs are treated as a separate account. Since, transaction cost is major determinant of investment decision; it has its own account in the SAM. This will be consistent with the sequential dynamic CGE model analysis. Thus, a transaction cost account is included explicitly to accommodate marketing and transportation costs (or marketing margins) associated with commodity flows. Marketing margin represent the cost of moving commodities from the point of their production (for domestic out-put) to the point of consumption. It also represents the cost of moving commodities from the boarder (for imports) to the point of consumption and from production to the boarder (for export).

3.2 The Benchmark Structure of Ethiopian SAM Characterization

A SAM which is a set of accounts written in a condensed matrix form is a representation of an economy for a particular year. It is the main database used to calibrate a CGE model. It provides insight into the sectoral and institutional structure of the economy such as the total value-added called GDP and other macroeconomic variables. GDP can be measured by adding the value added at each stage of production process (value add approach), adding income throughout the economy (income approach), and adding the expenditure from all sectors of the economy (expenditure approach). The Table 3.1 below shows that the GDP at the factor cost and the share of each economic sector for the total GDP. As we observed from the table since, Ethiopia is characterized by an agrarian economy for which agriculture contributes 46.63% of total GDP at factor cost followed by services which account for 43.59%. The least is contributed by industry sector which accounts for only 9.78%.

Table 3. 1 summary of GDP at factor cost by sector at base year (in billion birr)

GDP at Factor Cost		
Sector	Value of GDP	Percentage of share of GDP
Agriculture	165.53	46.63
Industry	34.74	9.78
Service	154.73	43.59
Total GDP at factor cost	355	100

Source: Author's Computation from Ethiopia SAM 2009/10 Developed by EDRI

In the production process different factors of production like labor, land, livestock and capital were used to produce goods and service. Different sector have different characteristics and use different factors depending up on their nature. The Table 3.2 below is disaggregated factors of production used by each sector during the production. Accordingly agriculture is labor intensive by employing 52.44% of total labor engaged in production. Agriculture is the only sectors that used livestock and land in production process, additionally the sector use 11.22% of capital engaging in production. Industry uses only 10% and 16.93% labor and capital in production respectively, which means industry use more capital than labor relative to agricultural sector. Finally service sector employ 37.49% and 71.84% of labor and capital and this indicates that the service sector is most capital intensive technology during 2009/10. The table below is the summary of disaggregated factors of production and its share to their total.

Table 3. 2 Summary of factors of production & their percentage shares (in billions)

Sector				
Factor	Agriculture	Industry	Service	Total
Labor	91.24(52.44%)	17.51(10.06%)	65.24(37.49%)	174.03(49.0%)
Land	39.76(100%)	0	0	39.76(11.2%)
Livestock	30.85(100%)	0	0	30.85(8.7%)
Capital	12.38(11.22%)	18.68(16.93%)	79.25(71.84%)	110.36(31.1%)
Total	174.31(46.63)	36.20(9.78)	144.49(43.59)	355 (100%)

Source: Author's Computation from Ethiopia SAM 2009/10 Developed by EDRI

Now proceed to macroeconomic variables including GDP at market price⁶, household consumption, Government consumption, investment demand, export, import, domestic saving, foreign saving, trade balance, direct tax, indirect tax, and transfer to household and government from the rest of the world. As explained in Table 3.3 GDP at market price account 385, of which 338.4 household consumption, 32.5 government consumption, 87.3 for investment demand and 74.8 trade deficit. Household consumption contributes 87.9% of GDP, government consumption contribute 8.5% of the economy and 23% for investment demand. Investment demand was financed by both domestic and foreign saving (88.6=66+22.6).The economy was experienced a trade deficit because of export less than import and this is also financed by government and household transfer from the rest of the world. The table below summarized the macroeconomic variable adjusted from Social Accounting matrix for Ethiopian economy 2009/10.

Table 3.3 Summary of Macroeconomic variable and percentage Shares to GDP

Macro variables	Value in billion birr	Percentage share of GDP
GDP at market price	385	100
household consumption	338.4	87.9
Government consumption	32.8	8.5
Investment demand	88.6	23
Net export (trade deficit)	-74.8	19.4
Import	126.41	
Export	52.13	
Domestic saving	66	
Foreign saving	22.6	
Direct tax	6	
Indirect tax	30	
transfer from ROW	74.8	

Source: Author's Computation from Ethiopia SAM 2009/10 Developed by EDRI

⁶ According to Bergman; GDP at market price is the sum of GDP at factor cost and indirect tax

Household and government income and expenditure

Since our macro SAM separates households by resident based on their income (poor and non-poor), there is a need to analyse the concept of how different household groups earn and spend their income. In most cases households earn their income from the factors of production.

Table 3. 4 Summary of Household & government income & expenditure (in billion birr)

Institution	Source	Amount	% share from total
Households Income	ROW	19.6	4.97
	Government	0.4	0.1
	Factor	355	94.94
Total		375	
Households expenditure	Tax	30	8.02
	Private Saving	6	1.6
	Consumption	339	90.6
Total		375	
Government Income	Tax	34	50
	ROW	34	50
Total		68	
Government expenditure	Transfers	0.47	0.6
	Current expenditure	32.53	47.9
	Government saving	35	51.5
Total		68	

Source: Author's Computation from Ethiopia SAM 2009/10 Developed by EDRI

Therefore the total household income in our macro SAM comes from factor income, ROW and transfer from the government. When we added all the amount we get 374 and from this income the household's gain 355 as factor income (192 as labor income, 110 as capital income, 40 as land income and 13 as livestock income and which is exactly equal to the GDP at factor cost). Additionally the household earn 0.4 income as transfer from the government and 18.6 as remittance from ROW. The total expenditure of household's accounts for 374, from this spending households spend 338.4 for consumption purpose (of which 153 (45.3%) for agricultural commodity consumption, 97(28.7%) for industrial commodities consumption, and 88 (26%) for service commodities consumption). The household also pay 6 in the form of tax payment and 30 for private saving. On the other hand, the total government income accounts 68, of which 34 from domestic resource mobilization. From this 6 billion (18%) is generated from direct tax and 28 billion (82%) from indirect tax. Government receives the remaining 34 from ROW in the form of grant and aid. The government also spends this income as government expenditure. The total government expenditure account for 68, of which 0.47 household transfer

(pension, subsidies), 32 for current expenditure (of which 21 (65%) for administration, 9 (28.1%) for education and health, and 2(6.2%) for other infrastructural facilities), the remaining 35 as government saving.

3.3 Taxation and tax reform in Ethiopia History

Taxation is the earliest and most common form of government revenue and its existence is related with the economic life of individuals and business enterprises. There is always a controversial on the general policy which determines who is to be taxed, how much the tax shall be, and for what purposes it shall be levied. The remarkable increases in public spending associated with depressions and war periods have raise the question of taxation to the mind of each and every citizen. In addition, the expansion of the government power and the formation of modern greater states have required huge revenue for the administration of states.

The history of formal tax system in Ethiopia is going back to the government formation in the country. In Ethiopia modern state was established at the beginning of 20th century. In the past Ethiopia as a country established modern tax system in order to raise funds to finance social and economic expenditures. Emperor Hailesilasie was the pioneer to approve modern tax system in the country after Second World War II. Before emperor Hailesilassie, during the reign of Minilik II the economic system was by “GebarMadria” system. However in central and southern part of Ethiopia the resources for war were mobilized from the serfs when desired to support a war since the land was under the direct control of the king, (Tsegaye, 2011).In Ethiopia tax and institutional reform can be go back to the early 1940s, where the government made tax reforms that including amendment to property taxes (Geda and Shimelis, 2005). Many studies show that in Ethiopia enormous tax reforms were initiated after WWII (1942-44). These reforms were generally discretionary changes including adjustments to property taxes⁷. In the mid-1950s International taxes⁸ on goods and services were also introduced. Later in the early 1960s, reforms were also made in the rate and structure of taxes, mainly on income. In the post-revolution period (1974-91), there is the growing demand to raise more revenues to support war efforts and so as to finance the continually growing public sector expenditure. To do this, there was an increase in the coverage of tax bases and tax rates owing. Above all during 1976-79, major changes on the

⁷ In this context property taxes include a tax imposed on land and cattle.

⁸ International taxes also refer the tax imposed on the import and export of goods (tax on international trade).

rate and structure of all types of taxes were made. Among the reforms; widening the land tax base, introducing capital and surplus transfers from nationalized firms, as well as certain minor arrangements on other taxes, are the most important (Ministry of Finance, 1997; Geda and Abebe, 2005: 2). In Ethiopia the tax composition and performance across regime show that tax as share of GDP still stagnant; whereas growth in tax revenues is showed an increment during the EPRDF. Now let us look the tax history and its performance for each three regimes.

3.3.1 The Imperial period: 1941-1974

Even though the imperial history of Ethiopia dates back numerous centuries, this section gives more stress on the tax policy during Emperor Haile Selassie. At the time of the Italian invasion during 1935, Haile Selassie, had to leave the country on got to London. After his restoration to Ethiopia in 1941, the empire was tried to re-established, the institutions and laws that would shape fiscal policy for the next three decades.

Taxation in the agricultural sector: during the Imperial period, the agricultural sector was mainly significant, not only for its great contribution to the economy, but also as the basis of power. In Ethiopia the traditional system of land tenure is basically depend on the notions of gult and rist⁹. In this agreement rist possession was considered permanent and it was inheritable (ShiferawBekele, 1995; Brietzke, 1976). Although this explanation of the land tenure system is highly simplified, it provides a basis for understanding the structure underlying the tax system. After the return of the emperor in 1941, the procedure of modernization included the substitution of gebbar obligations with taxes payable in cash was introduced in 1941 Land Tax Proclamation. The revised land tax proclamation of 1944 more worsened the relationship between landlords and peasants. As well, an income tax was introduced in 1943 on personal incomes, rents and business profits, and in order to foster investment it provides a tax exemption. In 1967 there was an attempt to introduce a tax on agricultural income. The final proclamation was a weak and due to great opposition from landlords it was scantily implemented (Shwab, 1970; Brietzke, 1976). There was a popular protest that expressed opposition to the new law, for example the 1968 tax revolt in Gojjam. Despite these problems and oppositions this tax holds fared better than the land tax in terms of revenue generation Eshetu Chole (1984).

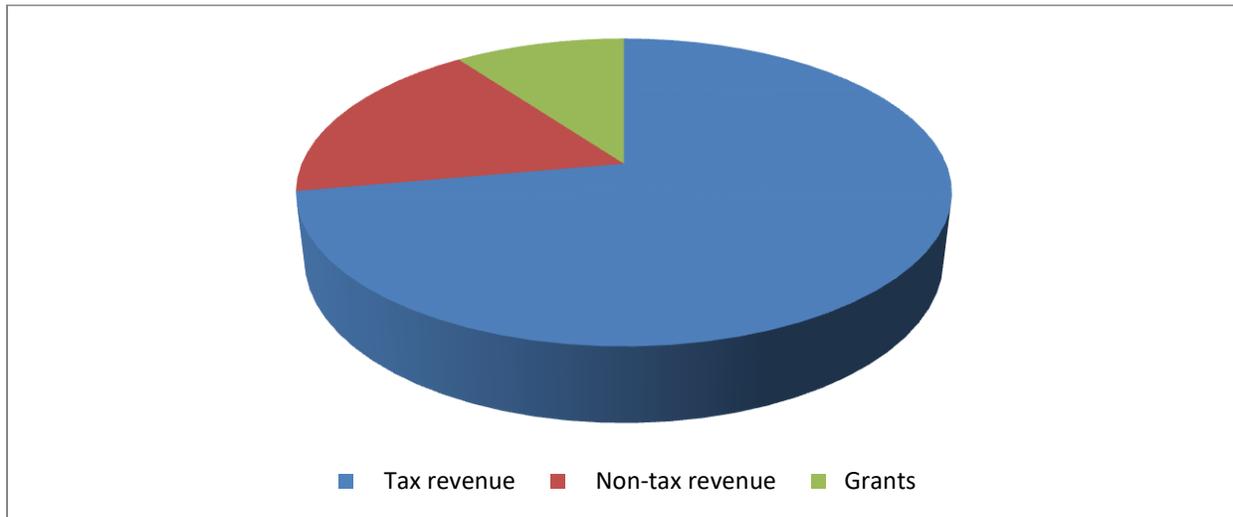
⁹Gult refers to the land that was given to landlords; whereas rist refers to the actual ownership of the land that was given to peasants on the condition that they would fulfill their gebbar obligation.

The Imperial government swiftly accepted and recognized the importance of FDI for industrial development and in 1950 issued the 'Notice for the encouragement of foreign capital investment' (Shiferaw, 1995). In this circumstance, a number of policy inducements were put for foreign investors¹⁰. Because of the low tax revenue acquired from direct taxation, the imperial regime collected more revenue from trade and indirect taxes. Trade taxation was based on the 1943 customs and export duties proclamation and it contribute a higher share to the total revenue during the emperor than other regimes. Import duties were the main source of revenue, contributing 78 % of trade taxes on average between the year 1949 and 1974 (Shiferaw, 1995). But due to the increase in exemptions the revenue-generated from import duties was not fully exploited (Eshetu, 1984). Export taxes were imposed largely on coffee, but because of the volatility of coffee price in the international market the revenue from the export taxes is not stable. Domestic indirect taxation intended to generate revenue and protect the domestic economy by granting lower rates for domestic products. Income also generated from taxes on alcohol, salt, fuel, tobacco and other excises on mass consumption goods¹¹ (Shwab, 1970; Eshetu, 1984). Transaction taxes introduced in 1951 and combined with a turnover tax was the most important source of indirect tax revenue (Shwab, 1970; Eshetu, 1984). At last, a stamp duty was introduced in 1957, but it did not generate much revenue as they are expected. As we look from the pie chart below during the Imperial regime the highest share of government revenue was from tax revenue which accounted to 72% of the total government revenue followed by the non-tax which accounted 18% of total government income. This clearly shows that during the Imperial regime the country also has an attempt to cover the necessary expenditure with a domestic resource mobilization using a tax system.

¹⁰ During the imperial regime foreign investors have an incentive to exemption from business income tax, duty free import and guarantees regarding the possibility of remitting the proportion of profits.

¹¹ Sugar and textile are an example of mass consumption goods and which have a large revenue generating capacity.

Figure 3. 1 Share of government revenue during the Imperial regime (1967-1974)



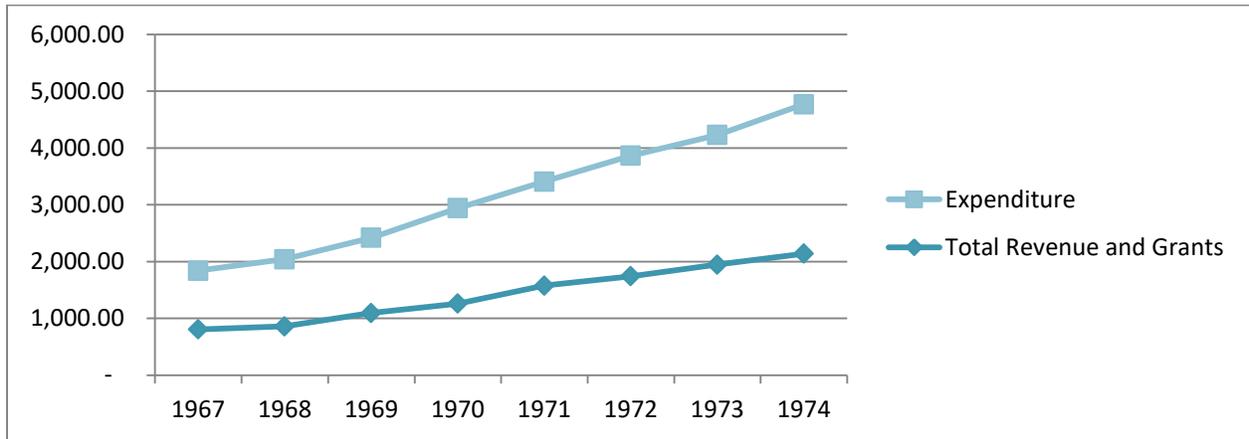
Source: Authors computation using NBE data

Reasons for the increasing demand for tax revenue mobilization

Modernizing the fiscal policy was the main concern for the emperor, as a result a number of laws and reforms implemented in the early 1940s. The system implemented in the 1970s was essentially the same as that in place four years after the return of the emperor from Britain, although there had been changes and innovations in the meantime (Eshetu Chole, 1984). The effort in tax revenue mobilization was mainly driven by; the expansion of the state and increased development expenditure¹² (Shiferaw Bekele, 1995). Development planning became a central issue in the international debate in the 1950s; and in this circumstance Ethiopia, as a founding member of the UN, was well part of it (Shiferaw Bekele, 1995). The graph below indicates about the existence of government budget deficit during the Imperial regime. For the last decade of the regime the expenditure of the country is more than its revenue and the gap became very high at the end of the regime

¹² During the imperial regime the effort in tax revenue mobilization was increased because of the expansion of the state (which entitled a great increase in the military and the civilian bureaucracy which receive salary in cash) and increased development expenditure (pushing the increase of revenue was increased development expenditure)

Figure 3. 2 Total government revenue and expenditure from 1967-1974 (in million birr)



Source: Authors computation from NBE data

Borrowing and external assistance: the raise in expenditure desires also leads to give more attention for borrowing and external assistance as sources of funding budget gap. According to Shiferaw (1995), the government started making more systematic use of domestic borrowing to finance its budget, as deficits are registered in each year after the mid-1960s. However deficits were still much smaller in magnitude than in later regimes.

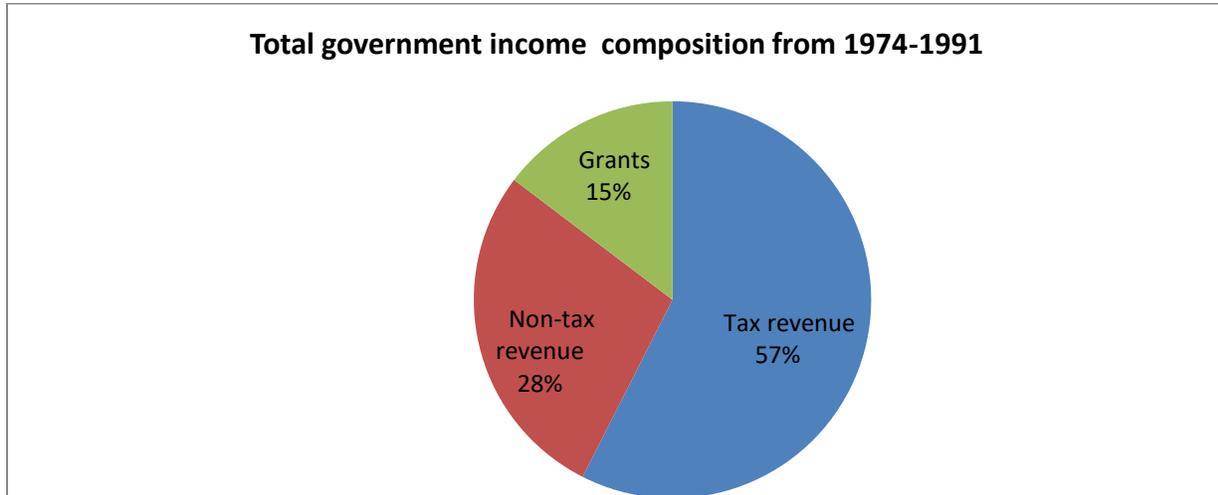
3.3.2 The Derg Regime 1974 - 1991

The Derg regime came to power since 1974, and Mengistu Haile Mariam was the leader for most of the period. Clapham, (1989) and Keller, (1985) divided the period in to three phases, as follows. The first period was the mobilization period (1974-78) started from the collapse of the old regime, and was characterize by the fight of different actors involved in the revolution for power. The regime was at this time mainly concerned with its survival. The second period was the campaign period (1978-1984) which is the emergence of the main traits of the regime. The third was the plan period (1984-1991) which was characterized by the establishment of socialist institutions, as well as the scaling-up of planning efforts.

Fiscal trends: the 1974 revolution sparked demands from both in the urban and in more remote ethnic communities. These political demands were willingly directed to the military government itself as soon as it took power. Indeed Clapham (1988) grasps that the major effect of revolution was not that the state apparatus was weakened, but that it was required to do much more. After its establishment in 1974, the Derg increased both tax revenue and expenditure. At the initial non-tax revenues also increased considerably, due to the lack of property ownership in the first

years of the regime. As we observed from the figure 3.5 during the Derg regime government revenue from tax decreased relatively the Imperial regime, whereas the share of non-tax revenue and grant for the total government revenue became increased. During the socialist regime domestic resource mobilization covers 85% of the total budget of which 57% is collected from the direct tax. The remaining 15% is comes from the abroad in terms of grant and remittance.

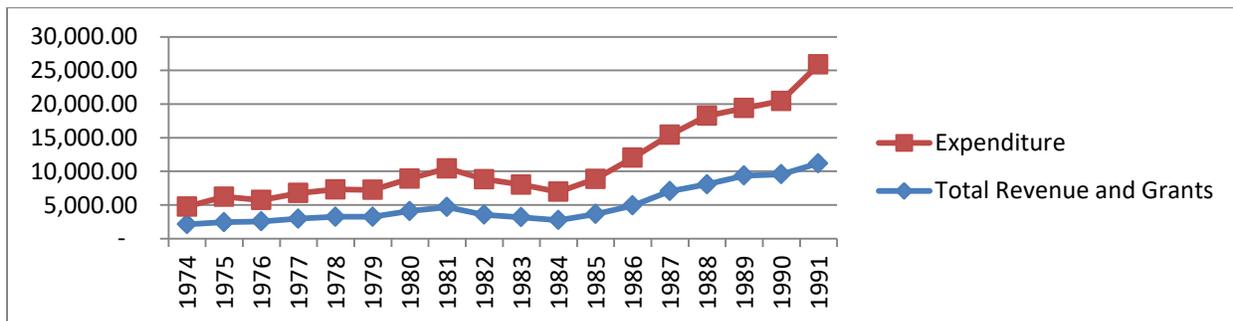
Figure 3. 3 Total Government Income Share during the Socialist Period



Source: Authors computation from NBE data

In spite of the increase in revenues, the government was still facing a resource gap which resulting in increasing levels of debt (Eshetu 2004). As he pointed out fiscal variables mainly tax, non tax revenue and expenditure reached to climax in 1988/89 then decrease steadily until the end of the regime in 1991. The graph below clearly showed the existence of budget deficit during the Derg regime. At the beginning of 1980's there were a decline in both expenditure and revenue, and this may be due to the reason that the period was a campaign period; the central government did not give much attention for the fiscal policy.

Figure 3. 4 Government total revenue and Expenditure comparison (in million birr)



Source: Authors computation from NBE data

Taxation: The distinctive feature of the Derg regime on the issue of taxation exceptionally there was high marginal tax rates imposed on income in all sectors. According to Griffin, (1992) the top brackets for agricultural income tax had accounted 89% rate for incomes above 36,000 ETB per year. Similar rates were also applied to personal incomes and business profits. Moreover the large state sector, was a source of both tax and non-tax revenue. Finally, during the Derg regime most taxes were collected from urban centre's that largely remained under the control government (Young, 1997; Clapham, 1988). Two main tax types were levied on the agricultural sector: the agricultural income tax and the land use tax. In the early years of the regime the role of agricultural taxation to the state revenue was more than doubled (Markakis, 1989).

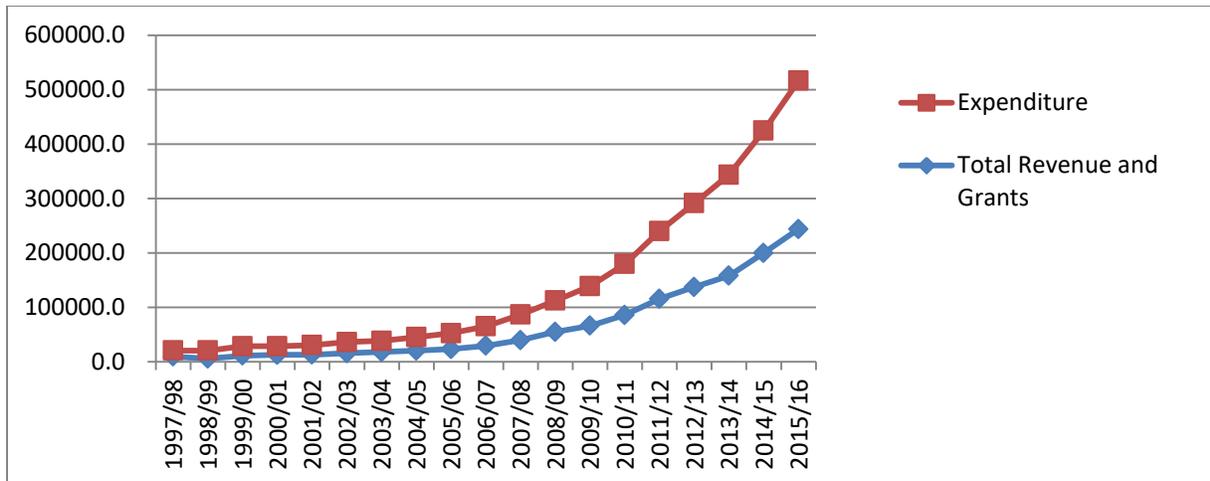
3.2.3 The EPRDF: 1991- 2010

Throughout the Derg regime, liberation movements were active in the country and during 1991 the socialist regime was overthrown and replaced by EPRDF.

Tax revenue mobilization and budget deficit: the new government in 1991 was able control the administrative apparatus quickly relative to the Derg. However the fiscal condition inherited from the Derg and it was characterized by instability. At the beginning not only low and a decreasing in revenue, but also debt payments kept accumulating. The top government official suggested that, at the beginning of the EPRDF period, debt payment was a central concern of the new government, more pressing than increasing revenue. Really the government does well both in deficit reduction and in revenue mobilization, for instance in 1992 which is increased by 36%. These large developments in fiscal policy were partially due to the very low level of tax collection under the fiscal collapse of the Derg. Additionally the collapse of the Derg's huge military apparatus decreased expenditure significantly and therefore it had a great contribution to decreasing the deficit. According to Young, (1997), tax revenue mobilization was constrained by the wish to keep the fiscal burden on peasants, since they were the main constituency of the EPRDF. Finally, the 1990s were a period of large political adjustment, thus restricting both the capacity and the policy space for change. Until 1994 the top marginal tax rates were kept as the Derg's levels, at 59% for businesses income and still 89% for personal income (Eshetu, 2004). Yet, a little policy changes were passed out by the EPRDF in this period. The year 1994 became amended the previous income tax law (Proclamation 173/1961) and substituted it by Proclamation 107/1994 and following the amendment the maximum marginal tax rates became to 35%. The tax on rural land and agricultural income was also reviewed in proclamation 1995

and 1997, accordingly it introduce tax exemptions for a decade to the agricultural investors (Alemayehu and Abebe, 2005). Revenue generation was stagnant between 1998 and 1999, and the deficit increased to a historical high.

Figure 3. 5 Government total revenue and expenditure during EPRDF (in million birr)



Source: Authors computation based on MoFEC data

As we look from the above graph Ethiopia experienced a budget deficit in all fiscal years. Studies indicate that, the raise in the deficit especially at the beginning of EPRDF was also because of the food shortages. To meet this food shortage the government had increased borrowing, since foreign aid was not accessible until the end of warfare with Eritrea in 2000. Starting from the early 2000s, there is more peaceful political setting and plan to development, that tax revenue mobilization became a higher priority for the government. Given that the woreda-level decentralization and the infrastructure projects were highly implemented in the context of a developmental state also needed huge resources. Consequently in 2002, the EPRDF conduct the major tax policy reform. The reform involved both an income tax proclamation (Proclamation 286/2002)¹³ and a law on indirect tax (Proclamation 285/2002)¹⁴. New taxes were also introduced in the early 2000s, for example the surtax on imports, the withholding tax on income and the interest tax, whereas taxes on exports were brought to zero starting from 2003.

¹³ The income tax proclamation further decreased the higher marginal income tax rate from 35% to 30% and introduced various deductions for the calculation of business profits. In addition it introduces the tax identification number to all business and individual tax payers in urban areas

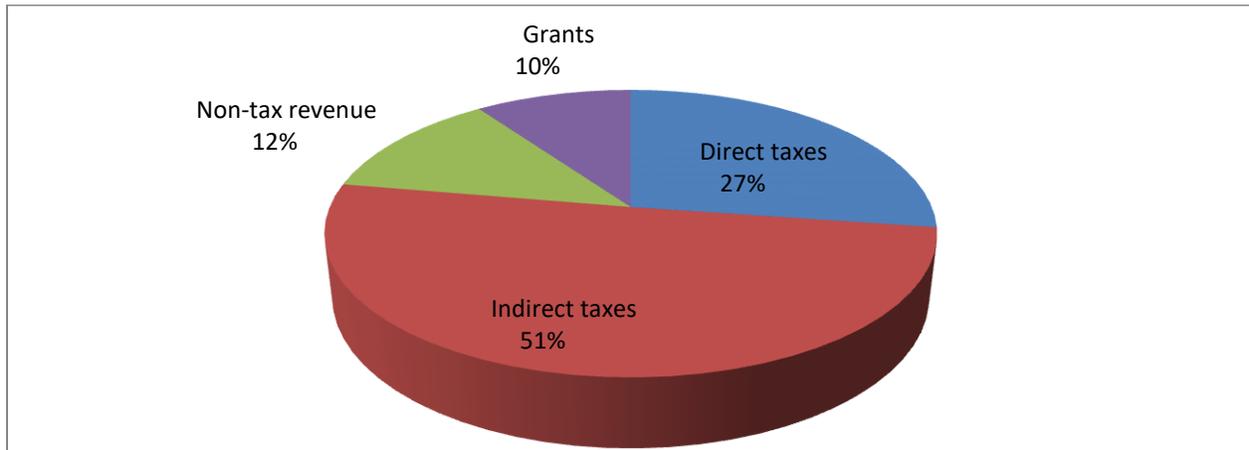
¹⁴ The main innovation of proclamation 285/2002 was the introduction of value added tax starting from 2003 by substituting the previous indirect taxes (sales and turn over tax).

Indeed the tax to GDP share actually reduced following the reform. This was mainly due to implementation problems and lack of taxpayer's awareness and collaboration.

In the 2000s the government of Ethiopia was fully aware about important role of domestic financing than foreign resources. Because aid had proved to be volatile and the donors' wish to influence the policy dialogue was undesirable. Instead domestic resource mobilization is perceived to be under the control of the government, thus offering a more stable source of revenue. This is the spirit with which the government engaged in the administrative tax reform of 2008 and 2009. Among such tax administration reforms the first is that, tax administration was unified under the Ethiopian Revenue and Customs Authority (ERCA). Secondly the implementation of VAT was complemented with the introduction of registration machines that would record all firms' transactions, and report them directly to the newly established ERCA. The reforms of 2008 and 2009 succeeded in increasing tax revenue, with the growth rate falling slightly short of 50% in 2009. This trend is mainly intended to revenue goals of the GTP I development plan, that foresees an average annual revenue growth rate of 24%, whereas the annual GDP growth rate foreseen at 11%. The raise in tax revenue has been largely achieved with an increase of the tax base rather than changes in the tax rate. Therefore by fighting tax evasion, improving compliance and administrative capacity, as well as bringing more taxpayers into the tax net is taken as a means of achieving the plan. The target for 2015 is for tax revenue to reach 15% of GDP, from the initial 11%. The GTP also sets a medium term goal for Ethiopia to become a middle-income country and to become independent from foreign aid, both ambitious goals that find widespread support and commitment amongst government officials.

Despite the great efforts to increase tax revenue, the tax share in Ethiopia, at 11% of GDP in 2009, remains lower than the average of low-income African countries of 15%. This is due to a few important constraints that are mostly related to a small tax base. They include both low income and the large share of the agricultural sector. On the one hand, at low levels of income it is difficult to extract revenue. On the other hand, the agricultural sector still contributes about 40 per cent of GDP, and 80 of the Ethiopian people live in rural areas. As we observed from the pie chart below the government of Ethiopia collects the major revenue from direct and indirect tax, both accounts 78% of its revenue. In spite of grant has still a 10% share of the government revenue the data indicates that Ethiopia as a least developed country it try to cover the expenditure by the domestic resource mobilization.

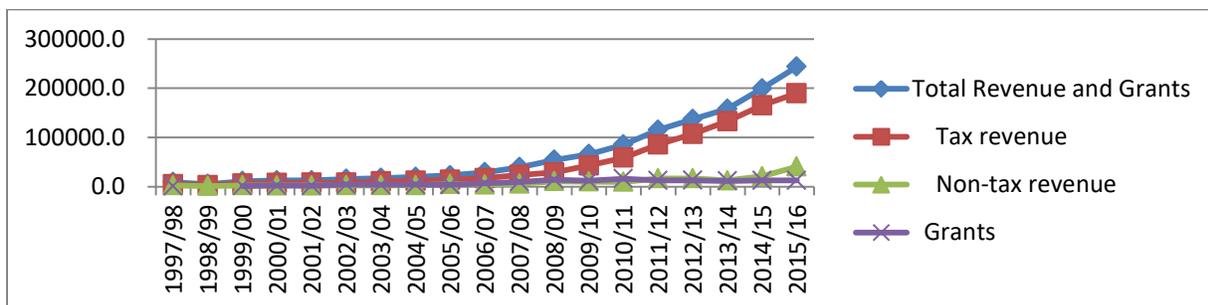
Figure 3. 6 Total Government Revenue Compositions during EPRDF



Source: Authors computation based on MoFEC data

Government of Ethiopia has different sources of revenue generation. Among them tax, non tax, grant and loans are the dominant. From those the tax revenue contributed the lion share of the total revenue, followed by non-tax revenue. In the past few years in order to promote the export sector of the country government of Ethiopia leave the export tax and try to cover its share by other types of taxes. From the graph we can conclude that, Total revenue and grants become increase from year to year and this is due to the tax revenue grows at a faster rate than any other government income sources. In contrast the income from grant becomes slightly decline and it shows the foreign donors were decrease the amount of fund that they give to the country from year to year. Finally we can conclude that if this situation is continued for the future, Ethiopia become a country that can depend only on domestic resource mobilization.

Figure 3. 7 Growth rate of government income share during EPRDF (in million birr)



Source: Authors computation based on MoFEC data

In general, government of Ethiopian subjected to a numerous tax reform from the beginning of the 1940s. However, the frequent tax reform unable to response its basic objective which is

raising sufficient revenue to finance government expenditure and minimize the distortion in the economy. This cause the need for another comprehensive tax reform to overcome this problem which is witnessed by IMF report of 2016 that call additional tax reform is necessary to overcome the problem of development agenda in Ethiopia. As a result government of Ethiopia confirmed the recommendation of IMF and introduced new tax reform in august 2016. The reform is both on administrative and on income at the same time. The income tax reform where: the new tax bracket adjustment, increment in tax schedule from four to five, raise in exempted threshold of birr subjected to income tax. The administrative reforms were simplification of complex tax laws, and scaling up capacity of the administrative and etc. The main feature of this law is that monthly incomes of up to Birr 600 are exempted from paying personal income tax and less than 7200 annual income are exempted from paying business profit tax and rental income tax (Federal Tax Administration Proclamation No. 983/2016).

CHAPTER FOUR

METHODOLOGY

4.1 Source of Data

The research was done by combining the latest national Input–Output table¹⁵ with a 2009/10 Social Accounting Matrix (SAM) developed for Ethiopian economy to evaluate the impact of Ethiopia's recent tax reforms at both the macro- and micro-levels. The data would obtain from Ethiopian research development institute (EDRI). In order to come up the economy in to the current performance the researcher updates the 2009/10 SAM by inserting the current values of the dynamic variables. Additionally to incorporate data on the share of tax to GDP ratio, share of direct tax for government revenue, population, production and other behavioral parameters and to provide a rich database that facilitates the analysis of the impacts of the tax policy on economic variables in Ethiopia, data will be collected from; national bank of Ethiopia (NBE), Ethiopian revenue and custom authority (ERCA), central statistical agency (CSA), International Food Policy Research Institute (IFPRI) and ministry of finance and economic cooperation.

4.2 Data analysis

In order to analyze the impact of direct tax reform on the economic variables, the researcher would use a computable general equilibrium (CGE) model. CGE model has played an important role on policy impact analysis. Even if Using CGE model that incorporated the huge of data and determined in many equations and variables, sometimes make it difficult to interpret the simulation results and communicate the analysis to the policy maker, the main strength of CGE analysis is that it models the whole economy explicitly, capture the market mechanism, interlinking between sectors and transactions between economic agents despite being under restrictive assumptions. A clear microeconomic structure with links between micro and macro aspects of the economy makes it the soundest tool for quantitative policy analysis. On policy formulation process, intensively a use of economic models in the framework of statistical and

¹⁵ The Input-output table shows the interdependence among various producing and demanding sectors of the economy as they interact as each other's customers. Each provides a systematic description of each sector's interdependence by tracing the flows of goods and services from one sectors of the economy to all other sectors (inter-sectoral flows) and to itself (intra-sectoral flows) (EDRI, 2009).

mathematical approaches to support the analysis is necessary. There for to study the impact of such policy changes the major mathematical model is computable general equilibrium (CGE) model. The CGE model has several advantages on ex-ante impact of policy analysis such as in the analysis of the impact on tax policies. There are typical tax policies that frequently need to be assessed such as increasing (reducing) the VAT rate, excise tax, or import tariff, imposing export tax, adjusting the corporate and personal income tax rate. Computable general equilibrium (CGE) models have been used since the early 1970s to analyze the economic effects of changes in taxation (Shoven and Whalley, 1992; Greenaway *et al.*, 1993).

Since the CGE model is developed based on theoretical background in both micro and macro economics and presented a comprehensive simulation results such as the impact on the macro variables (growth, inflation, employment, etc.), industrial sectors (in term of output and price), international trade (export – import in term of output and price), fiscal (in both revenue and expenditure side), and in the household level such as the changes in household income and consumption, it plays a significant role on the impact analysis of tax policies. Basically, a CGE model tries to model whole economy by incorporate all behavioral aspects of economic agents in all markets, commodities and factors (Burfisher, 2011). In sum, CGE model is the soundest tool for quantitative policy analysis to help analysts to understand the essential relationships relevant to particular policy. In order to analyze the impact of tax reform on the macroeconomic variable the researcher used recursive dynamic computable general Equilibrium model (DCGE). Since a recursive model enable agents to make their decisions on the basis of past and current information, which means the agents have myopic behavior. As a result the recursive dynamic model is very appropriate to combines a within period component and a between-period component. Allowing the model to become a recursive enables the researcher to look the result year after year. The within-period model is really the static model while the between-period model links the within period's part by updating selected parameters on the basis of exogenous trends and past endogenous variables such as: investment, population growth, and capital accumulation (Lofgren and Robinson, 2004). For the purpose of this study the researcher take Ethiopian into consideration and apply a recursive dynamic CGE model. Since Ethiopia is one of the developing country in which perfect foresight cannot be hold, using a recursive dynamic computable general equilibrium model is very appropriate choice for the analysis purpose. The researcher uses the dynamic CGE model for two purposes. **First**, the static CGE model lack the

quality of analytical consistency between the within-period decision and the between period-decision. *Second*, the static model also does not capture dynamic effect obtained from policy intervention and reveals unrealistic results (Keshab and Emmanuel 2005).

Figure 4.1 indicates how the diagrammatical representation of the circular flow of economic activity which is the bases for foundation of computable general equilibrium model.

Figure 4. 1 the Economic Framework

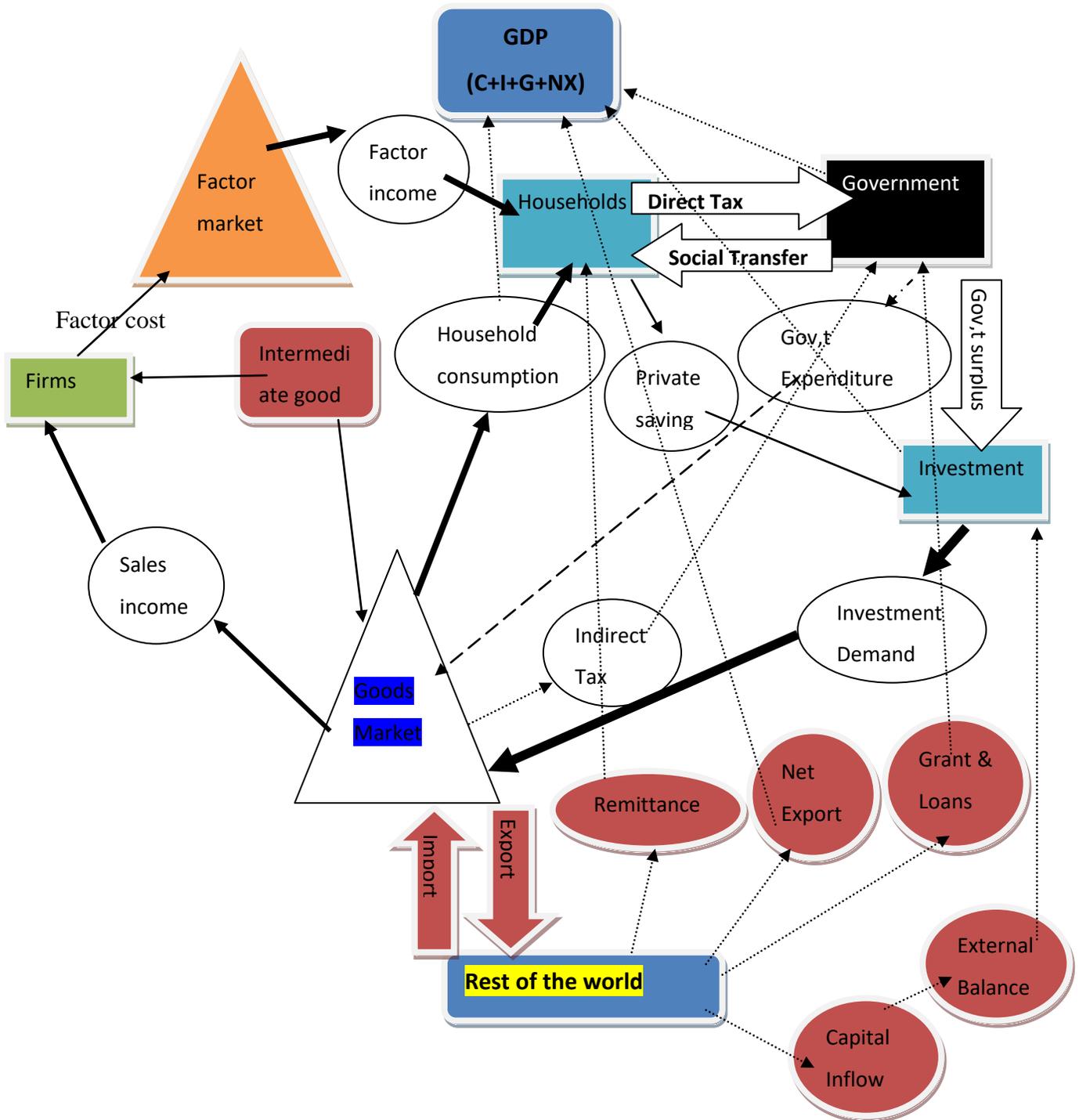


Figure 4.2 indicates that the direct and indirect effect of the tax reform on the overall economy (conceptual framework).

Figure 4.2 Circular Flow of Tax in the Multiplier Process

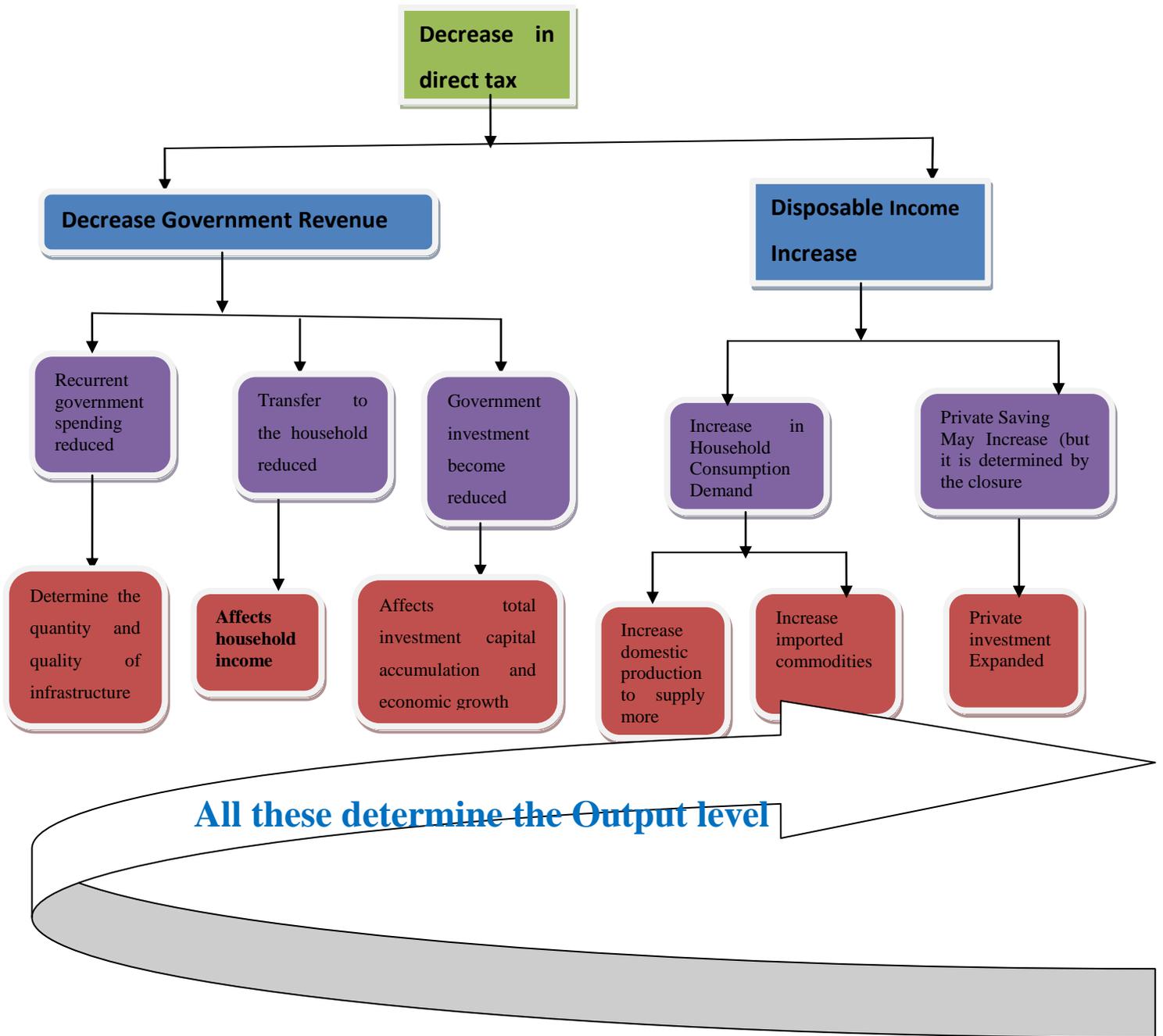
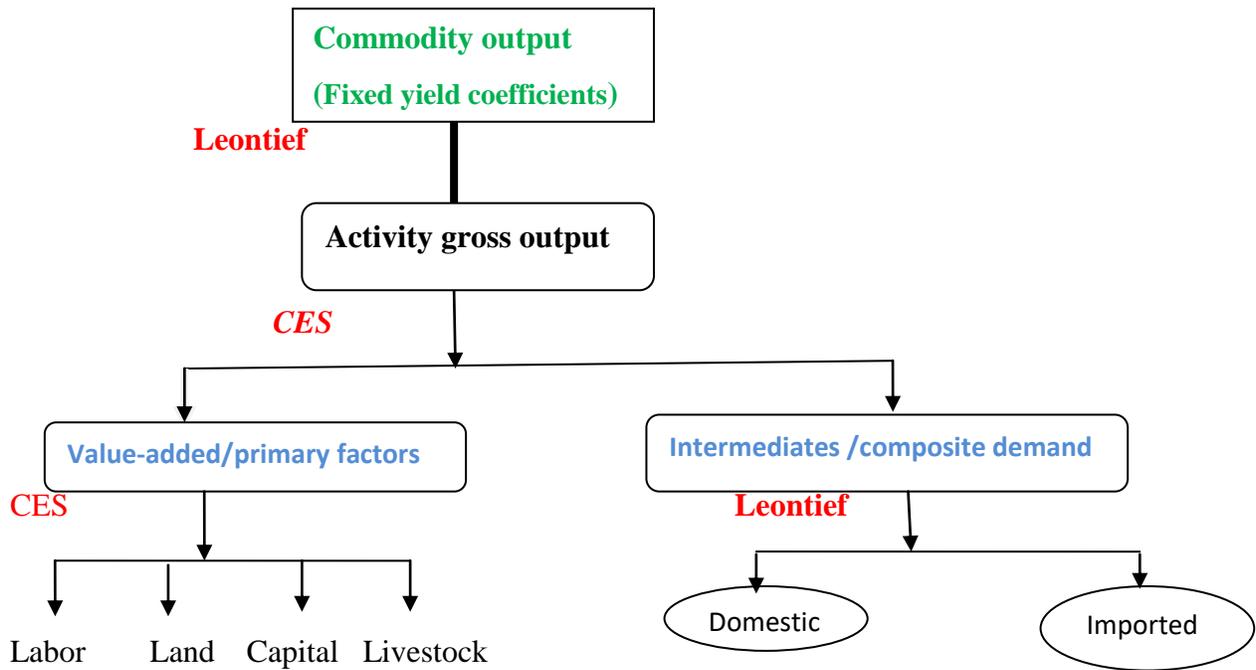


Figure 4.3 Production Technology of the CGE model/Standard Model Structure



Source: Lofgren et al 2002

4.3 Equation of the model

The model has several equations that are very essential for closures formulation and to adjust the economy to ensure equilibrium. The equation of the model is developed from the Lofgren’s literature on A Standard Computable General Equilibrium (CGE) model in GAMS. The equations in the model are divided in to four blocks; these are prices, production and trade, institutions, and system constraints block.

4.3.1 Price Block

In CGE model the price block considers the quality differences among commodities of different origins and destinations. The price block consists of equations in which endogenous model prices are linked to other prices (endogenous or exogenous) and to non-price model variables (Lofgren et. al. 2002).

$$\text{Import Price: } PM_C = Pwmc_c \cdot (1 + tm_c) \cdot EXR + \sum_{c' \in CT} PQ_{C'} \cdot icm_{c'c} \dots \dots \dots (1)$$

Where, $c \in CM$ = a set of commodities (also referred to as c . and C .), $c \in CT (\subset C)$ = a set of domestic trade inputs (distribution commodities), PMc = Import price in LCU (local-currency units) including transaction costs, $pwmc$ = C.i.f. import price in FCU (foreign-currency units),

tmc = import tariff rate, EXR = exchange rate (LCU per FCU), PWc = composite commodity price (including sales tax and transaction costs), and $icmc.c$ = quantity of commodity c . as trade input per imported unit of c . The import price in LCU (local-currency units) is the price paid by domestic users for imported commodities (exclusive of the sales tax). Equation (1) states that it is a transformation of the world price of these imports, considering the exchange rate and import tariffs plus transaction costs (the cost of trade inputs needed to move the commodity from the border to the demander) per unit of the import.

Export Price: $PE_c = pwe_c \cdot (1 - te_c) \cdot EXR - \sum_{c' \in CM} PQ_{c'} \cdot ice_{c'c} \dots \dots \dots (2)$

Where, $c \in CE (\subset C)$ = a set of exported commodities (with domestic production), PE =Export price (LCU), pwe_c = f.o.b. export price (FCU), te_c =export tax rate, $ice_{c'c}$ = quantity of commodity c . as trade input per exported unit of c . The export price in LCU is the price received by domestic producers when they sell their output in export markets.

Demand Price of Domestic

Non- Traded Goods $PDD_c = PDS_c + \sum_{c' \in CM} PQ_{c'} \cdot icd_{c'c} \dots \dots \dots (3)$

Where, $c \in CD (\subset C)$ =a set of commodities with domestic sales of domestic output, PDD_c =demand price for commodity produced and sold domestically, PDS_c =supply price for commodity produced and sold domestically, and $icd_{c'c}$ = quantity of commodity c . as trade input per unit of c produced and sold domestically. This equation includes different prices for domestic output that is used domestically.

Absorption $PQ_c \cdot (1 - tq_c) \cdot QQ_c = PDD_c \cdot QD_c + PM_c \cdot QM_c \dots \dots \dots (4)$

Where, QQ_c =quantity of goods supplied to domestic market (composite supply), QD_c =quantity sold domestically of domestic output, QM_c =quantity of imports of commodity, and tq_c =rate of sales tax (as share of composite price inclusive of sales tax).

Marketed Output Value $PX_c \cdot QX_c = PDS_c \cdot QD_c + PE_c \cdot QE_c \dots \dots \dots (5)$

Where, PX_c =aggregate producer price for commodity, QX_c = aggregate marketed quantity of domestic output of commodity, QE_c =quantity of exports, and $c \in CX (\subset C)$ =a set of commodities with domestic output. For each domestically produced commodity, the marketed output value at producer prices is stated as the sum of the values of domestic sales and exports; but this value does not include the value of home-consumed output.

Activity Price: $PA_a = \sum_{c \in C} PX_c \cdot AC_{ac} \cdot \theta_{ac} \dots \dots \dots (6)$

Where, $a \in A$ is a set of activities, PA_a is activity price (gross revenue per activity unit),

$PXAC_{ac}$ is producer price of commodity c for activity a , and θ_{ac} is the yield of output c per unit of activity a .

Aggregate Intermediate Input Price: $PINTA_a = \sum_{c \in C} PQ_c \cdot \theta_{ac} \dots \dots \dots (7)$

Where, $PINTA_a$ is the aggregate intermediate input price for activity a , and θ_{ac} is the quantity of c per unit of aggregate intermediate input a . The activity-specific aggregate intermediate input price shows the cost of disaggregated intermediate inputs per unit of aggregate intermediate input. It depends on composite commodity prices and intermediate input coefficients, which show the quantity of input commodity c per unit of aggregate intermediate input (not per unit of output).

Activity Revenue and cost: $PA_a \cdot (1 - ta_a) \cdot QA_a = PVA_a \cdot QVA_a + PINTA_a \cdot QINTA_a \dots (8)$

Where, ta_a = tax rate for activity, QA_a represent the quantity of activity, QVA_a is the quantity of (aggregate) value-added, $QINTA_a$ = quantity of aggregate intermediate input, where as PVA_a is the price of value-added. For each activity, total revenue net of taxes is fully exhausted by payments for value-added and intermediate inputs.

Consumer Price Index: $CPI = \sum_{c \in C} PQ_c \cdot cwtsc \dots \dots \dots (9)$

Where, $cwtsc$ = Weight of commodity c in the consumer price index, and CPI = Consumer price index (endogenous variable). The CPI is flexible, the price changed as real quantities are changed.

Producer Price Index: $\overline{DPI} = \sum_{c \in C} PDS_c \cdot dwtsc \dots \dots \dots (10)$

Where, $dwtsc$ is weight of commodity c in the producer price index, \overline{DPI} is producer price index (exogenous variable). The DPI is fixed and functions as the numeraire in the basic model version. A numeraire is required since the model is homogeneous of degree zero in prices. a doubling of the value of the numeraire would double all prices but leave all real quantities unchanged.

4.3.2 Production and Trade Block

The production and trade block covers four categories: domestic production and input use; the allocation of domestic output to home consumption, the domestic market, and exports; the aggregation of supply to the domestic market (from imports and domestic output sold domestically); and the definition of the demand for trade inputs that is generated by the distribution process. Production is carried out by activities that are assumed to maximize profits

subject to their technology, taking prices (for their outputs, intermediate inputs, and factors) as given. In other words, it acts in a perfectly competitive setting.

CES Technology:

Activity Production Function: $QA_\alpha = (\alpha_\alpha^\alpha (\delta_\alpha^\alpha \cdot QVA_\alpha^{-\rho_\alpha^\alpha} + (1 - \delta_\alpha^\alpha) \cdot QINTA_\alpha^{-\rho_\alpha^\alpha})^{\frac{-1}{\rho_\alpha^\alpha}} \dots\dots\dots (11)$

CES Technology: Value-Added–

Intermediate-Input Ratio: $\frac{QVA_\alpha}{QINTA_\alpha} = \left(\frac{PINTA_\alpha}{PVA_\alpha} \cdot \frac{\delta_\alpha^\alpha}{1 - \delta_\alpha^\alpha} \right)^{\frac{1}{1 + \rho_\alpha^\alpha}} \dots\dots\dots (12)$

Where, $a \in ACES(\subset A)$ =a set of activities with a CES function at the top of the technology nest, α_α^α =Efficiency parameter in the CES activity function, δ_α^α = CES activity function share parameter, and ρ_α^α = CES activity function exponent. The optimal mix of intermediate inputs and value-added is a function of the relative prices of value-added and the aggregate intermediate input.

Leontief Technology:

Demand for Aggregate Intermediate Inputs: $QINTA_a = inta_a \cdot QA_a \dots\dots\dots (13)$

Where; $inta_a$ = quantity of aggregate intermediate input per activity output. In the Technology nest to define the aggregate intermediate inputs Leontief functions of the activity level are very appropriate.

Demand for Aggregate Value- Added: $QVA_\alpha = iva_\alpha \cdot QA_\alpha \dots\dots\dots (14)$

Demand for Aggregate Intermediate Input: $QINTA_\alpha = inta_\alpha \cdot QA_\alpha \dots\dots\dots (15)$

Where, $a \in ALEO(\subset A)$ =a set of activities with a Leontief function at the top of the technology nest, iva_α represents the amount of value-added per activity unit, and $inta_\alpha$ is the quantity of aggregate intermediate input per activity unit.

Disaggregated Intermediate Input: $QINTA_{ca} = ica_{ca} \cdot QINTA_a \dots\dots\dots (16)$

Where, $QINT_{ca}$ is the quantity of commodity c as intermediate input to activity a . For each activity, the demand for disaggregated intermediate inputs is determined via a standard Leontief formulation as the level of aggregate intermediate input use times a fixed intermediate input coefficient.

Commodity Production and Allocation: $QXAC_{ac} + \sum_{h \in H} QHA_{a c h} = \theta_{a c} \cdot QA_a \dots\dots\dots (17)$

Where, QXA_{ac} , represents the quantity of marketed commodity c from activity a , and $QHA_{a c h}$, is also represent the quantity of household home consumption of commodity c from activity a .

On the right-hand side, production quantities, disaggregated by activity, are defined as yields time's activity levels. On the left-hand side, these quantities are allocated to market sales and home consumption.

Output Aggregation Function: $QX_c = a_c^{ac} (\sum_{a \in A} \delta_{ac}^{ac} \cdot QAC_{ac}^{-\rho_c^{ac}})^{\frac{1}{\rho_c^{ac}-1}}$ (18)

Where, a_c^{ac} = shift parameter for domestic commodity aggregation function, δ_{ac}^{ac} = share parameter for domestic commodity aggregation function, and ρ_c^{ac} = domestic commodity aggregation function exponent.

First-Order Condition for Output Aggregation Function

$PX_{ac} = PX_c QX_c (\sum_{a \in A} \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_c^{ac}})^{-1} \cdot \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_c^{ac}-1}$ (19)

Aggregate marketed production of any commodity is defined as a CES aggregate of the marketed output levels of the different activities producing the commodity. The optimal quantity of the commodity from each activity source is inversely related to the activity-specific price. QX appears as the output, sold at the price, PX , and produced with the inputs, $QXAC$, that are purchased at the prices, $PXAC$.

Export-Domestic Supply Ratio: $\frac{QE_c}{DD_c} = \left(\frac{PE_c}{PDS_c} - \frac{1-\delta_c^t}{\delta_c^t} \right)^{\frac{1}{\rho_c^t-1}}$ (20)

Import-Domestic Demand Ratio: $\frac{QM_c}{QD_c} = \left(\frac{PDD_c}{PM_c} - \frac{1-\delta_c^q}{\delta_c^q} \right)^{\frac{1}{1+\rho_c^q}}$ (21)

Composite Supply Function: $QQ_c = a_c^q \left(\delta_c^q \cdot QM_c^{-\rho_c^q} + (1 - \delta_c^q) \cdot QD_c^{-\rho_c^q} \right)^{\frac{1}{\rho_c^q}}$ (22)

Where, a_c^q is an Armington function shift parameter, δ_c^q = an Armington function share parameter, and ρ_c^q = an Armington function exponent. Imperfect substitutability between imports and domestic output sold domestically is captured by a CES aggregation function in which the composite commodity that is supplied domestically is produced by domestic and imported commodities entering this function as inputs. When the domain of this function is limited to commodities that are both imported and produced domestically, it is often called an “Armington” function.

4.3.3 Institution Block

Factor Income: $YF_f = \sum_{a \in A} WF_f \cdot \overline{WFDIST}_{fa} \cdot QF_{fa}$ (23)

Where, YF_f = income of factor f , WF_f is economic wide wage and $WFDIST_{fa}$ is the wage distortion factor.

Institutional factor incomes: $YIF_{if} = shif_{if} \cdot [(1 - tf_f) \cdot YF_f - trnsfr_{rowf} \cdot EXR] \dots \dots \dots (24)$

Where, $i \in INS$ is a set of institutions, $i \in INSD (\subset INS)$ = a set of domestic institutions, YIF_{if} income to domestic institution i from factor f , $shif_{if}$ share of domestic institution i in income of factor f , tf_f = direct tax rate for factor f , and $trnsfr_{if}$ is show the transfer from factor f to institution i .

Income of domestic Non-Government Institutions

$YI_i = \sum_{f \in F} YIF_{if} + \sum_{i' \in} TRII_{ii'} + trnsfr_{i\ gov} \cdot CPI + trnsfer_{i\ row} \cdot EXR \dots \dots \dots (25)$

Where, $i \in INSDNG (= INSDNG \subset INSD)$ is a set of domestic non-government institutions, YI_i is income of institution i (in the set INSDNG), and $TRII_{ii}$ is also the transfers from institution i' to i (both in the set INSDNG). Domestic nongovernment institutions form a subset of the set of domestic institutions. The total income of any domestic non-government institution is the sum of factor incomes, transfers from other domestic non-government institutions, transfers from the government (indexed to the CPI), and transfers from the rest of the world.

Intra-Institutional Transfers Household Consumption Expenditures

$TRII_{ii'} = shii_{i'}. (1 - \overline{MPS}_{i'}) \cdot (1 - TINS_{i'}) \cdot YI_{i'} \dots \dots \dots (26)$

Where, $shii_{ii}$ is the share of net income of i' to i ($i' \in INSDNG$; $i \in INSDNG$), $\overline{MPS}_{i'}$ is the marginal propensity to save for domestic non-government institution (exogenous variable), and $TINS_i$ is the direct tax rate for institution i ($i \in INSDNG$).

Transfers between domestic non-government institutions are paid as fixed shares of the total institutional incomes net of direct taxes and savings.

Household Consumption Expenditures

$EH_h = (1 - \sum_{i \in INSDING} shii_{ih}) \cdot (1 - MPS_h) \cdot (1 - TINS_h) \cdot YI_h \dots \dots \dots (27)$

Where, $i \in H (\subset INSDNG)$ is a set of households, and EH_h is also represent the households consumption expenditure. Among the domestic non-government institutions, only households demand commodities. The total value of consumption spending is defined as the income that remains after direct taxes, savings, and transfers to other domestic non-government institutions.

Household Consumption Spending on Marketed Commodities:

$PQ_c QH_{ch} = PQ_c \cdot \gamma_{ch}^m + \beta_{ch}^m \cdot (EH_h - \sum_{c' \in C} PQ_{c'} \cdot \gamma_{c'h}^m - \sum_{a \in A} \sum_{c' \in C} PXAC_{ac'} \cdot \gamma_{ac'h}^h) \dots (28)$

Where, QH_{ch} is the quantity of consumption of marketed commodity c for household h , $\gamma_{ch}^m =$ Subsistence consumption of marketed commodity c for household h , $\gamma_{ach}^m =$ Subsistence consumption of home commodity c from activity a for household h , and β_{ch}^m is the marginal share of consumption spending on marketed commodity c for household h .

Household Consumption Spending on Home Commodities

$$PXAC_{ac} \cdot QHA_{ach} = PXAC_{ac} \cdot \gamma_{ach}^h + \beta_{ach}^h \cdot (EH_h - \sum_{c' \in C} PQ_{c'} \cdot \gamma_{c'h}^m - \sum_{a \in A} \sum_{c' \in C} PXAC_{ac'} \cdot \gamma_{ac'h}^h) \quad (29)$$

Where, β_{ach}^h is the marginal share of consumption spending on home commodity c from activity a for household h and γ_{ach}^h represents the subsistence consumption of home commodity c from activity a for household h . Two functions are needed since household consumption is for two types of commodities¹⁶:

Investment Demand: $QINV_c = IADJ \cdot \overline{qinv}_c \dots \dots \dots (30)$

Where, $QINV_c$ is the Quantity of fixed investment demand for commodity, $IADJ$ is the Investment adjustment factor, and \overline{qinv}_c is also the Base-year quantity of fixed investment demand. Fixed investment demand is defined as the base-year quantity multiplied by an adjustment factor. For the basic model version, the adjustment factor is exogenous, in effect also making the investment quantity exogenous. Inventory investment is also included in the model, but is treated as an exogenous demand.

Government Consumption Demand $QG_C = \overline{GADJ} \cdot \overline{qg}_C \dots \dots \dots (31)$

Where, QG_C is the government consumption demand for commodity, \overline{GADJ} is the government consumption adjustment factor (exogenous variable), and \overline{qg}_C is the base-year quantity of government demand. Similarly, government consumption demand, in which the main component tends to be the services provided by the government labor force, is also defined as the base-year quantity multiplied by an adjustment factor. This factor is also exogenous and, hence, the quantity of government consumption is fixed.

Government

Revenue: $YG = \sum_{i' \in INSDING} TINS_{i'} \cdot YI_{i'} + \sum_{f \in F} tf_f \cdot YF_f + \sum_{a \in A} tva_a \cdot PVA_a \cdot QVA_a + \sum_{a \in A} ta_a \cdot PA_a \cdot QA_a + \sum_{a \in CM} tm_a \cdot pwm_a \cdot QM_a \cdot EXR + \sum_{c \in CE} te_c \cdot pwe_c \cdot QE_c \cdot EXR + \sum_{c \in C} tq_c \cdot PQ_c \cdot QQ_c + \sum_{f \in F} YIF_{gov f} + transfr_{gov row} \cdot EXR \dots \dots \dots (32)$

¹⁶ Household consume two types of commodities (they consume marketed commodities purchased at market prices and domestically produced commodities).

Where, YG represent the total government revenue, $TINS_i$ is direct taxes from institutions, tf_f is taxes from factors of production f , tva_a is the value added tax, ta_a is the activity tax, tm_c is the import tariff, te_c is the export tax, tq_c is the tax collected from the sales of a commodity, YIF_{govf} is the revenue from government owned factors and $trnsfr_{govrow}$ represents the revenue of government from the rest of the world in terms of transfer. Total government revenue is the sum of revenues from taxes, factors, and transfers from the rest of the world.

4.3.4 System Constraint Block

Composite Commodity Markets:

$$QQ_c = \sum_{a \in A} QINTA_{c a} + \sum_{h \in H} QH_{c h} + QG_c + QINV_c + qdst_c + QT_c \dots \dots \dots (33)$$

Where, $qdst_c$ = quantity of stock change.

$$\text{Total Absorption: } TABS = \sum_{h \in H} \sum_{c \in C} PQ_c \cdot QH_{c h} + \sum_{a \in A} \sum_{c \in C} \sum_{h \in H} PXAC_{a c} \cdot QHA_{a c h} + \sum_{c \in C} PQ_c \cdot QG_c + \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c \dots \dots \dots (35)$$

Where, $TABS$ = total nominal absorption.

Total absorption is measured as the total value of domestic final demands, which equals GDP at market prices plus imports minus exports. The new variable, $TABS$, records this value.

Real GDP at Market Prices

$$\begin{aligned} GDPREAL_t = & \sum_{c \in C} \sum_{h \in H} PQ_c^0 \cdot QH_{c,h,t} + \sum_{a \in A} \sum_{c \in C} \sum_{h \in H} PXAC_{a,c}^0 \cdot QHA_{a,c,h,t} + \sum_{c \in C} PQ_c^0 \cdot OG_{c,t} + \\ & \sum_{c \in C} PQ_c^0 \cdot QINV_{c,t} + \sum_{c \in C} \sum_{c \in INS} PQ_c^0 \cdot qdst_{c,i,t} + \sum_{c \in CE} EXR^0 \cdot pwe_c^0 \cdot QE_{c,t} - \\ & \sum_{c \in CM} EXR^0 \cdot pwm_c^0 \cdot QM_{c,t} \dots \dots \dots (36) \end{aligned}$$

$$\text{Real GDP at factor Cost: } GDP REALFC_t = \sum_{a \in A} pva_a^0 \cdot (1 - tva_{a,t}^0) \cdot QVA_{a,t} \dots \dots \dots (37)$$

Equivalent Variation:

$$EV_h = \left((CTH_h - \sum_{trj} PC_{trj} C_{trj,h}^{min}) \pi_{tr} \left[\frac{PCO_{tr}}{PC_{tr}} \right]^{Y_{tr,h}} - (CTHO_h - \sum_{trj} PCO_{trj} C_{trj,h}^{MIN}) \right) \dots \dots \dots (38)$$

4.4 Recursive Dynamics

Most CGE models are essentially static in nature. The dynamics in our CGE model is defined as a recursive process. Thus, we can completely separate the model into within-period and between-period components. The equations presented above fully specify the within-period component, in which consumers and producers maximize their utility and profits based on prevailing factor and

product prices. Then, between periods, certain exogenous variables in the static model are updated based on either externally determined trends or previous period results.

$$Q_g = \sum(P_i \cdot G_i) + Transfer \dots\dots\dots (39)$$

Where, Q_g is government expenditure G_i , is government consumption spending and P is price level. The impact of policy changes includes dynamic aspects, such as the inter-temporal effects of changes in investment and the rate of capital accumulation. In order to investigate in more detail the relationship between policy changes and factor accumulation the static model is extended to a dynamic recursive model. In the extended part of the model labor supply will be determined exogenously (updated by the population growth rate, i.e. as population grows, the total labor supply increases at the same rate).

$$L_{t+1} = (1 + ng) \cdot L_t \dots\dots\dots Labor\ supply \dots\dots\dots (40)$$

Where, ng ; is population growth.

Capital accumulation is determined endogenously (In a given time period the total available capital is determined by the previous period's capital stock and investment spending). Then new capital will be distributed among sectors based on each sector's initial share of aggregate capital income (Thurlow, 2004). Capital accumulations also take in to account the depreciated amount of capital in each year.

$$K_{t+1} = (1 - \delta)K_t + I_t \dots\dots\dots Capital\ Accumulation \dots\dots\dots (41)$$

$$I_t = K_{t+1} - (1 - \delta)K_t \dots\dots\dots Investment \dots\dots\dots (42)$$

Consumption also has a dynamics pattern from time to time if there is an innovation.

$$C_t = (1 - S_t) * Y_t \dots\dots\dots (43)$$

$$C_{t+1} = C_t + K_t + V_{t+1} \dots\dots\dots Consumption\ dynamics \dots\dots\dots (44)$$

Where; K_t is deterministic term

V_{t+1} are innovation in consumption ($E_t V_{t+1}=0$)

4.5 Macroeconomic Closures

Macroeconomic balance in a CGE model is determined by a series of closure rules. The model would incorporate several macroeconomic accounts: the current account, the government balance, factor market and the savings and investment account. In order to bring with equilibrium in the various macro accounts it is necessary to specify a set of macro closure rules, which provide a mechanism through which adjustment is assumed to take place.

Government balances: the government in our CGE model appears as a separate institution with incomes and expenditures but without any behavioral functions¹⁷. Total domestic revenue is the sum of all individual taxes. Tax rates are typically exogenous in a CGE model so that they can be used to simulate policy changes. The government may also receive income from abroad, such as via foreign grants or borrowing and from holding assets. For the government account the level of real government consumption, are always held constant. As a result the balance on the government budget is assumed to adjust to ensure that public expenditures equal to its revenue. Although the government does not attempt to maximize revenues by endogenously changing tax rates, its revenues increase at given tax rates when the economy grows. Therefore in our case to look the effect of tax reform the researcher take in to account, direct tax rates are fixed and government saving is flexible.

Government Balance: $YG = EG + GSAV$ (45)

$$\begin{bmatrix} \text{government} \\ \text{revenue} \end{bmatrix} = \begin{bmatrix} \text{government} \\ \text{spending} \end{bmatrix} + \begin{bmatrix} \text{government} \\ \text{saving} \end{bmatrix}$$

Current Account balance: current account balance is the most important component of the macroeconomic closures. Neoclassical general equilibrium theory does not permit current account imbalances. Thus, our model cannot be achieve equilibrium unless we include external financial flows, such as incomes from holding foreign assets or the government’s external borrowing or foreign aid receipts. Current account imbalances must be accounted for, because they affect the real economy via the relationship between exports and imports and between savings and investment. Therefore, the current account balance is assumed that a flexible exchange rate adjusts in order to maintain a fixed level of foreign borrowing or negative savings.

The equation of the current account balance expressed in foreign currency as follow;

$$\sum_{c \in CM} p w m_c \cdot Q M_c + \sum_{f \in F} trnsfr_{rowf} = \sum_{c \in CE} p w e_c \cdot Q E_c + \sum_{i \in INSD} trnsfr_{irow} + \overline{FSAV} \dots \dots \dots (46)$$

Where \overline{FSAV} denotes foreign saving. According to the above equation, import spending plus factor transfers to the ROW must equal the sum of export earning, institutional transfers from the rest of the ROW and foreign savings.

Investment-saving closure: for the investment–saving closures, the model adopts saving driven investment closure, in which the domestic institutions save a fixed amount, and the investment adjustment coefficient, try to adjusts to make investment equals savings spending at equilibrium.

¹⁷ The decision of the government to either invest or consume is not solved as an optimization problem.

However the inclusion of dynamics into the model results to last year investment influence the current economic growth, and the level of savings available for investment in this period. Generally the S-I closure rule is presented in equation from as;

$$\sum_{i \in \text{INSDNG}} \overline{\text{MPS}}_i \cdot (1 - \text{TINS}_i) \cdot \text{YI}_i + \text{GSAV} + \text{EXR} \cdot \overline{\text{FSAV}} = \sum_{c \in \text{C}} \text{PQ}_c \cdot \text{QINV}_c + \sum_{c \in \text{C}} \text{PQ}_c \cdot \text{qdst}_c \dots \dots \dots (47)$$

Where qdst_c represents the quantity of stock changes. Accordingly, the sum of savings from the government, domestic non-government institutions and the ROW are equated with the sum of fixed investment and stock change.

Factor Market Closure: the factor market closure requires equilibrating factor demand and supply which is dependent on how the relationship between factor supply and wages is defined.

$$\sum_{a \in A} QF_{fa} = \overline{QFS}_f \dots \dots \dots (48)$$

Where QFS_f denotes quantities supplied of factor and QF_{fa} are factor demanded by activity. The above equation requires equality among the total quantity demanded and the total quantity supplied for each factor. For this model land and capital is assumed to be fully employed but capital is sector-specific, whereas land is free mobile. This implies that fixed supply of capital & land; and for capital the wage distortion factor adjusts to ensure that demand for capital equals total supply of capital and for land economic wide wage equilibrates demand and supply. The intention behind the full employment of land and capital is the fixation of their quantity (\overline{QFS}_f). The supply of unskilled, semi-skilled, skilled and agricultural labor is assumed to be sufficiently large and they are not fully employed and free mobile. In this case the economic wide wages are fixed in real terms and labor supply passively adjusts to match with the labor demand.

Calibrating the Model

One of the main advantages of CGE models over other theoretical models is their calibration¹⁸ to detailed empirical data. Some of the assumptions made when specifying the CGE model were done to ease its calibration, because in many cases the data needed for more complex functional forms are unavailable in developing countries. Calibrating the behavior of more complicated functional forms often just involves making more assumptions where data are unavailable. As a

¹⁸ Calibration refers to the process of assigning values to the model's parameter and variables, typically using observed country data.

result in our case we take the values of the parameters and variables done by the EFPRI for Ethiopian economy.

4.6 Direct Tax in a CGE Model

Direct taxes in a CGE model are paid by factors of production or by households usually as a percentage of their income from land rent, wages and capital returns. Direct taxes are different from indirect taxes, because they are not imposed on goods and services and they do not alter relative market prices, it simply affect the after tax wage. If direct taxes lower net wages, some people may choose to work less and spend more time on leisure. In the alternative case a decline in net wage may also motivate some peoples to work more hours instead of less, if they need the additional earning to compensate for the fall in their after tax income. In addition income tax affects the rate of return on saving and may cause households to change their allocation of income between consumption and saving. This is an inter-temporal distortion since it affects the timing and amount of consumption over a lifetime and the availability of saving for investment in the future production. If tax rate differ among asset classes; direct taxes can also influence household's investment allocations. The dynamic CGE models are needed to analyze the inter-temporal effects of direct taxes on labor supply, and on saving- investment decision. Households spend their after-tax income and government spends their tax revenue, therefore a decrease in a direct tax increases household spending and decrease government spending. Depending on the closure in these models, direct taxes also affect investment by changing the government surplus or deficit (government saving). Since households, investors and governments are differ in the type of goods that they demand; a change in direct taxes and the composition of final demand will lead to change in the overall structure of the economy. From the various tax policies that can be included into CGE models are personal income taxes, corporate income taxes, sales taxes, value added taxes, tariffs on imports, export taxes, and land taxes (Mendoza et al 2013).

In our case the researcher give great emphasis on overall impact of the direct tax reform on Ethiopian economy. The analysis is based on the last 2016 Ethiopia government tax reform on personal income tax, business profit tax and rental income tax. Generally the reform is not on the tax rate rather it is targeted on income tax free threshold; increase withholding (deduction) and adjusted the tax bracket. The data obtained from MoFEC indicates that on average the reform introduced 40% decrease in the direct tax. In other words the reform increases the tax free threshold on personal income tax from 150 to 600 and on business profit tax from 1800 to 7200.

Therefore in our simulation the researcher take direct tax reduction by 40% on average for all direct tax payers in the economy due to increase in tax free threshold and the distention of tax brackets for both personal income tax and rental income taxes. The distention of tax brackets shows that there is a 5% reduction in marginal tax rate for all tax payers. The amalgamation of increase in tax free threshold and decrease in marginal tax rate given the new adjusted salary level causes to decrease the government revenue from direct tax by 40%. We can done this in a simple calculation as first take the average of the new tax in each brackets by adding the upper and lower boundary and divide it by two for each brackets. Then calculate the amount of tax paid by the tax payers in the new tax bracket and also calculate how much they pay in the old tax brackets with the same average salary. Finally calculate the percentage change for the amount of tax they pay in the new and old brackets for all and take the average. Based on this calculation we can conclude that on average direct tax was reduced by 40% when we compared to what happen if there is no tax reform on brackets and tax free thresholds. As a result we shocked the direct tax by 40% in order to look the impact of reduction in direct tax on all macroeconomic variables.

CHAPTER FIVE

ANALYSIS OF THE RESULT

5.1 Simulation Specification

In this part, a series of different scenarios are identified. Each representing exogenous change by policy maker's on direct tax, which are used to analyze the effect of direct tax reform on the Ethiopian economy. Besides to the baseline scenario, we have three policy simulations that would allow us to measure the impact of policy shocks concerning on the tax and government revenue in general. Since we take the 2009/10 Ethiopian SAM, for each of our simulations we run the model from its 2009 base. At last the researcher makes simulation starting from 2017 till 2025, which is the year in which the country expects to achieve its national plan of becoming a middle income country.

Baseline scenario: in the CGE modeling framework, it is essential to establish a baseline scenario that is counterfactual for comparing against the outcome of a policy shock. Hence, we begin with the baseline simulation. The model which we introduced, DCGE, is calibrated to reflect what would happen to the economy when there is no policy change and external shocks; and to generate the growth path over time or the economy can grow even without a policy shock, analysis should be made with respect to the growth path in the absence of any shock (business as usual) or baseline scenario. The baseline scenario in this study assumes that business continues as usual with continuation of historical growth trends of 2009/2010 to 2016/2017 for additional eight years, from 2017 to 2025 with no specific changes made to policies.

Simulation 1: simulate direct tax using the calculated tax reform percentage, which is given in the above. Accordingly, we get 40% as a change in direct tax revenue. Therefore we introduce a negative shock in the model and take 40% as a change of direct tax. For the sake of simplicity we call it DTR1/SIM1.

Simulation 2: in the second scenario the researcher take 15% reduction in the direct tax and try to compare the result from the baseline. This scenario is formulated for the purpose of looking the policy effects of direct tax reduction with a less percentage than scenario one. It also represented as DTR2/SIM2.

5.2 Analysis of the Simulation Results

In this section we present the results of the three simulations discussed above and the implications of the results on macroeconomic balances, sectoral shares of the economy, household and government income and expenditure and welfare of the society in the overall economy. Since the tax reform is made in 2016, in order to incorporate the effect of direct tax reform on the economy the analysis covers the period starting from 2017 to 2025. In the simulation of the impact of direct tax reform on the overall macroeconomic variables, government and household income and the welfare of households, estimation is made starting from 2017 to 2025 by considering the average of the economy from 2009 to 2016 as a base year. The experiment system was introduced with three different scenarios. That is we shocked the direct tax first reduction in it by 40%, second by 15%. Before the application of the direct tax shock in the model the value for the benchmark that is the base year value is exactly equal with the value of the experimental that is the simulation result after the direct tax reform. **Recall** that the abbreviation DTR1 and DTR2 represents the direct tax reduction by 40%, and by 15% respectively (in other words to represent the simulation result for each alternative scenarios which means that SIM1 for DTR1 and SIM2 for DTR2).

In a CGE model we have mainly two way of making analysis. **First** only looking the magnitude and direction of all the simulation result and comparing each simulation results from one simulation to another, **second** take the difference for all simulation relative to the base line and make a comparison. In our case we used the second way of analyzing, that is by taking the difference between the baseline and the alternative simulation and justify the reason behind it. Fortunately, for all the variables in all simulation case our result is positive, but they may be less than or greater than the base line.

5.2.1 Impact on Macroeconomic Variables

In this part we try to look at the impact of the direct tax reform on the basic macroeconomic variables for each simulation turn by turn. As a result the table below shows the summary of the results obtained from the three simulations by focusing on absorption, private consumption, fixed investment, Government expenditure, government income, export and import, net indirect tax, consumer price index, real GDP at factor cost and at market price.

According to Table 5.1 and Figure 5.1 only government expenditure and consumer price index has slightly increasing trend in all scenarios when we compared it from the baseline simulation.

As direct tax reduced, government income immediately decreased, this in turn affects government investment, for countries like Ethiopia having a larger population, reduction government investment, exacerbate unemployment level, therefore in order to create employment level for those, government may spend huge amount of money. The source of the income is may be external borrowing or foreign aid. For CPI the reduction in the direct tax decreases the government income then the level of government investment. The contraction in government investment reduce the output level, and this in return causes a reduction in the quantity of consumption commodities, finally this causes to increase in the price of consumer goods. In addition to this the reduction in the direct tax, increases the disposable income of households. The increments in their disposable income, increases the consumption demand, and as demand increase price also rise. Inflation in Ethiopia is heavily associated with the dominant role of agriculture and food price in the economy, and also CPI inflation has two main component food and non-food price inflation (Durevall et al., 2010). According to central statistical agency (CSA) report on 2018 the overall inflation rate is 15.20, among which food inflation rate contributes 19.90 and non-food inflation rate also 10.00. Therefore a decrease in direct tax increases the disposable income of a household, which in return creates higher demand for consumption goods and finally as demand increase price also rise.

Private consumption became increase from the baseline simulation by 0.05 and 0.04 percentage points in SIM1 and SIM2 respectively. The reason for this is due to the income elasticity of demand, as direct tax decrease, disposable income also increases, and finally it raises the private consumption demand. When we look at the effect of direct tax reform on fixed investment, it decreases by 0.4 and 0.3 in SIM1, and SIM2 respectively from the baseline. This is due to the fact that even if disposable income of a household increase, initially households want to consume more instead of saving, on the other hand as direct tax reduce, government saving also must be decreased. Since what you invest is the amount of what you saved, the amalgamation of the two causes fixed investment became lower in SIM1 and SIM2 when we compare it from the baseline. Both GDP at factor cost and GDP at market price slightly decreased from the baseline in SIM1 and SIM2. This may be because of the contraction of fixed investment. Economic theories tell that, if tax reduction is financed by immediate decrease in unproductive government spending, it could raise output. Whereas if a decrease in tax is followed by reductions in government investment it could reduce output. In addition to the reduction in investment, this may be due to

the fact that direct tax cuts may also provide positive income effects, which reduce the need to work, save, and invest. In our methodology (DCGE), the market structure is a perfect competitive market and in this case the factors earn their value of marginal productivity.

Table 5. 1 Simulation results of Macroeconomic Indicators (average % change per year)

VARIABLES	INITIAL	BASE	DRT1	DRT2
Absorption	457.737	10.88	10.77	10.80
Real GDP at factor cost	354.95	11.68	11.56	11.59
Real GDP at market price	383.364	12	11.95	11.98
Fixed Investment	85.49	15	14.6	14.7
Private Consumption	338.6	9.52	9.57	9.56
Export	52.14	22.22	21.97	22.02
Import	126.51	16.4	16.2	16.25
Government Income	67.78	9.66	8.57	8.78
Government Current Expenditure	32.29	5.04	5.85	5.82
Net Indirect Tax	28.4	3.12	3.053	3.056
CPI	0.948	0.355	0.357	0.358

Source: Authors Computation from Simulation Result

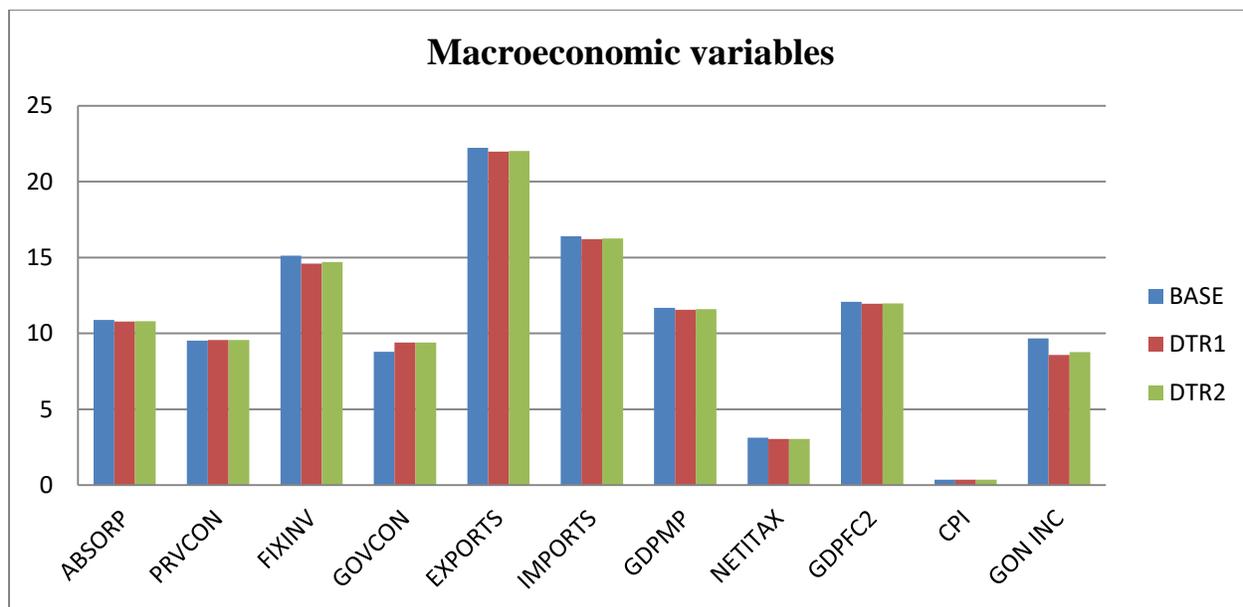
Then a reduction in the direct tax would hurt the productivity of factors through substitution effect, and this also in turn, may reduce the earning of factors. Given that GDP at factor cost represents earnings received by factors of production, in such a way the reduction in factor earning due to the substitution effect has a multiplier positive effect on GDP at factor cost¹⁹. Therefore the decrement of GDP at factor cost in SIM1 and SIM2 may be due to the fact because of the decrease in factor income. Since GDP at market price is the summation of the private consumption, fixed investment, government consumption and net export; the reductions in one component have multiple effects for the entire GDP component.

Government income became reduced by 1.08 and 0.88 percentage point in SIM1 and SIM2. Government revenue is composed of direct tax, indirect tax and other non-tax sources. Consequently countries like Ethiopia on which direct tax has a great contribution for the government revenue, decreasing some portion of a tax system affects the government revenue directly. Government earns income from the domestic institutions in the form of tax, and among them direct tax is the main component (in our case non-farm non-poor and urban non-poor households pay direct tax). Therefore a reduction in the direct tax immediately decreased the government income. Unexpectedly the net indirect tax decreased by 0.067 and 0.064 percentage point from the baseline simulation for SIM1 and SIM2. This is may be due to the fact that the

¹⁹ GDP at factor cost is also known as total value added. It represents the earnings received by factors of production, such as employee compensation and gross operating services.

reduction in GDP reduces the tax base for the government and in return it reduces the revenue from the indirect tax. Based on our simulation both direct and indirect tax revenues are going simultaneously.

Figure 5. 1 Simulation results of Macroeconomic Indicators (average % change per year)



Source: Authors computation From Simulation Result

The above figure indicates that as direct tax decreases private consumption became enhances relative to the base in both scenarios (SIM1 and SIM2), whereas fixed investment, government income and consumer price index became reduced.

5.2.2 Impact of Direct Tax Reform on Sectoral Performance

In this topic we present the effects of the simulations on the agriculture, industry and the service sectors growth. In order to make it clear for reporting, we have aggregated all the 113 activities into three: that is; agricultural, industrial and service sectors. The Table below represents the growth of sectors on average percentage change²⁰ per year. Table 5.6 indicates that agricultural sector grow by 4.9% which is on average the same for all simulations and very slight compared to other sectors growth. When we compared the simulation result from the baseline scenario, in both SIM1 and SIM2 agricultural sector growth is (0.00035 and 0.000354 respectively) than. This may be due to the fact that the increase in disposable income of a household due to the reduction

²⁰Average percentage change in sectoral output is calculated by aggregating output of activities into total outputs of agricultural, industrial and service sector for each year. Then the mean growth rate is calculated from the annual growth rates of each sector.

in the direct tax causes to increase domestic agricultural product demand. As agricultural product demand increases, the agriculture sector becomes motivated and produces more amount of product, which increases the agricultural sector growth. In addition because households consume a composite commodity, as we looked at the simulation results of the macroeconomic variables in Table 5.1 import would decline, which forces the consumer to turn their face in to consumption of domestic commodity. In Ethiopia most of the domestically consumed commodity came from agriculture sector, therefore households have higher demand for it, causes to increase the sector's productivity.

Table 5. 2 Impact on Sectoral growth (average % change per year)

SECTORS	BASE	DRT1	DRT2
Agriculture	0.049	0.0493	0.0493
Industry	0.18	0.1787	0.1789
Service	0.15	0.1465	0.1469

Source: Authors computation from simulation result

As we observed from the above table the simulation result indicated that for the case of SIM1 and SIM2 industry growth rate decreases from the base line by 0.00132 and 0.00108 percentage points respectively. As we discussed in the above, the decrease in the direct tax, reduce fixed investment and this in return may restrain the growth of industry sector. Additionally the decrease in government revenue reduces the expansion of industrialization, and this also affect the growth of industry sector negatively. When we became to the service sector, the simulation result showed as direct tax increased, the growth of the service sector became decline. As we looked from the Table 5.2 in both SIM1 and SIM2 simulation results, service growth declined by 0.00353 and 0.0031 percentage points respectively from the baseline simulation. This is due to the fact that since service is provided by either government or private sectors, as direct tax revenue decreased, it affects government revenue and this may reduce the recurrent government spending. This affects the quality and quantity of service, provided by government. Finally as the service provided by government decreases, the total service growth also becomes decline.

Share of sectors to GDP: as we know before few years Ethiopia economic growth has been highly dependent on the agriculture sector, and the sector is the main contributor for the total GDP. But now though even it employs around 80% of the labor force, its contribution is dominated by the service sector and the share of agriculture to the total GDP decreases from time

to time. The simulation result also supports this fact and the share of service sector becomes the leading for the coming years.

Table 5. 3 Summary of the Share of each Sector to the Total GDP

SECTOR SHARES TO GDP	INITIAL	BASE	DTR1	DTR2
Agriculture	41.8%	25%	25.5%	25.4%
Industry	12.2%	19%	18.9%	18.9%
Service	46%	56%	55.6%	55.7%

Source: Authors computation from simulation result

As we clearly showed from the Table 5.3 for the coming years the service sector take the lion share of the country's GDP. In both SIM1 and SIM2 agriculture share to the GDP would increase by 0.5 and 0.4 percentage points relative to the baseline simulation. As mentioned earlier this is due to the fact that the decrease in direct tax increases the demand for agricultural products and this leads to increase the agricultural production. The table also clearly shows the share of industry is increasing and until 2025 it may cover around 20% of the total GDP of the country. The industrial parks opened in recent years may have a great contribution for the success of this.

5.2.3 Impact of direct tax reform on Factor Income and Factor Supply

Factor Income: factors of production have their own return, and they are paid based on the value of their marginal productivity. Any policy change in the economy is affecting not only the economic performance of a country, but also it determines the amount of factor employed the payment for those factors, demand and supply of factors of production and so on. The demand and supply of factors became equilibrate through the price of factors. The main cost of the producer is the cost of production, which is mainly incurred for the factors of production as income. Therefore rational producer try to adjust his/her cost of production by employing the one which has a least cost. In our case for the sake of simplicity we aggregated all 16 factors of production in our social accounting matrix in to 7 and make the deep analysis the reason behind the result in all simulation cases for all factors. In all the simulation result we have a positive wage /rent for all factors of production, but the magnitude is different from one simulation to other simulation. Therefore our analysis is based on the simulation difference between the baseline simulation and the alternative scenarios.

Table 5. 4 Summary of Factor income (average % change per year)

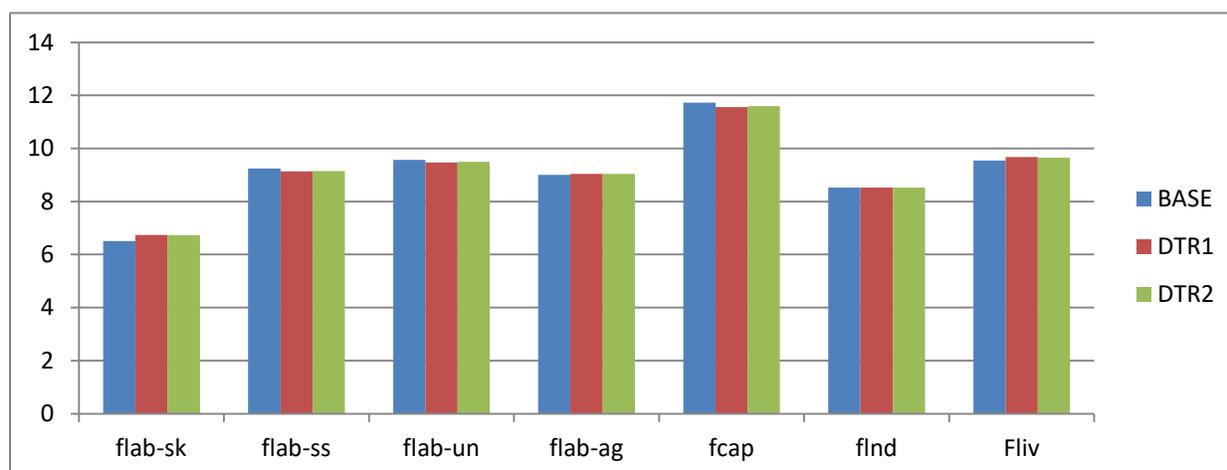
FACTORS	INITIAL	BASE	DTR1	DTR2
flab-skilled	20.4781	6.5114	6.7339	6.7195
flab-semi-skilled	57.0492	9.2426	9.1375	9.1534
flab-unskilled	39.3978	9.5684	9.4719	9.493
flab-agriculture	57.0833	9.0079	9.0446	9.0361
Capital	110.3244	11.728	11.5533	11.5953
Land	39.762	8.5228	8.52937	8.5268
Livestock	30.8575	9.5423	9.68005	9.6544

Source: Authors computation from the simulation result

The simulation result shows that as direct tax decreases, income for skilled labor increases. For example in SIM1 when we compared with the baseline simulation, income of skilled labor increased by 0.23 percentage point. Whereas income for skilled labor, unskilled labor and capital became reduced as direct tax decreased. This may be due to; the reduction in the direct tax is directly related to the production levels which show reduction in both simulations. On the other hand, government income which is the source of factor income worse for both the simulation and this causes decrease in factor income.

The income for capital declines as direct tax decreases. The reason for this result may be due to the contraction of investment. Our investment is our capital; therefore a reduction in investment directly affects our capital income. From the simulation result SIM1 and SIM2 have a decreased in capital income from the baseline by 0.2 and 0.1 percentage point respectively. Decreasing direct tax increases the income for both land and livestock and this result is mainly related with the agriculture sector production growth. In Ethiopia agriculture uses labor, land and livestock as a factor of production. As we discussed earlier the reduction in the direct tax has a positive effect on the growth of agriculture production, in other words which means the sector generates higher income and in return which increases the factor income. For the case of land in SIM1 and SIM2 the income for land increases from the baseline by 0.0065 and 0.004 percentage point respectively. Income for the factor livestock increases from the baseline simulation in SIM1 and SIM2 by 0.14 and 0.11 percentage point respectively.

Figure 5. 2 Summary of the factor income (average % change per year)



Source: Authors computation from the simulation result

The above graph 5.2 indicates that a decrease in the direct tax also increased the income for skilled labor relative to the baseline. On the reverse the direct tax reduction decreases the income for semi-skilled and unskilled labor.

Quantity of factor supply: the supply of factor is for the purpose of earning an income. Many reasons influence the provision of quantity of factors of production, but the wage rate is a key factor. The supply of factor may also depend in the income and substitution effects of the factors decision. Any policy change in the economy affects the amount of factor supply either positively or negatively. The simulation result in Table 5.5 indicates that there is a change in the supply unskilled labor and capital for all the simulation scenarios, when we compared it from the baseline case. But for the remaining no any improvement in factor supply as tax reduced, their supply were constant as base case scenario.

Table 5. 5 Summary of Factor Supply (average % change per year)

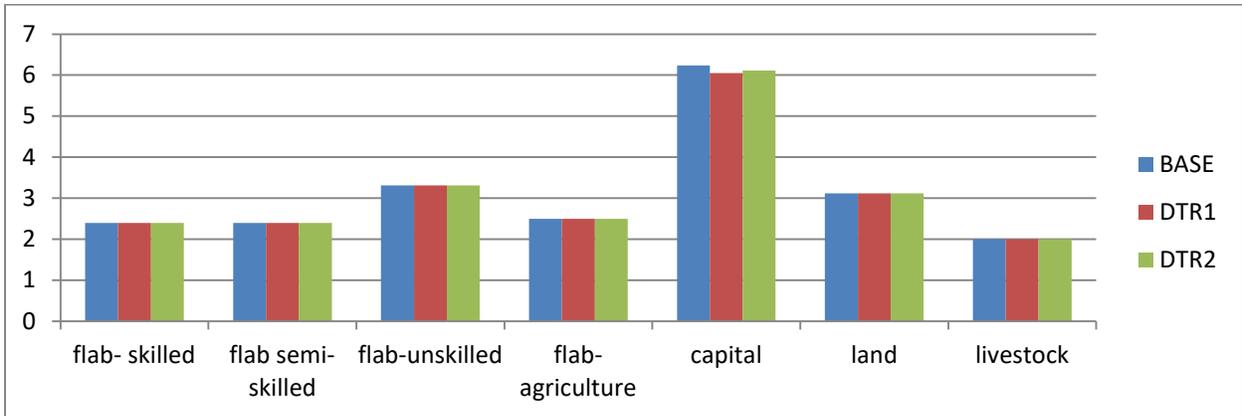
FACTORS		INITIAL	BASE	DTR1	DTR2
Labor	Skilled	20.48	2.4	2.4	2.4
	Semi- skilled	57.05	2.4	2.4	2.4
	Unskilled	39.39	3.309	3.312	3.308
	Agricultural labor	57.08	2.5	2.5	2.5
Capital		441.29	6.238	6.052	6.113
Land		1383.3	3.12	3.12	3.12
Livestock		30.85	2	2	2

Source: Authors computation from simulation result

The Table 5.5 above indicates that, most of the factor supply is constant and does not make any change from the base line for all simulations. Among them all labor types except unskilled labor, land and livestock has constant supply for the base as well as for the simulation scenario. This is may be due to the fact that, all tax reform resulted by reducing the factor supply because of as workers will see an increase in the discretionary income with lower tax rate, they would keep more of their gross income, therefore they have more money to spend. Therefore, tax cuts may not increase labor supply because people don't need to work more, unless the work is became highly paid. Therefore based on this concept any change in the direct tax does not make any supply change in the skilled, semiskilled and agriculture labor.

Land is fully employed, and the supply for it is fixed. The country's land size is once restricted and it cannot be expand as they want. For the case of unskilled labor, the supply of factor increases in SIM1 by 0.003 and decreases by 0.001 percentage points in SIM2. We have two reasons for this result; **first** the increase in adult population may increase the supply of unskilled labor, **Second** time in school and training (The lower people who remain in school for full-time education and training, the higher is the supply of unskilled labor). As the direct tax decreased more people motivated to work hard and want to become a daily laborer instead of spent their time on education, this in turn increases the supply of unskilled labors. As the direct tax decreases the supply of labor also reduced. Even if we assumed that capital is fully employed and sector specific activity, economic theories suggest that the current level of investment determines the next year investment capital amount. Therefore; as direct tax reduced, investment also decreased, and finally this reduces the supply of capital.

Figure 5. 3 Summarize the Supply of Factor as Direct tax reformed



Source: Authors computation from the simulation result

The graph above clearly indicates that only the supply of capital and in some extent unskilled labor supply is changed as the direct tax is reformed. This is related to the factor income analysis, as the return for the factor increased they become initiated to work and supply in much amount. The figure also tells about the average return for capital is growing at higher rate than any other factors of production.

5.2.4 Impact on Household’s Income and Consumption Expenditure

A) Impact on Household Income: the concept of household income is defined as the receipts in cash, in kind or in services, those are usually recurrent and regular and are received by the household or by individual members of the household at annual or at more frequent intervals. During the reference period when they are received, such receipts are potentially available for current consumption and, as a rule; do not reduce the net worth of the household (ILO, 2001). Households earn their income from employment, property income, income from household production of services for own consumption and transfers received in the form of cash, goods and services. The primary sources of income for households are factor payments generated during production. They also receive transfers from other institutions like government, other domestic institutions and the rest of the world. In the analysis of household income simply taking factor income (YIFXPY) only make the result ambiguous, so it is better if we take in to consideration all income sources of households.

Table 5. 6 Summary of household Income (average % change per year)/YIXPI

Household income	INITIAL	BASE	DTR1	DTR2
Rural poor	73.93175	9.21588	9.210778	9.21699
Rural non-poor	261.0755	9.907388	9.819914	9.839458
Urban poor	3.82552	9.79566	9.65218	9.68043
Urban non-poor	35.53874	9.19763	9.0689	9.09402

Source: Authors computation from simulation result

The simulation result shows a positive change in household incomes for all simulation case. For rural poor SIM1 result is less than the base line by 0.005 percentage points respectively, whereas in SIM2 the income of the rural poor increased by 0.001 relatively the base line simulation. This indicates that the income of rural poor is not much dependant on the direct tax policy and the simulation result is indeterminate. The rural households have a more diversified source of

income. Unexpectedly the incomes for all household groups except the rural poor, decreased in SIM1 and SIM2 case relatively to the base line simulation as direct tax decreased. The reason for this result may be the reduction in GDP. As we discussed in the above for many reasons GDP of the country reduced as direct tax decreased, and this may affect the day to day activities of households both in rural and urban and finally it affects their income level negatively. In urban areas the effect of contraction of the economy has greater effect, because it highly discourages the capacity of the government to create job opportunities, and this in return affects the income of the urban.

B) Impact on Household Consumption Expenditure

Expenditure refers to the way people choose to spend their income in order to satisfy various needs and wants. Households have personal needs and wants that are directly satisfied through consumption of goods and services resulting from activities that are productive in an economic sense (SNA, 1993). These goods and services are referred to as consumer goods and services and their individual value is defined as the consumption expenditure on these goods or services. Household expenditure is defined as the sum of household consumption expenditure²¹ and the non-consumption expenditures of the household. The latter are those expenditures incurred by a household that relate to compulsory and quasi-compulsory transfers made to government, non-profit institutions and other households, without acquiring any goods or services in return for the satisfaction of the needs of its members. Household expenditure represents the total outlay that a household has to make to satisfy its needs and meet its legal commitments.

Table 5. 7 Summary of household Consumption expenditure (average % change per year)

HOUSEHOLDS	INITIAL	BASE	DTR1	DTR2
Rural poor	70.181	8.8844	8.8794	8.8854
Rural non-poor	237.97	9.265	9.3862	9.3778
Urban poor	3.426	9.06	8.918	8.946
Urban non-poor	27.036	7.108	8.085	7.962

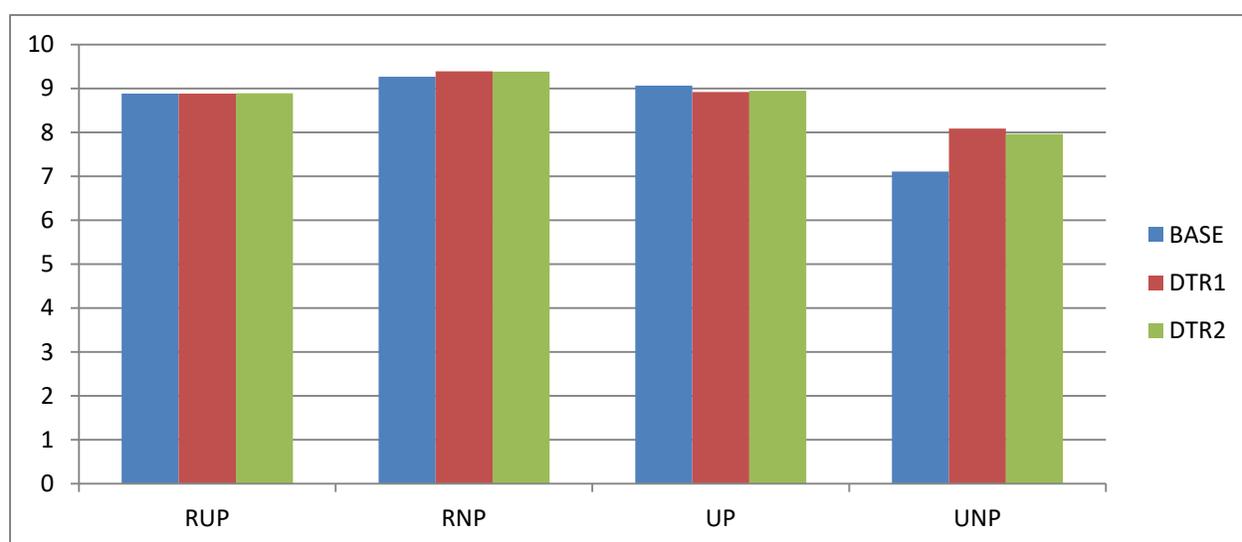
Source: Authors computation From Simulation Result

Table 5.7 indicates the existence of positive change in direction of all household groups expenditure, but it has different magnitude from the base line simulation (it may be less than or greater than the baseline). In SIM1, the result shows that there is an increment for rural non poor

²¹ Household consumption expenditure is the value of consumer goods and services acquired, used for or paid by a household through direct monetary purchases, own account production, barter or as income in-kind for the satisfaction of the needs and wants of its members.

and urban non-poor household's expenditure from the base line simulation by 0.1212 and 0.977 percentage points respectively. Even if the income for those household groups became decrease a little bit their expenditure on the other hand became raise. This is due to the fact that the reductions in the direct tax increase the disposable income of households, so the increment in disposable income increases their consumption expenditure directly. Therefore the result clearly indicates that the reduction in the direct tax increases the consumption expenditure of the rural poor and urban non poor, and on the reverse it negatively affects the consumption decision of the rural poor and urban poor.

Figure 5. 4 Impacts on Household Consumption Expenditure



Source Authors computation from simulation result

The graph in the above in tells that any change related with the direct tax policy did not affect the consumption expenditure of the rural poor households. On the other hand a reduction in the direct tax increased the consumption expenditure of the rural non-poor and urban non-poor households. The urban poor's consumption expenditure became decreased as the direct tax reduced.

5.2.5 Saving in the Economy

Our closure has a great role on the amount of the growth of the saving in the economy. In our case government saving is flexible, but foreign and domestic non-government institution saving is fixed. As a result the simulation result shows that marginal propensity to saving and foreign saving is hold at constant for all the simulation scenarios. In contrast government saving change as direct tax is reformed.

Table 5. 8 Summary of Government Saving

INITIAL	BASE	DTR1	DTR2
35.49	12.11	10.25	10.55

Source: Authors computation from the simulation result

As we observed from Table 5.8 in both SIM1 and SIM2 government saving became decline by 1.86 and 1.56 percentage point respectively from the baseline simulation. Everybody may save some portion of their income if there is surplus after consumption. But in our case due to the reduction in the direct tax, government revenue decreased, but government expenditure increased, therefore in this time government became a borrower instead of saving and this decreased the amount of government saving. This in return negatively affects the investment

5.2.6 Impact Direct Tax Reform on Welfare of Households

The word welfare is defined as the well-being, happiness; health and prosperity person and community at all. Generally welfare refers to social wellbeing of all the people in terms of utility. Welfare has historically been related to happiness and prosperity, whereas its current understanding first emerged in the 20th century (Williams 1976). The CGE model uses a technique of the Equivalent Variation (EV) in order to measure welfare change in terms of change in utility that arises from policy shocks. As it is a measure of wellbeing of the society, a positive EV indicates the existence of welfare gain due to policy change and negative EV implies loss of welfare (Zerayehu, 2013). Since policy shocks are usually followed by major price adjustments, the EV measures the level of income that the consumer needs to pay before the shock to leave him as well off at the equivalent level of utility changes after the price changes. From any policy change, consumer can be harmed or benefited prior to the policy change by paying or receiving the price equivalent in income, negative or positive EV changes represent welfare loss or gain as a result of the policy shock.

Table 5. 9 Summary of Welfare Impact (average % change per year)

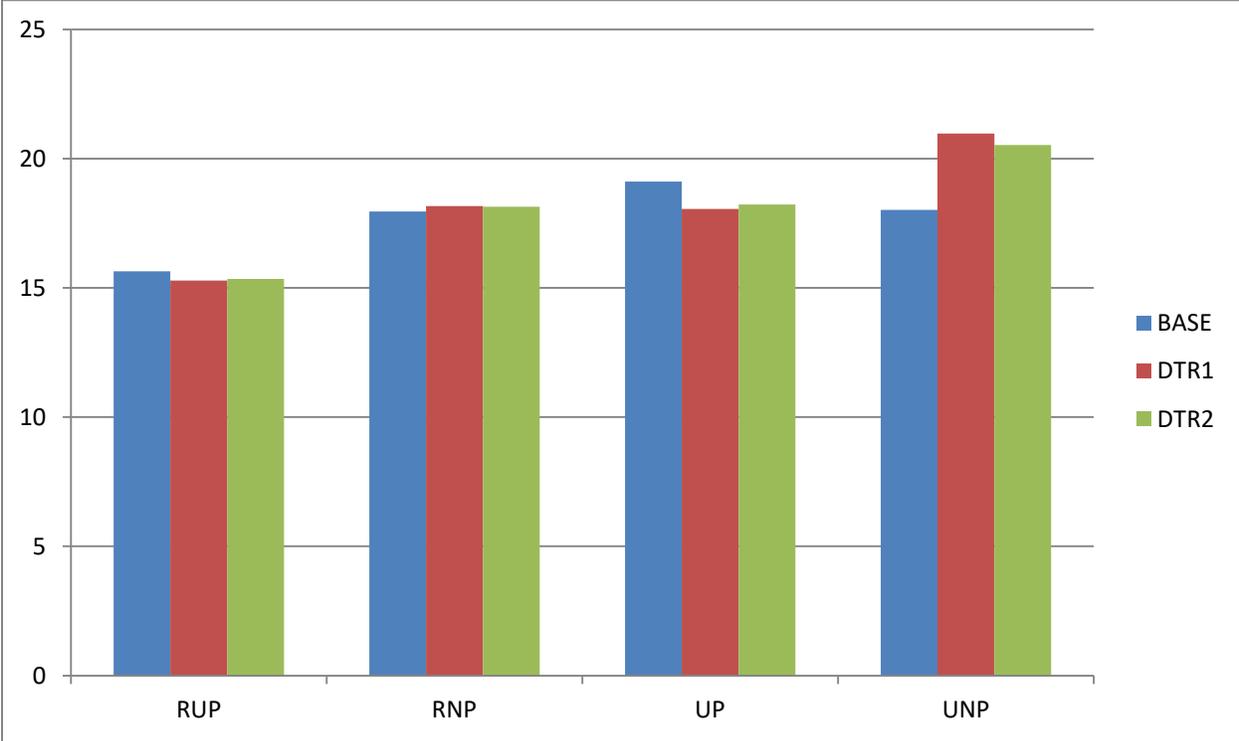
HOUSEHOLDS	INITIAL	BASE	DTR1	DTR2
Rural Poor	70.18	15.64	15.286	15.34
Rural Non-Poor	237.96	17.96	18.164	18.142
Urban Poor	3.43	19.11	18.05	18.23
Urban Non-Poor	27.04	18.01	20.97	20.53

Source: Own computation From Simulation Result

The simulation result in Table 5.9 indicates that there is a positive equivalent variation and the existence of welfare improvement in all simulations. But when we came to analysis based on the baseline simulation, for rural poor households all the alternative simulation results has a negative impact on their welfare relatively to the base line simulation. Both alternative simulations (reduction in the direct tax policy) also have a great negative impact on the welfare of the rural poor society. The reason behind is because of the fact that rural poor households has no any direct linkage with the direct tax reduction policy, the only thing that they did get was the increase in the consumer price index. Therefore given their fixed income the increase in the consumer price has a negative effect on the wellbeing of the rural poor. As we observed from the Table 5.9 in both SIM1 and SIM2 welfare of the rural poor is reduced by 0.354 and 0.3 percentage point respectively from the baseline simulation. This shows that as direct tax is reduced more and more, the wellbeing of the rural poor was hurt. In addition to this the welfare of the rural poor may be affected negatively by the reduction in the direct tax when they are supported by the government safety net program (transfer payment). If they are supported by the safety net program, they are directly affected when the government revenue decreases due to the reduction in the direct tax. The same result is observed for the urban poor.

On the other hand rural non-poor and urban non-poor households' welfare is improved due to the reduction in the direct tax policy. When we compared to the baseline both in SIM1 and SIM2 the welfare of the rural non-poor is improved by 0.204 and 0.182 percentage points and as the same case for urban non-poor it is improved by 2.96 and 2.52 percentage points respectively. The reason for this result is that most of those households pay a direct tax; a reduction in the direct tax immediately improved their welfare through increasing their earning. The result clearly shows that the urban non-poor are highly vulnerable in the direct tax reform. This may be due to the rural households be able to compensate their loss in welfare easily by clean air; getting fresh and quality farm products and so on. Welfare is improved not only through consumption of goods and services, but also leisure also the main source of welfare improvements. As direct tax reduced, income effect may out way the substitution effect and people want to get more leisure, this intern cause to the improvement of their welfare especially for urban non-poor households.

Figure 5. 5 Summary of Welfare Impact (average % change per year)



Source: Authors Computation from the Simulation Result

Figure 5.6 shows that urban poor household’s welfare is highly affected by the reduction in the direct tax, and the reverse is true for the urban non-poor households. When we compared the rural with urban households, rural households are less affected by the direct tax policy, because they have a more diversified source of income.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS

6.1 Conclusion

This paper has evaluated the impacts of the tax reforms introduced in Ethiopia in the 2016/17 fiscal year. The intention of this paper is to examine the impacts of direct tax reform (the joint change in employment income tax and rental income tax); on macroeconomic variables, economic growth, household and government income and expenditure in Ethiopia. Direct tax comprises an important source of government tax revenue for most developing countries. For Ethiopia the direct tax revenue is about 36% of the tax revenue and 28 % of the total tax revenue and grants. As a result, a direct tax reform can significantly affect government tax revenue and cause a serious fiscal challenge especially for the least developing countries like Ethiopia. To do this study researcher used an updated version of the 2009/10 Ethiopian SAM which is developed by the EDRI. We used different scenarios to assess economy wide impact of the direct tax reform such as reduction direct tax by 40% and decrease direct tax by 15%.

Our simulation result shows that there is an improvement in economic activities in the case of all scenarios. The researcher tries to analyze the result by taking the difference from the baseline simulation for all the alternative simulation. When we compared to the baseline result, the decrease in the direct tax increases the private consumption, government expenditure and consumer price index in some extent; whereas fixed investment, government income, net indirect tax and real GDP decreased as direct tax revenue reduced. The sectoral impact of the direct tax reform indicates that the reduction in direct tax enhanced the agricultural growth, but it hurts the growth of the industry and service sector growth rate.

Relative to the baseline simulation result, direct tax reduction decreases the income of the semi-skilled labor, unskilled labor and capital. On the other hand income of the skilled labor, agricultural labor, land and livestock became enhanced. Only the supply of capital and unskilled labor became depend on the direct tax reform, but all the rest factors were not affected by the direct tax policy. The simulation result also indicates that rural non-poor and urban non-poor households' incomes is more dependent on the direct tax reform and have a positive relationship with the tax reform direction (both in SIM1 and SIM2 their income became decreased); whereas

their expenditure increased as the direct tax reduced. For households, a decrease in the tax amount results in higher disposable incomes, especially for urban households that participate in the labor market. Benefits to rural households are lower, mainly because of these households' dependence on subsistence farming and mixed incomes. The analysis also indicates that the direct tax reduction decreases the welfare of the rural and urban poor significantly, but the reverse is true for rural non-poor and urban non-poor households.

6.2 Policy Implications

The recommendations illustrated from this paper are the following:

Since direct tax is one element of government revenue which affects the micro and macro aspects of the economy, some adjustment on it results in overall disturbance of the economy. Therefore a deep and careful analysis should be done on immediate and long run effect before conducting tax reform because, the involvement of the government through the direct tax policy has both positive and negative implications on the economic activities.

Based on our analysis all the simulation results improve the economic performance. In order to increase net indirect tax, raise government revenue, stimulate the fixed investment and enhance the real GDP relative to the baseline simulation; government of Ethiopia should increase the tax base and seek in to other financing mechanism. For countries like Ethiopia, which collects tax revenue below its capacity, decreasing the direct tax has only an effect on increasing the private consumption and enhances the rural and urban non-poor household's welfare but relatively it affects the overall economic performance negatively. Therefore, in order to achieve the plan of the country to become a middle income country by 2025 and to benefit the poor; the government of Ethiopia must increase the tax revenue by broadening the tax base. In order to generate high domestic revenue and to become independent from foreign aid dependency, the government of Ethiopia should increase the tax revenue as much as it benefits the majority of the poor and stimulate the economic growth. The governments must be careful to design tax reforms in ways that take proper account of their distributional impact, particularly, their impact on the poor.

Since Ethiopia has large capacity to generate huge amount of tax revenue, in order to enhance the domestic resource mobilization and to enjoy faster economic growth, government should be under take a policies like the tax structures are more efficiently administered and legally enforced.

These results encourage further research with different policy tools and different advanced model specifications; including tax on private domestic consumption, value added tax, tariff, and other government revenue sources along with making the model comprehensive, and which would provide new result, which could help to shape policy recommendations for developing countries like Ethiopia.

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Appendix: the standard CGE model of IFPRI

Appendix 1: Definition of Sets, Parameters and Variables

Sets

AC	Global set for model accounts-aggregated micro-SAM accounts
$\alpha \in A$	activities
$\alpha \in ALEO(\subset A)$	activities with a Leontief function at the top of the technology nest
$c \in C$	commodities
$c \in CD(\subset C)$	commodities with domestic sales of domestic output
$c \in CDN(\subset C)$	commodities without domestic sales of output
$c \in CE(\subset C)$	exported commodities
$c \in EN(\subset C)$	non-exported commodities
$c \in CM(\subset C)$	imported commodities
$c \in CMN(\subset C)$	non-imported commodities
$c \in CT(\subset C)$	transactions service commodities
$c \in CX(\subset C)$	commodities with domestic production
$f \in F$	factors
$i \in INS$	institutions (domestic and rest of the world)
$i \in INSD(\subset INS)$	domestic institutions
$i \in INSDNG(\subset INSD)$	domestic nongovernmental institutions
$h \in H(\subset INSDNG)$	households

Parameters (Latin Letters)

$ctws_c$	weight of commodity c in the CPI
$dwtsc$	weight of commodity c in the producer price index
ica_{ca}	quantity of c as intermediate input per unit of activity a
$icd_{cc'}$	quantity of commodity c as trade input per unit of c' produced and sold domestically
$ice_{cc'}$	quantity of commodity c as trade input per exported unit of c'
$icm_{cc'}$	quantity of commodity c as trade input per imported unit of c'
$int \alpha_\alpha$	quantity of aggregate intermediate input per activity unit
iva_α	Quantity of value-added per activity unit
\overline{mps}_i	base savings rate for domestic institution i

$mps01_c$ 0-1 parameter with 1 for institutions with potentially flexed direct tax rates
 pwe_c Export price (foreign currency)
 pwm_c Import price (foreign currency)
 pwe_c quantity of stock change
 \overline{qg}_c base year quantity of government demand
 \overline{qinv}_c Base year quantity of private investment demand
 $shif_{if}$ share for domestic institution i in income of factor f
 $shii_{ii}$ Share of net income of i' to i ($i' \in \text{INSDNG}'$; $i \in \text{INSDNG}$)
 \overline{tins}_i Exogenous direct tax rate for domestic institution i
 $tins01_i$ 0 1 parameter with 1 for institutions with potentially flexed direct tax rates
 tm_c import tariff rate
 tq_c Rate of sales tax
 $trnsfr_{if}$ Transfer from factor f to institution i

Parameters (Greek Letters)

α_a^{va} Efficiency parameter in the CES value – added function
 α_a^{ac} shift parameter for domestic commodity aggregation function
 α_a^q Armington function shift parameter
 α_c^t CET function shift parameter
 β_{ach}^h Marginal share of consumption spending on home commodity c from activity α for household h
 β_{ch}^m Marginal share of consumption spending on marketed commodity c for household h
 δ_{ac}^{ac} share parameter for domestic commodity aggregation function
 δ_c^q Armington function share parameter
 δ_c^t CET function share parameter
 δ_{fa}^{va} CES value – added function share parameter for factor f in activity α
 γ_{ch}^m subsistence consumption of marketed commodity c for household h
 γ_{ach}^h subsistence consumption of home commodity c from activity α for household h
 θ_{ac} yield of output c per unit of activity α
 ρ_a^{va} CES value – added function exponent
 ρ_c^{ac} domestic commodity aggregation function exponent ρ_c^q Armington function exponent
 ρ_c^t CET function exponent

Exogenous Variables

\overline{DPI} producer price index for domestically marketed output
 \overline{DTINS} change in domestic institution tax share (= 0 for base; exogenous variable)
 \overline{DMPS} change in domestic institution savings rates (0 for base; exogenous variable)

\overline{FSAV} foreign saving(FCU)
 \overline{GADJ} government consumption adjustment factor
 \overline{MPSADJ} savings rate scaling factor (= 0 for base)
 \overline{MPSi} marginal propensity to save for domestic non – government institution
 \overline{QFS}_f quantity supplied of factor
 $\overline{TINSADJ}$ direct tax scaling factor (= 0 for base; exogenous variable)
 $\overline{WFDIST}_{f\alpha}$ wage distortion factor for factor f in activity a

Endogenous Variables

CPI consumer price index
 EG government expenditure
 EH_h consumption spending for household
 EXR exchange rate (LCU per unit of FCU)
 $GOVSHR$ government consumption share in nominal absorption
 $GSAV$ government savings
 $IADJ$ investment adjustment factor
 $INVSHR$ investment share in nominal absorption
 PA_α activity price (unit gross revenue)
 PDD_c demand price for commodity produced and sold domestically
 PDS_c supply price for commodity produced and sold domestically
 PE_c export price (domestic currency)
 $PINTA_\alpha$ aggregate intermediate input price for activity α
 PM_C import price (domestic currency)
 PQ_C composite commodity price
 PVA_α value – added price (factor income per unit of activity)
 PX_c aggregate producer price for commodity
 $XAC_{\alpha c}$ producer price of commodity c for activity α
 QA_α quantity (level) of activity
 QD_C quantity sold domestically of domestic output
 QE_C quantity of exports
 $QF_{f\alpha}$ quantity demanded of factor f from activity α
 QG_C government consumption demand for commodity c
 QH_{ch} quantity consumed of commodity c by household h
 $QHA_{\alpha ch}$ quantity of household home consumption of commodity c from activity α for household h

$QINTA_\alpha$	quantity of aggregate intermediate input
$QINT_{c\alpha}$	quantity of commodity c as intermediate input to activity α
$QINV_c$	quantity of investment demand for commodity c
QM_c	quantity of imports of commodity c
QQ_c	quantity of goods supplied to domestic market (composite supply)
QT_c	quantity of commodity demanded as trade input
QVA_α	quantity of (aggregate) value – added
QX_c	aggregated marketed quantity of domestic output of commodity c
$QXAC_{ac}$	quantity of marketed output of commodity c from activity a
$TABS_{ac}$	quantity of marketed output of commodity c from activity a
$TABS$	total nominal absorption
$TINS_i$	direct tax rate for institution i ($i \in INSDNG$)
$TRII_{i'}$	transfers from institution i' to i (both in the set INSDNG)
WF_f	average price of factor f
YF_f	income of factor f
YG	government revenue
YI_i	income of domestic nongovernment institution
YIF_{if}	income to domestic institution i from factor f

Appendix 2: Equations of the Model

STATIC PART

A) Price Block

[1] Import price

$$PM_c = pwm_c(1 + tm_c) * EXR + \sum_{c' \in CT} PQ_{c'} * icm_{c'c} \quad c \in CM$$

[2] Export price

$$PE_c = pwe_c * (1 - te_c) * EXR - \sum_{c' \in CT} PQ_{c'} * ice_{c'c} \quad c \in CE$$

[3] Demand price of domestic non-traded goods

$$PDD_c = PDS_c + \sum_{c' \in CT} PQ_{c'} * icd_{c'c} \quad c \in CD$$

[4] Absorption

$$PQ_c \cdot (1 - tq_c) \cdot QQ_c = PDD_c \cdot QD_c + PM_c \cdot QM_c \quad c \in (CD \cup CM)$$

[5] Marketed output value

$$PX_c \cdot QX_c = PDS_c \cdot QD_c + PE_c \cdot QE_{cC} \in CX$$

[6] Activity price

$$PA_\alpha = \sum_{c \in C} PXAC_{ac} \cdot \theta_{ac} \quad \alpha \in A$$

[7] Aggregate intermediate input price

$$PINTA_\alpha = \sum_{c \in C} PQ_c \cdot ica_{c\alpha} \quad \alpha \in A$$

[8] Consumer price index

$$CPI = \sum_{c \in C} PQ_c \cdot cwts_c$$

[9] Producer price index for non-traded market output

$$\overline{DPI} = \sum_{c \in C} PDS_c \cdot dwts_c$$

B) Production and Trade Block

[10] Leontief technology: Demand for aggregate value-added

$$QVA_\alpha = iva_\alpha \cdot QA_\alpha \alpha \in ALEO$$

[11] Leontief technology: Demand for aggregate intermediate input

$$QINTA_\alpha = inta_\alpha \cdot QA_\alpha \alpha \in ALEO$$

[13] Value-added and factor demand

$$QVA_a = \alpha_a^{va} \left(\sum_{f \in F} \delta_{fa}^{va} \cdot QF_{fa}^{-\rho_a^{va}} \right)^{\frac{1}{\rho_a^{va}}} \quad a \in A$$

[14] Factor Demand

$$WF_f \cdot \overline{WFDIST}_{fa} = PVA_a \cdot QVA_a \left(\sum_{f \in F'} \delta_{fa}^{va} QF_{fa}^{-\rho_a^{va}} \right) \cdot \delta_{fa}^{va} QF_{fa}^{-\rho_a^{va} a^{-1}} \quad a \in A; f \in F$$

[15] Disaggregated intermediate input demand

$$QINT_{ca} = ica_{ca} \cdot QINTA_a \quad a \in A; c \in C$$

[16] Commodity production and allocation

$$QXAC_{ac} + \sum_{h \in H} QHA_{ach} = \theta_{ac} \cdot QA_a \quad a \in A; a \in CX$$

[17] Output aggregation function

$$QX_c = \alpha_c^{ac} \left(\sum_{a \in A} \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_{ac} c} \right)^{-\frac{1}{\rho_c^{ac}-1}} \quad c \in CX$$

[18] First-order condition for output aggregation function

$$PXAC_{ac} = PX_c \cdot QX_c \left(\sum_{a \in A} \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_{ac} c} \right)^{-1} \cdot \delta_{ac}^{ac} \cdot QXAC_{ac}^{-\rho_{ac} c^{-1}} \quad a \in A; c \in CX$$

[19] Output transformation (CET) function

$$QX_c = \alpha_c^t \left(\delta_c^t \cdot QE_c^{\rho_c^t} + (1 - \delta_c^t) \cdot QD_c^{\rho_c^t} \right)^{\frac{1}{\rho_c^t}} c \in (CE \cap CD)$$

[20] Export-domestic supply ratio

$$\frac{QE_c}{QD_c} = \left(\frac{PE_c}{PDS_c} \cdot \frac{1 - \delta_c^t}{\delta_c^t} \right)^{\frac{1}{\rho_c^t - 1}} \quad c \in (CE \cap CD)$$

[21] Output transformation for non-exported commodities

[22] Composite supply (Armington) function

$$QQ_c = \alpha_c^q \cdot \left(\delta_c^q \cdot QM_c^{-\rho_c^q} + (1 - \delta_c^q) \cdot QD_c^{-\rho_c^q} \right)^{\frac{1}{\rho_c^q}} c \in (CM \cap CD)$$

[23] Import-domestic demand ratio

$$\frac{QM_c}{QD_c} = \left(\frac{PDD_c}{PM_c} \cdot \frac{\delta_c^q}{1 - \delta_c^q} \right)^{\frac{1}{1 + \rho_c^q}} c \in (CM \cap CD)$$

[24] Composite supply for non-imported outputs and non-produced imports

$$QQ_c = QD_c + QM_c \quad c \in (CD \cap CMN) \cup (CM \cup CDN)$$

[25] Demand for transaction services

$$QT_c = \sum_{c' \in CT} (icm_{cc'} \cdot QM_{c'} + ice_{cc'} \cdot QE_{c'} + icd_{cc'} \cdot QD_{c'}) \quad c \in CT$$

C) Institutional Block

[26] Factor income

$$YF_f = \sum_{a \in A} WF_f \cdot \overline{WFDIST}_{fa} \cdot QF_{fa} f \in F$$

[27] Institutional factor income

$$YIF_{if} = shif_{if} \cdot [(1 - tf_f) \cdot YF_f - transfr_{rowf} \cdot EXR] i \in INSD; f \in F$$

[28] Income of domestic, non-government institutions

$$YI_i = \sum_{f \in F} YIF_{if} + \sum_{i' \in INSDNG} TRII_{ii'} + trnsfr_{gov} \cdot CPI + trnsfr_{irow} \cdot EXR \quad i \in INSDNG$$

[29] Intra-institutional transfer

$$TRII_{ii'} = shii_{ii'} \cdot (1 - MPS_h)(1 - TINS_h) \cdot YI_h \quad h \in H$$

[30] Household consumption expenditure

$$EH_h = \left(1 - \sum_{i \in INSDNG} shii_{ih} \right) \cdot (1 - MPS_h) \cdot (1 - TINS_h) \cdot YI_h$$

[31] Household consumption demand for marketed commodities

$$PQ_c \cdot QH_{ch} = PQ_c \cdot \gamma_{ch}^m + \beta_{ch}^m \cdot \left(EH_h - \sum_{c' \in C} PQ_{c'} \cdot \gamma_{c'h}^m - \sum_{a \in A} \sum_{c' \in C} PXAC_{ac'} \cdot \gamma_{ac'h}^h \right) \quad c \in C; h \in H$$

[32] Household consumption demand for home commodities

$$\begin{aligned} PXAC_{ac} \cdot QHA_{ach} &= PXAC_{ac} \cdot \gamma_{ach}^h \\ &+ \beta_{ach}^h \cdot \left(EH_h - \sum_{c' \in C} PQ_{c'} \cdot \gamma_{c'h}^m - \sum_{a \in A} \sum_{c' \in C} PXAC_{ac'} \cdot \gamma_{ac'h}^h \right) \quad a \in A \end{aligned}$$

[33] Investment demand

$$QINV_c = IADJ \cdot \overline{qinv}_c \quad c \in CINV$$

[34] Government consumption demand

$$QG_e = \overline{GADJ} \cdot \overline{qg}_e \quad c \in C$$

[35] Government revenue

$$\begin{aligned} YG &= \sum_{i \in INSDNG} TINS_i \cdot YI_i \\ &+ \sum_{c \in CM} tm_c \cdot pwm_c \cdot QM_c \cdot EXR \\ &+ \sum_{c \in C} tq_c PQ_c QQ_c + \sum_{f \in F} yif_{govf} + trnsfr_{govrow} \cdot EXR \end{aligned}$$

[36] Government expenditure

$$EG = \sum_{c \in C} PQ_c \cdot QG_c + \sum_{i \in INSDNG} trnsfr_{igov} \cdot CPI$$

D) System Constraint Block

[37] Factor market

$$\sum_{a \in A} QF_{fa} = \overline{QFS_f} \quad c \in C$$

[38] Composite commodity market

$$QQ_c = \sum_{a \in A} QINT_{ca} + \sum_{h \in H} QH_{ch} + QG_c + QINV_c + qdst_c + QT_c$$

[39] Current account balance for the rest of the world (in foreign currency)

$$\sum_{c \in CM} pwm_c \cdot QM_c + \sum_{f \in F} trnsfr_{rowf} = \sum_{c \in CE} pwe_c \cdot QE_c + \sum_{i \in INSD} trnsfr_{irow} + \overline{FSAV}$$

[40] Government balance

$$YG = EG + GSAV$$

[41] Direct institutional tax rates

$$TINS_i = \overline{tins}_i \cdot (1 + \overline{TINSADJ} \cdot TINS01_i) + DMPS \cdot mps01_i \quad i \in INSDNG$$

[42] Institutional savings rates

$$MPS_i = \overline{mps}_i \cdot (1 + \overline{MPSADJ} \cdot mps01_i) + \overline{DTINS} \cdot TINS01_i \quad i \in INSDNG$$

[43] Saving-investment balance

$$\sum_{i \in INSDNG} \overline{MPS}_i \cdot (1 - TINS_i) \cdot YI_i + GSAV + EXR \cdot \overline{FSAV} = \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c$$

[44] Total absorption

$$\begin{aligned} TABS &= \sum_{h \in H} \sum_{c \in C} PQ_c \cdot QH_{ch} \\ &\quad + \sum_{a \in A} \sum_{c \in C} \sum_{h \in H} PXAC_{ac} \cdot QHA_{ach} \\ &\quad + \sum_{c \in C} PQ_c \cdot QG_c + \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c \end{aligned}$$

[45] Ratio of investment to absorption

$$INVSHR \cdot TABS = \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c$$

[46] Ratio of government consumption to absorption

$$GOVSHR \cdot TABS = \sum_{c \in C} PQ_c \cdot QG_c$$

[47] Government share

$$INVSHR.(TABS) = \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c$$

[48] Investment share

$$GOVSHR.(TABS) = \sum_{c \in C} PQ_c \cdot QG_c$$

DYNAMIC PART

[49] Average capital rental rate

$$AWF_{ft}^a = \sum_a \left[\left(\frac{QF_{fat}}{\sum_{a'} QF_{fat}} \right) \cdot WF_{ft} \cdot WFDIST_{fat} \right]$$

[50] Share of new capital

$$\eta_{fat}^a = \left(\frac{QF_{fat}}{\sum_{a'} QF_{fat}} \right) \cdot \left(\beta^a \left(\frac{WF_{ft} \cdot WFDIST_{fat}}{AWF_{ft}^a} - 1 \right) + 1 \right)$$

[51] Quantity of new capital by sector

$$\Delta K_{fat}^a = \eta_{fat}^a \left(\frac{\sum_a PQ_{ct} \cdot QINV_{ct}}{PK_{ft}} \right)$$

[52] Unit price of capital

$$PK_{ft} = \sum_c PQ_{ct} \frac{QINV_{ct}}{\sum_{c'} QINV_{ct}}$$

[53] Average Price of capital

$$QFS_{fat+1} = QFS_{fat} \cdot \left(1 + \frac{\sum_a \Delta K_{fat}}{QFS_{fat}} - v_f \right)$$

[54] Average quantity demanded of factor f from activity a

$$QF_{f_{t+1}} = QF_{fat} \cdot \left(1 + \frac{\Delta K_{fat}^a}{QF_{fat}} - v_f \right)$$

Declaration

I, the undersigned, declare that this thesis is my original work and it has never been presented for a degree or masters in any other university, and that all source of materials used for the thesis have been duly acknowledged.

The examiners' comments have been duly incorporated.

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