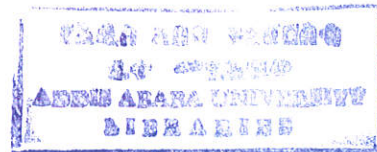


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REVENUE PRODUCTIVITY OF THE TAX SYSTEM
IN ETHIOPIA

YOSEPH ZELALEM
MAY, 1998

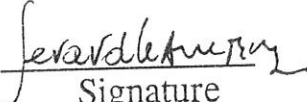
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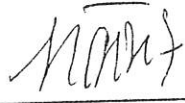
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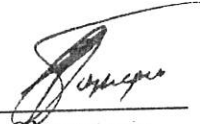
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DEDICATION

This work is dedicated to my mother Kukube Dinka and my late father Zelalem Gobena.

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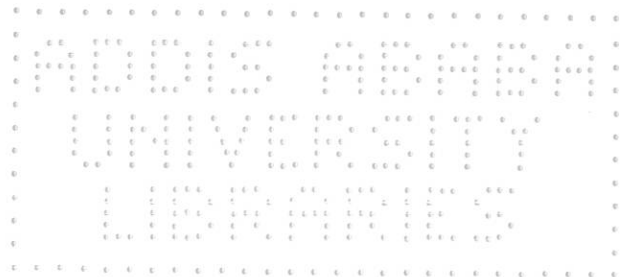
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Abstract

This paper studies the role played by built-in- tax elasticity and discretionary tax measures in the government's efforts to reduce the budget deficit and finance development in Ethiopia. The estimation results demonstrate an income inelastic tax system. Analysis of the components of the overall tax elasticity brings out the generally low value of the tax-to-base relative to base to income as a key factor in explaining the low elasticity of the tax system. The main reason for the low tax-to-base elasticity is inefficient and poor tax administration and the existence of large exemptions. Therefore the increase in total tax revenue has been mainly due to discretionary tax measures. The DTMs were found to be an effective policy instrument both for raising additional revenue and for effecting a shift from the taxation of international trade to the taxation of domestic transactions. These results have important implications for tax reform. There is a need to evolve an elastic tax structure since it implies that tax collections will grow automatically with the growing economy without resorting to frequent, potentially sensitive discretionary changes in tax structure. This mainly requires establishing a strong tax administration, reducing or eliminating exemptions, introducing lower rates, and broadening the tax base.

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CHAPTER ONE

INTRODUCTION

Ethiopia is currently undertaking a structural adjustment program. One of the policy tools of the program for achieving real economic growth with price stability and balance of payment viability is fiscal deficit reduction. The latter requires tax collections to grow automatically with the growing income within the existing tax system and the effectiveness of discretionary tax measures as policy instrument to raise revenue. Also, both the world Bank and the IMF recommend a shift from the taxation of international trade to the taxation of domestic transactions as one of the main objectives of a tax reform program. This reform has been included in the structural adjustment program on the presumption that discretionary tax measures play a crucial role in effecting this shift.

This thesis analyses the revenue productivity of the tax system in Ethiopia. It examines the capacity of the individual tax and overall tax system to mobilize an increasing proportion of national income as the latter grows. The study also examines whether discretionary tax measures (DTMs) are effective policy instruments in mobilizing resources, and compares the roles that economic growth and discretionary tax measures play in explaining the movements in tax revenues.

1.1 Statement of the Problem

In less developed countries, like Ethiopia, the question of how to bring about economic development is crucial. Such economies are characterized by a dominant subsistence sector and high propensity to consume; as a result development financing is a major problem. A.R. Prest pointed out this fact by saying "...all government at all times have to face demands for additional spending but... the pressure in underdeveloped countries tends to be particularly intense" (1972:14). Since developing countries are at low levels of development, the

government must provide a wide range of basic services that development requires.

In Ethiopia, especially during the Derg regime (1974-1991), the public sector grew rapidly with many new ministries, institutes, corporations and departments being established, which played a part in the rapid expansion of government expenditure. Thus government expenditure has consistently exceeded domestic revenue. For example, government expenditure as a percent of GDP in 1975 was 21.7 percent, this rose to 25.9 percent of GDP in 1981 and reached 41.9 percent in 1989. This ratio declined to 32.1 percent in 1991. On the revenue side, however, there has been slow rate of growth in comparison to the growth in expenditure. Even though there was some revenue mobilization effort and a corresponding revenue growth, the growth in government expenditure substantially exceeded revenue growth throughout the period. The government total domestic revenue as a ratio of total government expenditure for the periods 1956-64, 1965-74 and 1975-1991 was 82.63, 73.08, and 66.59 percent respectively (Teshome, 1993).

The result of this, like in many other LDCs, is that Ethiopia has been facing large and increasing budget deficits. For example, the budget deficit as a ratio of GDP has been 3.2%, 4.5% and 10.5% in the 1960s, 1970s and 1980s respectively. In general Since the 1950s, except in 1953, 1954 and 1967, the fiscal balance of the Ethiopian government has consistently been negative (Wogene, 1994). The large deficit, especially during the Derg regime, was explained in large part by large defense expenditure though expenditures on economic services also increased. The trend in the post Derg regime is explained by increases in capital expenditure.

A growing budget deficit can cause economic instability which, in turn, may retard domestic investment, lead to inflation, and increase balance of payments(BOP) deficits, depending on the way the deficits are financed. In Ethiopia, for example, since the 1970s more than half of the deficit is financed by domestic borrowing and the excessive reliance on this source has generated inflationary pressures and crowded out private investment.

Given such a situation, Ethiopia has to find alternative ways to finance the increase in government expenditure. Although financing development expenditures can as well be accomplished with the help of external finance, the ability of any country to sustain its economic growth lies in its capacity to mobilize domestic resources. That is, the reliance on domestic sources for development finance is beyond question and external finance should only be seen as supplementary (Nurkse, 1953). Thus, it is widely asserted that the domestic rate of capital formation is one of the fundamental determinants of long term growth of a nation.

As in other LDCs, taxation has been the most important source of domestic revenue in Ethiopia. During the periods 1950-60, 1961-74 and 1975-91 tax revenue as a proportion of domestic revenue was 88.1, 86.2 and 76.26 percent while during the same period tax revenue as a proportion of total expenditure was 86.46, 66.84 and 50.68 percent respectively (Teshome, 1993). However, the performance of the Ethiopian tax system is widely argued to be unsatisfactory. The poor performance is attributed to deficiencies in tax policy, weak tax administration, considerable tax evasion and the existence of a large informal sector (Taube and Tadesse, 1995). Various studies have suggested that the country's tax system is neither efficient nor effective. The study by Teshome Mulat suggests that "although over the longer term tax yield had a high growth rate, there has been a marked decline in the rate of growth of tax revenues in recent years. The recent declines in tax collections have resulted in the main from an erosion of the tax base and marked deterioration in tax administration" (Teshome, 1993: 85). Also, various studies of the tax system of Ethiopia have concluded that the tax system is income inelastic (Teame, 1985; Teshome, 1993).

Thus, we can argue that fostering an efficient tax system is a major concern in Ethiopia. "Tax revenue must be high enough to cover current expenditure and above that to mobilize enough resources to finance development expenditure" (UN Secretariat, 1975:60). The tax system must be structured in such a way that it has a high degree of income elasticity. Moreover, developing such a tax system may also require effective discretionary

tax measures. This could be achieved by basing any action towards reforming any aspect of the tax system on frequent and comprehensive studies of the country's tax system. This thesis offers one such study.

1.2 Economic Background

In this section we review the performance of the Ethiopian economy since 1960. The summary of main economic indicators is provided in table 1.

The country's GDP in real terms grew on the average by 4.4% per annum between 1961-70. However this growth rate began to decelerate on the eve of the Ethiopian revolution, being 2.5% in 1972/73. The real GDP growth rate declined in the era of the Derg and averaged 1.8% in the period 1973/74-1989/90. In the meantime the average growth rate of population was 2.75%. As a result there was a decline in per-capita income, averaging 0.95 percent per annum. The growth of real GDP has witnessed a recovery since 1992/93, except in 1993/94 during which drought and pest damage occurred. Between 1991/92-1994/95 GDP at constant factor cost grew at an average annual rate of 3.8% per year and as a result per-capita income grew at average rate of 1.97% during the same period (Siyoum, 1997).

In the 1970s and 1980s there was not only poor achievement in total GDP growth but also performance in various sectors of the economy was quite uneven (Eshetu and Mekonnen 1992). The poor overall economic growth record especially in the period 1974-1991 was due to the poor growth in the commodity producing sectors, mainly agriculture (see table 1).

From the 1960s up to the end of the 1980s the average growth rate of agricultural output has consistently been lower than the population growth rate. Therefore between 1970 and 1990 the sector has been unable to feed the population let alone supply any excess as industrial raw materials and exports. As a result an estimated 60% of the population lived

below the absolute poverty line (WB, 1991).

Table 1: Average annual Growth Rate (in per cent).

	1961-70	1970-80	1980-91	1991-96
GNP	4.4	1.9	1.6	5.4
Agriculture	2.2	0.7	0.3	3.8
Industry	7.4	1.6	1.8	8.8
Services	4.5	3.9	3.1	7.1
Population	2.4	2.7	3.1	(3.1)

Source: The World Bank, Ethiopia: An economic Overview, november 1996, pp.2.

The economic structure of the country is dominated by agriculture. It contributes the largest share of GDP (for instance in 1995/96 the sector contributed 51% of GDP (WB, 1996)), employs nearly 80% of the total labour force, and major export items (80%) originate from this sector (WB, 1995). In terms of contribution to GDP, agriculture is followed by the services sector, which includes distributive services, social services and public administration services. The growth of the service sector reflects a narrow industrial base and the preponderance of non-wage employment in the overall economy. Ethiopia's industrial sector accounts for 12% of GDP (WB, 1994). It provided employment opportunity for about 120,000 workers as of December 1992. More than half of this figure are employed in public enterprises. The sector also represents about 25% of total export earnings (WB, 1994).

During the period 1970/71-1994/95 the average annual growth rate was 0.66% for agricultural value added, 3.6% for the industrial sector and 4.39% for the service sector (Siyoum, 1997). In the periods 1974-80, 1981-88 and 1988-93 the real industrial growth, in terms of annual percentage change in value added, has been 1.4, 3.9 and 4.1 percent respectively (Annual Report of the Global Coalition for Africa, 1994). since 1993 the manufacturing has sector also recorded a significant recovery.

In general, during the period 1991-96, the Ethiopian economy managed to attain the overall performance level it enjoyed during the 1961-70 period. However, the recovery recorded in the 1990s has made little change in terms of welfare and standards of living, since the level of per-capita GDP of Ethiopia still remains one of the lowest in sub-saharan Africa (WB, 1996). The recent relatively better performance in real GDP, among others, is due to improved performance in the agricultural sector, improvements in productivity in the manufacturing sector and partial liberalization that included elimination of controls on marketing and pricing of grains.

With regards to savings and investment, over the periods 1971/72-1972/73, 1973/74-1989/90 and 1991/92- 1994/95, average saving as a percent of GDP has been 12.1, 5.2 and 4.64%. In contrast the trend in annual gross investment as a percent of GDP was upward, except during 1973/74-77/78 when it was 8.89%. Investment as a percent of GDP over the period 1971/72-1972/73 was 11.99% but was very low between 1988/89-1989/90. During the period 1991/92-1994/95 gross investment as a percent of GDP increased substantially, rising from 7.12% in 1990/91 to about double in 1994/95, the composition changing in favour of private investment. However, compared with previous years the growth in the saving rate has been weak. As a result, investment is dominantly financed from foreign sources (Seyoum, 1997).

The performance of the balance of payments was poor during the period under review. Between the periods 1971/72-1994/95, except for 1972/73 and 1973/74, the BOP was not only showing a deficit but also the magnitude of the deficit was increasing overtime. This was due to fluctuations in volume and price of imports and exports (Seyoum, 1997).

Relating to fiscal development during the periods 1950-60, 1960-74 and 1975-90, average annual growth rate of real expenditure was 9.17, 10.25 and 8.38 percent; while average annual growth rate of real tax revenue was 8.45, 7.52 and 5.96 percent respectively (Teshome, 1993). Between 1990/91-94/95 domestic revenue increased, expenditure also

increased but the share of military spending became as low as 22.8% of total expenditure in the period 1990/91-1995/96.

The government deficit, that is the excess of government expenditure over domestic revenue, has been financed by external assistance, external loans and domestic bank borrowing. During the sixties about 80% of government deficit had been financed by borrowing from external sources. In the latter decades, however, foreign sources covered less than half of the deficit, being 44% and 47% in the 1970s and 1980s respectively (Wogene, 1994). The increasing contribution of the domestic banking system in financing the deficit has also led to increases in the money supply which, in turn, explains the inflationary situation. "Both narrow money supply (m1) and broad money (m2) expanded by 6 and 5 fold respectively from 1973/74 to 1988/89 and each grew by two fold in 1994/95 from their 1988/89 level. These rates of growth were much higher than the GDP" (Siyoun, 1997:34).

In summary, the overview of the Ethiopian economy indicates an unsatisfactory overall performance, mainly in the 1970s and 1980s, arising primarily from poor performance in the main sectors of the economy (mainly in agriculture), low domestic savings, weak private investment, very low foreign investment, and high population growth, but also from poor infrastructure, volatile terms of trade, and a poor policy environment as noted by Eshetu and Mekonnen (1992); Semu (1994); and Seyoum (1997). This suggests, among other things, the importance of critically studying the efficiency of various policy instruments used by the government. The present study on taxation is part of such an attempt. In addition the fact that the study examines one aspect of tax reform, which is part of the overall economic reform program the country is undertaking, makes the study of special interest.

1.3 Objectives of the Study

In the face of large budget deficits and given the increasing demand for development expenditures, there is a need to devise a more efficient tax system which will ensure that the government budget maintains macroeconomic stability and supports long-run economic growth. The general objective of this thesis is to assess the revenue productivity of the Ethiopian tax system in light of the tax base, discretionary measures, and economic growth.

The specific objectives of the study are:

1. To review and analyze the structure of the tax system and its evolution over time;
2. To determine the built-in elasticity of individual taxes and the overall tax system. The objective here is to determine whether individual and overall tax revenues are income elastic. In this analysis the elasticity of each separate tax will be broken into its two elements: the elasticity of the tax to base and the elasticity of the base to income.
3. To assess the revenue impact of discretionary tax measures; and
4. To estimate and compare the contribution of economic growth and discretionary measures to total and individual tax revenues.

1.4 Hypotheses

This thesis tests two hypotheses. One is that Ethiopia's tax system is not sufficiently elastic to allow for increases in tax revenue as the economy grows; and the other is that discretionary tax measures are not effective policy instruments to mobilize resources.

The first hypothesis emerged from the fact that Ethiopian domestic revenue doesn't cover its expenditure and the gap between the two is widening overtime; while the second hypothesis arises from the findings of several studies on the tax system of several LDCs.



1.5 Significance Of The Study

The study tests these hypotheses by applying appropriate quantitative techniques to data of sufficiently long period of time. Fiscal deficit reduction, one of the policy tools of the structural adjustment program in Ethiopia, is expected to support progress toward achieving real economic growth with price stability and balance of payment viability. In dealing with fiscal policy within such a framework, quantitative analysis is needed to ensure that an increasing proportion of growth in national income is mobilized within the existing tax system. Achieving the objective of deficit reduction may also require the activation of additional means of revenue generation through discretionary tax changes, which should as well be based on a quantitative analysis of the existing tax system.

The findings of the study will help to identify the sources of rapid revenue growth and/or the causes of lagging revenue growth. The results will also help to determine the potential of each tax system to raise higher levels of revenue in the future through tax reform. This study differs from the previous studies on the Ethiopian tax system not only because it employs an adequate analytical framework or model but also because it deals with the tax system in general and the study uses data for 1961-1996, covering a longer period. It will therefore provide additional insights into the potential of the tax system to raise adequate revenue to bridge the gap between revenue and expenditure.

1.6 limitations of the study

The scope and depth of this study has been limited by the availability and quality of relevant statistical data. For example data on legal tax bases is not available. Faced with this problem we used proxy rather than legal tax base. Also as regards data on GDP and its components, actual such data is only available for the years post 1960, thus limiting our year of study to periods starting from 1961.

Measurement problem is another limitation. There is a great deal of scepticism about the accuracy of the figures on GDP and its components. Also, apart from the questionability of accuracy of such figures, the GDP figures do not include the informal sector which, however, is significant in size. This imposes limitations to our study since our main objective is to establish the relationship between tax revenue and GDP.

Thus it is with these limitations in mind that the results of the study should be interpreted and used.

1.7 Organization of the study

The rest of the paper is organized as follows. As a background to subsequent analysis a review of the Ethiopian tax system, the analysis of its structure, composition and growth over time appear in chapter two. Chapter three provides review of theoretical and empirical literature related to the study. Chapter four describes the model and the data. Chapter five covers estimation of the model and analysis of empirical results. Lastly, in chapter six, conclusions and policy recommendations are presented.

CHAPTER TWO

ANALYSIS OF THE ETHIOPIAN TAX STRUCTURE

2.1. Development of The Tax System in Ethiopia

In Ethiopia fiscal policy is reported to have started in 1908, when the ministry of finance was established (Teame, 1985). However, a relatively comprehensive system of revenue collection and expenditure was only introduced by the Ethiopian government after independence from Italy. Therefore, under this sub-topic, the discussion will emphasize the development of modern taxation in Ethiopia after independence.

The change overtime in the tax system of Ethiopia has occurred through discretionary measures . Even though the discretionary changes relate to both the rate structure and the base, the changes that were introduced in the rate structure were more important.

A review of tax policy of Ethiopia suggests that the history of changes in rate structure can be divided in to five epochs. These are : (a) First, the 1941-1944 period. In this period, in 1943 and 1944, laws regulating the payment of customs and excise duties as well as personal and business income taxes were issued. (b) The second epoch covers the years between mid-forties and early fifties (1947-1952). During this period, in an attempt to improve the performance of the tax system to meet the increasing need for finance, new laws were introduced and amendment and a revision of former laws were made. (c) The period between late fifties and early sixties is the third epoch. During this period changes in rate structure especially changes relating to taxes on income were introduced. (d) The changes in tax rates that were made between 1976-1979 (i.e. the laws that were passed during early period of the Derg regime) characterized the fourth epoch. Also at around the end of the Derg regime many amendments were made mainly relating to the indirect tax. (e) Finally,

the last major changes took place after the overthrow of the Derg regime. These relate to changes in rates of both direct and indirect taxes.

The Changes that were introduced with respect to the tax base were as follows. Taxes on land and cattle were introduced during the late forties and early fifties. During the mid-fifties, a broad-based transaction tax on goods and services was introduced. This measure was taken following the development of the industrial sector and subsequent expansion of trade. Two basic changes in revenue base took place during the post 1974 period. The changes were introduced following changes in the ownership pattern of land and other productive resources introduced by the Derg regime. The two changes are (a) expansion of the base of land tax; (b) The nationalization of various enterprises by the government and their subsequent expansion under government ownership created two additional sources of government revenue, namely, capital charges and residual surplus. However after the overthrow of the Derg regime this structure (direction) was reversed.

The Ethiopian tax system offers tax incentives, the objectives of which varied over time. The principal objectives of tax incentives in Ethiopia has been the encouragement of investment , mainly for promoting industrial and agricultural development. However, the main objective during the Derg regime has been the promotion of the socialization process of individual producers. The tax incentives mainly related to exemptions from paying income taxes for a specific number of years, which in most case varied from 3 to 5 years; exemptions or lower duty rate on imports and exemptions from sales tax.

In the following subsections we will examine how the above changes relate to individual taxes, focusing on the changes that occurred in the period of our study and making the distinction between direct and indirect taxation.

2.1.1 Direct Taxation

The direct taxes are those taxes the burden of which falls on the legal tax payers. In Ethiopia the main components of direct taxes are income taxes and land use tax.

2.1.1.1 Income Taxes

This category includes personal income tax, corporate or business profit tax, taxation of income from agriculture, and tax on income from rent of land and building (Negarit Gazeta, proclamation No.255/1967).

Proclamation No.60 of 1944 introduced the payments of income tax by all individuals and businesses. This is one of the earliest taxes introduced by the government, which has been subsequently revised a number of times. It has undergone several modifications from a system of simple tributes to a highly developed modern income tax system. The First major amendments were made in 1961 and in 1967. With the introduction of the income tax proclamation of 1967, the taxation of various incomes started.

The income tax proclamation No. 255 of 1967 was in operation up to 1976. After the overthrow of the imperial regime in 1974, the military government issued proclamation No. 77 of 1976 which was further amended by proclamation No. 144 of 1978. The 1978 proclamation resulted in a major change in various schedules of the 1967 tax law. The latter proclamation has been replaced by a new proclamation No. 30 of 1992 issued by the transitional government of Ethiopia.

The income tax proclamation No.255 of 1967 divided the income tax into four categories. Schedule A applied to taxation of incomes from employment (i.e personal income tax); Schedule B applied to the taxation of incomes from rent of land and buildings used for other activities than agriculture; schedule C applied to incomes from any trade,

business, professional or vocational occupation (i.e corporate income or business profit tax);and schedule D applied to income from agricultural activities (i.e. agricultural income tax).

A.Personal Income Tax

Personal income tax is levied on incomes, mainly wages and salaries. Before the introduction of decree No.19 of 1956, this tax was levied on annual income. According to the latter law monthly income up to birr 30 was exempted from paying the tax. The tax per month on monthly income over birr 30 varied from a minimum of 0.5 birr on monthly income of birr 30 to 40 to 210 birr on monthly income of birr 1450 -1500. On monthly income over birr 1500 a tax rate of 15% was applied. This decree was amended by proclamation No.173 of 1961. In this proclamation specific tax rates and ad valorem rates were increased. Accordingly, specific rates were applied to monthly income of up to birr 750 and ad valorem rates were applied to monthly income above birr 750, each divided into several income brackets. This proclamation was amended by proclamation No.255 of 1961. The latter law lowered the minimum exemption limit from the previous monthly income of 30 birr to 25 birr. The other difference was that it made a slight upward revision of some ad valorem rates and raised the rate on monthly income of birr 5000 from 21% to 25%.

The above law was amended in 1967 and the law categorized personal income tax under schedule A. According to this schedule: a monthly employment income of birr 25 and below is exempted from paying income tax, monthly employment income above 25 birr but not exceeding 750 birr was divided into income brackets and charged personal income tax at specific rates, while employment incomes above birr 750 per month were subjected to ad valorem rates.

However, the income tax amendment proclamation No.155 of 1978 resulted in major changes in the personal income tax. The main changes included: the exemption limit

was raised to birr 50 per month (instead of birr 25 in the former law), rates were made marginal (thus eliminating causes of regressivity in the former law), rates were made more progressive and they ranged from 10% (on monthly employment income ranging between birr 50 to 250) to 85% (on monthly employment income exceeding birr 3750). Moreover, this law provided incentives for the development of co-operative societies. These include exemptions from payment of income tax by members of urban co-operatives whose monthly income does not exceed birr 500, while the monthly incomes between 501-700, 701-900, 901-1200 and above 1200 birr were charged 24 birr, 40 birr, 70 birr according to schedule C of the proclamation, respectively.

The transitional government of Ethiopia replaced the amendments made in 1976 and 1978 by proclamation No.30 of 1992. The main features of this law are that: monthly income of up to birr 105 is exempted from paying personal income tax, and the rates were generally revised downwards.

Finally, the above proclamation was repealed by proclamation No.107 of 1994. The latter proclamation provided exemption to monthly incomes of up to birr 120 and the rate applied on upper incomes was lowered from 50 to 40%.

Personal income taxation in Ethiopia, unlike in most LDCs, doesn't contain any provision for exemptions on the basis of marital status, and doesn't provide any allowance for dependent children. The tax is calculated on gross income, and is collected on "pay-as-you earn" basis.

B. Rental income

This tax when initially introduced by decree No.19 of 1956 covered income from the rent of land and buildings used for non-agricultural purposes, but by proclamation No 173 of 1961, it was extended to apply to all kinds of land and buildings and to include income from

crop-sharing arrangements between land owners and tenants (Eshetu, 1968:50). The rate structure of the law that was passed in 1956 varied from a minimum of 2% on annual taxable income of 361-960 to 16% on annual taxable income over birr 15000. The amendment proclamation No. 173 of 1961 increased the number of income brackets for this law and made a slight upward revision of the rate. The rates in both of these laws were ad valorem and a surtax of 10% was charged on any part of income in excess of birr 30,000 according to the later law.

The above laws were repealed by proclamation No.255 of 1967 and its subsequent amendment No. 155 of 1978. The former law introduced different rates for incorporated bodies, the rate being 20% of annual taxable income; and for person, it applied specific rates to annual incomes of up to birr 9600 and ad valorem rate to annual taxable income above birr 9600. The rates were applied after dividing incomes into several brackets. The amendment proclamation No.155 of 1978 changed only the rate of tax on persons. The rate of this tax was similar to that applied to business profit tax (schedule c). Accordingly, the rate is totally ad valorem and the rate varied from 11% to 89%. Also annual taxable income of up to birr 1200 was exempted from paying this tax.

The law currently in operation and which repealed the above laws is proclamation No. 62 of 1993. This law raised the tax on incorporated bodies to 35% from 20% of annual taxable income. Relating to tax on persons the number of income brackets for this tax was lowered to only four and the rates were also lowered.

C. Business and profit tax

C-1: Corporate income tax

As mentioned earlier, schedule c of the 1967 law was applied to income from businesses and from professional and vocational occupations. According to the proclamation No.60 of 1944 the tax rate varies for traders, retailers and for premises and sundry

establishments. And within these categories it varies depending on sub-categories and classes of each category. This proclamation was repealed by proclamation No.107 of 1949, according to which the amount of tax payable varies depending on group of activities and their grades. This law identified about 69 group of activities and classified each activity into 7 grades depending on the amount of tax they are required to pay. The law was repealed by decree No. 19 of 1956.

Under the decree No. 19 of 1956 distinctions were made between the rate of tax on incorporated bodies (bodies) and on unincorporated (persons). The rate on incorporated bodies was 15% of taxable income. The rate on persons was as follows: annual taxable income of up to birr 360 was exempted, the rate for taxable annual income of above birr 360 varied from ad valorem rate of 9% to 15% on annual taxable income of birr 361-480 to above birr 15,000 respectively. This law was amended by proclamation No.173 of 1961. The law raised the rate on bodies to 16% of annual taxable income; and applied both specific rate and ad valorem rate on persons. On persons it applied specific rate on annual taxable income of up to birr 9000 and applied ad valorem rate on the annual taxable income exceeding birr 9000. The maximum ad valorem rate was 16% on annual taxable income above birr 15,000. Also a surtax of 10% was payable on income in excess of birr 30,000. The latter law was also amended by proclamation No.255 of 1967.

According to proclamation No. 255 of 1967 the rate on bodies was raised to 20% of taxable incomes. Relating to the rate on persons, like in the case of the former law, both specific and ad valorem rates were applied but the ad valorem rate was revised upward in the latter law. That is the ad valorem rate became more progressive and income brackets for this rate increased from 8 in the previous law to 13. The upper ad valorem rate was 20% on taxable annual income of above birr 27000. The only change in specific rate was that the formerly exempted taxable annual income of up to birr 360 was also made to pay taxes.

Some elements of this schedule were designed to attract foreign capital. These included a provision for raising the income level at which a sur tax would be applicable (this implies the commitment of a certain minimum funds) and provisions for exemption from payment of income tax (i.e. tax holiday), in addition to the import duty relief discussed below.

The 1967 proclamation was amended by the decree No.155 of 1978 proclamation and the new law was relatively more progressive because of the elimination of the old regressive features and the introduction of marginal rates. As a result of this 1978 income tax reform, this tax category has undergone a major change comparable to that of employment tax. like the previous law a distinction is made between organization (any government or privately owned juridical person or association that carries out business activity excluding cooperative society) and persons. The organizations were required to pay 50% of their taxable income as compared to 20% in the former law. The rates on persons were made higher and much more progressive, ranging from 10 % for taxable annual income of up to birr 300 per annum to 89% for incomes exceeding birr 36,000. The law changed most of the rates on persons to ad valorem rate. Under this law, incomes which have formerly been exempted have been made to pay taxes. These include taxes on incomes from dividends to share holders at a rate of 25% of the income, on incomes from chance winnings and lottery at a rate of 10% of the income, on incomes from royalties at a rate of 40% of the income and incomes derived from services rendered abroad at a rate of 10%.

As in the case of income tax on employment, no personal allowances for special circumstances were granted and there were no backward or forward carrying for losses, except in public enterprises. Expenses incurred in earning income and depreciation of fixed assets were deducted from gross income to arrive at the taxable income.

The 1978 decree was amended by special decree No.18 of 1990. The distinguishing features of this law were : it made changes only in rates of the tax on persons; it exempted

annual taxable income of up to birr 300 from paying the tax; it changed all rates to ad valorem rate; and downward movement is its general distinguishing feature. For example the maximum rate was lowered to 59% of taxable annual income above birr 24 000. Apart from reducing income tax brackets, the decree imposed a 10% income tax on dividend to share holders, down from 25% under former laws.

The above law was repealed by the proclamation No. 107 of 1994 and amendment proclamation No. 26 of 1996, which are currently in operation. In the 1994 proclamation the rate on incorporated bodies was lowered to 40% from 50% in the former law; on persons, annual taxable income of up to birr 1200 was exempted; and the maximum rate was lowered to 40% from 59% in former law. That is the tax is generally lower. This law, relating to incorporated bodies, was amended by proclamation No. 26 of 1996. The law lowered the rate of this tax from 40% to 35% of taxable income.

C-2: Other Business Taxes

This mainly includes tax on income from mining and capital gains.

a. Tax on income from mining activities:

Mining income tax was first introduced by proclamation No.53 of 1993. According to the law the tax rates were 45% for large scale mining and 35% for small scale mining. This law was amended by proclamation No.23 of 1996. According to the amendment tax rates are 35% of the taxable income for both large scale and small scale mining licence.

b. Capital gains Tax:

This type of tax was introduced by proclamation No.53 of 1993, and it imposed

capital gains tax on shares, bonds, and urban houses. The rate of this tax is 30 percent of the gains realized and no amendment has been made since the issuance of the law. This law exempts aggregate annual gains of less than birr 10,000 from paying this tax.

D.Agricultural Income Tax

The tax on agricultural income was first introduced in 1967, by proclamation No.255/1967. It was incorporated as schedule D of the income tax proclamation of 1967. "According to the law taxable income is gross income less various expenses of tax payers such as other tax payments, rents and production expenses." The rates were different for bodies and persons. The rate for bodies was 20% of their annual taxable income. The rate structure on persons was both specific and ad valorem. The rate was specific on taxable annual incomes of up to 9000, and ad valorem rates applied on annual taxable incomes exceeding birr 9000. Both rates were applied after dividing the taxable income into several brackets. The ad valorem rates varied from 10% to 20% for taxable income brackets of birr 9001-9600 to taxable income brackets of over birr 27,000.

Moreover, the law provided for local assessment committees to assess agricultural income, after having taken into account the harvest, the types of crops and produce. The assessment holds for five consecutive years. The law operated until 1976 and it was replaced by proclamation No.77 of 1976 (the rural land use fee and agricultural activities income tax reform) and subsequent amendments by proclamation No.152 of 1978, which brought about a major change in the rate structure.

The 1976 law made the agricultural income tax structure more progressive and reduced the number of taxable income brackets. The change brought by this law in relation to agricultural income tax relates only to tax on persons. The subsequent amendment of 1978 was even more progressive in comparison to the old law. In general the two proclamations were aimed at changing the income tax structure levied on agricultural

activities. Accordingly, they imposed rural land use fee and tax on income from agricultural activity. The latter law is currently in operation in most regional states, and it requires individual farmers and agricultural producer co-operatives earning up to birr 600 per annum to pay 10 birr, and the tax rates on every additional income vary from 10% to 89% for income above 36,000 birr.

Relating to this tax Oromia regional state has promulgated proclamation No.8 of 1995, which revised agricultural income tax rates schedule and rural land use fee per proclamations No.77 of 1976 and No. 152 of 1978. According to this law a state farm shall pay 40% of the taxable income it realizes from its agricultural activities. Others (agricultural producers other than state farms) are subject to a tax of birr 15 on annual taxable income of up to birr 1200, and the rates vary from 5% to 40% on annual taxable income of above birr 1200 divided in to five taxable income brackets.

2.1.1.2. Land Use Tax

In earlier periods, in most cases, the law (the rates) for this tax was not uniform, distinctions were made between measured and unmeasured land, and between different regions of the country because of the very complex traditional methods of paying tax and the existence of differences in traditional units of measuring land in various provinces.

According to proclamation No.8 of 1942 the tax rate varies depending on the fertility of the land. Accordingly on fertile, semi-fertile, and poor land a tax of 15, 10 and 5 birr per Gasha had to be paid. The 1942 law was amended by proclamation No.70 of 1944 and subsequently by amendment proclamation No.117 of 1951. Both laws revised the land tax rate based on fertility. For this purpose the law used the classification of land in to gabar measured land and rist land , and unmeasured gabar land and rist land.

The 1942 law was amended in 1944 to cover tithe and tax. According to the 1944 law the landowners were required to pay tax instead of tithe at the flat rates per Gasha of birr 35, birr 30, and birr 10 on fertile, semi-fertile, and poor land respectively. That is, this law required land tax to be paid based on fertility and it was applicable to all parts of the region. Thus it seems to have been enacted on grounds of administrative ease and its capacity to generate stable revenue. However, as officials responsible for the assessment of harvests were the village chiefs, they were easily corruptible by the land lords. In addition, even though the intention of the law was that the tax be paid by the landlords, there is evidence that the landlords were able to shift the burden of the tax to the poor peasants. On the grounds of equity, revenue generation and its incentive effects, the law was condemned by analysts (Taye, 1968; and Eshetu, 1968). As a result the tax in lieu of tithe was replaced by a tax on agricultural income in 1967.

In 1947 the education tax, and in 1958 the health tax were introduced as additional taxes related to land ownership. The education tax was based on rural land ownership and it was introduced for the purpose of financing elementary education in the provinces the tax was collected. The base of this tax was later extended to include urban land ownership and personal incomes. Similarly the health tax was based on rural land ownership, (the rates were the same as the education tax) and was introduced to finance health services in the respective provinces of the tax collection. Also there was a kind of tax called cattle tax which, however, was negligible.

The 1976 land reform, which resulted in the nationalization of rural lands, eliminated all taxes related to land ownership. That is, it abolished land tax, education tax and health tax. Therefore, due to the nationalization of land, the agricultural income tax proclamation No. 255 of 1967 was repealed by proclamations No. 77 of 1976 and No. 152 of 1978. According to this law, which has been in operation up to now, the land tax is paid in the form of "rural land use fee". The law requires individual farmers, who is not member of producer cooperatives, members of producer co-operatives, and governments agricultural

organizations to pay a land use fee of birr 10, 5 and 2 per hectare per annum, respectively.

In almost all regional states of the country, except Oromia, proclamation No.152 of 1978 is still in operation. According to the proclamation No.8 of 1995 of Oromia state, farming enterprises shall pay birr 15 for each hectare of their land holdings per annum, while annual land rent payable by a farmer shall be birr 10 for the first hectare and birr 7.5 for each extra half hectare of land.

2.1.2. Indirect Taxes

2.1.2.1 Foreign Trade Taxation

The foreign trade tax refers to various taxes imposed directly on the activities of imports and exports of goods and services. It is, therefore, divided into two main parts: import taxes and export taxes. Modern foreign trade taxation started with the introduction of the customs and export duties proclamation in 1943. The law was modified and revised subsequently on several occasions. Since then foreign trade tax, more importantly import tax, has played a key role in the revenue structure of the country.

A.Import Duties

Because custom tariffs are very diverse and cover a large number of commodities, attempts will be made to only give the salient features of the tariff structure and describe the major changes in the tariff structure.

According to custom duties amendment by legal notice No. 354 of 1969 the schedules and commodities were classified according to (a) the standard international trade

classification (S.I. T.C) of the United Nations statistical office, and (b) the Brussels tariff Nomenclature (BTN) of the customs corporation council.

In the law of 1969, 77 articles under the former law were deleted and new advalorem rates of 15% on cotton products and on some metal manufactures, and 75% on meat extracts, soups manufactured from meat and other related items were applied. Before the introduction of this law most of the items were taxed at specific rates; the main contribution of the 1969 amendment was, therefore, to change most of the specific rates to ad valorem ones.

Among the measures taken by the military government in 1976 was the customs duties reform. The main features of the reform included: the classifications of commodities and schedules according to B.T.N and S.I.T. C., the schedules included both specific and ad valorem rates; the tariff rates varied from 5% on some necessity goods to a maximum of 125% on goods considered luxuries. The reform also provided exemptions to some capital goods, such as imports of agricultural and industrial machinery, implements and spare parts. Other items that were given duty free privilege included goods such as fertilizers, chemicals used in hospitals and similar institutions, goods imported by or for the religious body, goods for laboratory and scientific use, some spare parts of aircraft and railways, etc.

The 1976 proclamation also introduced quantitative restrictions on imports and total prohibition of importation of some goods. Quantitative restrictions were imposed on goods such as foodstuffs, general merchandise, building materials, stationary materials, Investment goods, textiles and their components. The quota system was used to protect domestic industries and as a solution to the serious problem of shortage of foreign exchange.

The tax rates on jewellery, ivory, bone, ornament and worked vegetables or minerals, carving materials and articles of these materials were raised from 100% to 200% by the 1979 amendment (i.e. regulation No. 68). The rate on vehicles especially on vehicles with the maximum horse power, was raised to a maximum of 230% in 1990. This was designed

mainly to discourage luxury goods.

As part of the economic reform program, the tariff structure was revised in 1993, after the devaluation of the birr in 1992. Regulation No. 42 of 1976 and its subsequent amendment was replaced by customs tariff regulation No.122 of 1993, which reduced the duty rates which previously ranged from 5%-230% to 5%-80%, and converted most of specific rates to ad valorem. This reform also provided some exemptions to organizations, persons and public bodies, diplomats and consular, churches and related religious bodies, tourists, gifts and donations. Most other commodities, which previously were freely imported according to the law of 1976, were taxed at lower rates ranging from 5%-15%. The previously quantitatively restricted goods are now permitted entry after paying the necessary import tariff.

Finally regulation No.122 of 1993 was amended by regulation No.2 of 1996. Under this regulation the number of free items increased, the highest duty rate, 80% in former regulations levied on 410 items, was reduced to 60%, thus reducing dispersion rates significantly.

B.Excise Tax

Excise taxes on imports and domestic products were imposed on few selected products (mostly on products that are considered luxury or products that are not necessity or products that have high inelasticity of demand) and are mainly designed to raise revenue.

An excise tax on imported alcohol was introduced in 1943 and it was taxed at more or less the same rate as domestically produced alcohol but in some cases the rates on domestic production was slightly lower. A motor fuel tax was imposed five years later. The tax was levied on imported and locally manufactured petroleum products, with some exceptions. Salt tax was introduced in 1954 to apply to imported as well as locally produced,

mined or collected salt. Next to this a proclamation on excise taxes applying to imported and locally manufactured sugar, cotton yarn and textile fabrics was introduced in 1955. Before 1971 excise tax covered only seven products, while after 1971, the list was enlarged to twelve products. The products liable to this tax are salt, textiles, yarn, sugar, tobacco and tobacco products, alcohol and alcoholic beverages, petroleum products and lubricants, soft drinks and foot wear, iron and steel rods, bars and sheets, plastic, rubber and canvas goods, and matches. The rates under this law are specific except those levied on tobacco and tobacco products, leather and plastic goods. A series of amendments and proclamations were made to improve this tax system in different periods. These includes proclamations (amendments) No. 285 of 1971, No.314 of 1973, No. 114 of 1977, No.162 of 1978, and No. 160 of 1979. The amendments of 1978 changed some specific rates to ad valorem rates with out making any change in their coverage.

These old laws were amended by proclamations No. 68 and 122 of 1993. Proclamations No.68 changed most of the previous specific rates to ad valorem ones, and the rates of excise taxes on domestic production and on imports were kept the same. Under regulation No.122 of 1993, all excise tax rates are changed to ad valorem and the law widened the coverage from the previous twelve items to 117 items by including radios, machines, video, television sets, passenger cars, etc, which are considered luxuries by the law.

C.Transaction Tax

As distinct from excise taxes, transaction taxes are levied on the sales of a wide range of goods. Thus it is among the most important in the category of indirect taxes. It was introduced in 1954 and several subsequent changes were made in later years. By proclamation No.143 of 1954 a transaction tax of 10% and 2% of the value of imported goods and of exported goods were levied respectively. This law was amended by decree No.17 of 1956, according to which transaction tax rates on imported goods, on exported

goods and on locally manufactured goods were set at 12% , 2% and 5% of manufacture's sale price respectively. This law was amended by proclamation No.205 of 1963, which introduced a turnover tax on the sale of movable goods set at 1% of their gross value and a tax on construction set at 2% of the cost of construction.

Amendment of this law was made by many proclamations, including proclamation No.254 of 1967 and No.307 of 1972. According to the 1972 law imported goods were in general liable to a transaction tax of 15% based on their value as assessed by customs. Exemptions were also provided for some sales.

Another important amendment was made in may 1979(proclamation No.159 of 1979). This law, which was in operation up to the late 1980s, imposed the existence of three separate transaction taxes. These are 7% ad valorem tax on domestically manufactured goods (except pharmaceutical items which were charged at 5%) compared to 5% in previous years, and 18% ad valorem tax rate on imported goods, and ad valorem tax of 2% on exported goods. Exemptions were also given to many products. The tax base ,for locally manufactured goods was the gross amount received from sale by manufacturers;while it was the value of import and export for the imported and exported goods respectively.

In 1990 a new sales tax law, which brought transaction tax, turnover tax and excise taxes together was passed. The proclamation was issued by the government in order to consolidate the many and scattered indirect taxes, to make tax administration more simple and efficient, and to widen the coverage. According to this law all the previous proclamations and amendments regarding sales, transaction, turnover and excise taxes were replaced by this sales tax law and are now consolidated in to a single tax system. According to this law the base of taxation is the price on which the customs duty is assessed and the rate of this tax is 24% ad valorem rate.

D.Export Tax

Although in Ethiopia, the export tariff is entirely dictated by revenue considerations, its role in revenue structure is insignificant as we will see later. The export duties are levied on a small number of commodities and they are simple, compared to the import duties. The main source of export duties revenue is exports of coffee, followed by export of hides and skins. Others include taxes levied on the export of live animals (mainly cattle), ivory, civet, chat, bees wax, butter, and leopard skins.

Also a sur tax, first introduced in 1964, is levied on the export of coffee, export of sugar and cotton seeds at their FOB price. Moreover, cess tax is levied on coffee exports. As mentioned earlier, all exported goods are also subjected to a 2% transaction tax.

Currently all export taxes levied on goods other than coffee are no longer functional. This reform measure was taken to encourage the export sector and to increase participation in world trade. The coffee export tax is used as a means of generating revenue for the government, particularly when the world price of coffee rises.

2.1.2.2 Domestic Indirect Taxation

Indirect taxes, particularly domestic indirect taxes, are those taxes the burden of which can be shifted from the legal tax payer to others (mostly to consumers) through the price of goods and services. In Ethiopia this tax is characterized by a great multiplicity of types and rates, which poses great burden on its administration. The major components of domestic indirect taxes are excise taxes and transaction taxes on domestic products, turnover taxes and sales taxes. The law relating to this tax in its broad and comprehensive sense was introduced in 1943 and has undergone a number of changes since then. Most domestic indirect tax rates were specific.

Excise tax

The base of this tax is locally produced goods and because of limited industrialization, excise tax revenue comes from a few selected commodities. Up to 1978, commodities liable to excise taxes were twelve in number and in this law most of the rates were specific. Proclamation No.68 of 1993 changed most of specific rates in the former law to ad valorem, and made the rates of excise tax on domestic production and imports the same.

Transaction tax

According to principal legislation of 1963 (proclamation No.17/1963) transaction tax had four components. These are the transaction tax on locally manufactured goods, transaction tax on imports and exports, turn over tax, and the transaction tax on construction. In the law, with the exception of pharmaceutical items which are taxed at a rate of 5%, domestically manufactured goods were subject to 7% ad valorem rate. The base of this tax is sale of manufacturers.

Turn over tax

Proclamation No.254 of 1967 amended the tax rate on turnover. Turnover tax is imposed on every sale at all stages of production and distribution irrespective of their origin. It is levied at ad valorem tax rate of 2% on the sale of all goods in Ethiopia with the exception of certain commodities for which the rate is 4% or 6%. In 1990 a new sales tax proclamation was issued by proclamation No.16/1990. The objective was to consolidate the many scattered indirect taxes, to make tax administration more simple and efficient, and to widen the coverage. This law, therefore, repealed all previous proclamations and

amendments relating to transaction tax, turnover tax and excise tax by consolidating them into a single tax system. The tax rate on goods produced and service rendered locally were 12% and 10% respectively. The computation of this tax is based on producer's selling price and service charge.

The above law was amended by proclamation No.122/1993, which is currently in operation. The rate of this tax is 12% ad valorem on goods sold locally; while it is 10% on services such as telecommunication, laundry, garage, and contractors. In this category of service, however, the tax rate on tax payers whose daily income is between 25 and 50 birr is 5%. That is the service tax rate of 10% applies to those whose daily income is above birr 50. Moreover the law exempts those tax payers whose daily income is up to birr 25 from paying the sales tax.

Sales Of Stamps and Stamp Duty

The last and the least significant category of indirect tax is sales of stamps and stamp duties. The statutory bases for stamp duty before 1974 were proclamation No.41 of 1943 and Decree No.26 of 1957. The law requires an obligatory use of stamped paper and payment of stamp duty for a variety of instruments such as bills of exchange, petition and applications to government offices, contracts, various agreements, etc. It is insignificant as a source of revenue.

To conclude this description of the tax system of Ethiopia, the following points could be noted. The tax system and structure of the country has undergone constant changes and amendments overtime. With respect to Direct taxation, income tax laws before the Derg regime first imposed taxes on personal and business incomes, later on rental income and on income from agricultural activities. During the Derg regime, the income tax base was broadened by incorporating income from dividends to share holders, chance winnings and lottery, royalties and service rendered from abroad. After the Derg regime the income tax

base was broadened by adding the mining income tax and capital gains tax. Relating to the other components of direct tax the earlier land tax system was repealed by proclamation No.77 of 1976 and replaced by land use fee and tax on agricultural activities.

Relating to the development of indirect taxes the following points will be noted. Excise taxes were first levied on tobacco and alcoholic products under tobacco regie tax and alcohol excise tax. Excise tax coverage was widened by levying the tax on other products, such as footwear, coal, petroleum etc., in the latter decades. In 1990, the scattered and multiple taxes were consolidated into a general sales tax. An important feature of garage, laundry, etc., sales tax. This further broadened the tax base and widened the neutrality of the tax system by bringing the service sector in to the tax net.

2.2 ANALYSIS OF TAX STRUCTURE

2.2.1 Relationship Between Tax Structure and Stages of Development: Theories and Evidence From Developing Countries

The analysis of the structure of taxation and its relationship to the level of development helps to see whether the various characteristics of LDCs affect the way in which taxes can be raised. The main distinguishing features of LDCs is the importance of the traditional sector. Transactions within the sector are hard to observe and are, therefore, hard to tax.

The relationships between the "level of development" and the structure of taxation were examined by Hinrichs (1966) and Musgrave (1969). Since then there have been a large number of studies which have concentrated on international comparisons of "tax capacity" and "effort" carried out primarily by staff members of the IMF's fiscal Department (Lotz and Morss, 1967; Bahl, 1971; Chelliah, Baas and Kelly, 1975; and Tait, Gratz and Echengreen, 1979).

Both Hinrichs and Musgrave, using international cross-sectional comparisons, stress that the scarcity of simple ways of collecting revenues, or “tax handles” and limited administrative capabilities characterize the early stages of development. This will limit revenue collection. However, this limitation will become less severe as the economy develops. Based on the work of Hinrichs, Goode commented on the relation between the stages of development and tax structure by saying that “countries tend to move in the course of development from an early period in which the ratio of direct to indirect tax revenue is high through stages in which indirect taxation becomes more important and finally to a stage in which direct taxes are again dominant” (Goode, 1984:89). This relationship emerges results from the availability of tax bases or tax handles and the administrative capacity.

Hinrichs proposed a four-fold classification to describe the pattern of change in tax structure during development: traditional; transitional; adoption of new means of taxation and modern. In what follows, we consider each of these stages in turn.

(a) **Traditional stage:** Traditional societies derive government revenue primarily from a combination of “traditional direct taxes” in the form of taxes on land, livestock, agricultural output, and water rights; poll taxes; and non-tax revenues.

(b) **Transition:** This stage marks a “breakaway” from the traditional stage. At this stage the above sources diminish in importance compared with indirect taxes. That is, indirect taxation becomes more important. In particular trade taxes dominate depending on the degree of “openness” of the economy. Here the foreign trade sector provides a convenient handles as it is possible to monitor flows of goods and also because in a dualistic framework, the degree of monetization is likely to be high in such activities.

(c) **“Adoption” of new:** As development proceeds, which results in increases in monetization, domestic production and the volume of internal transactions, the share of revenue from internal indirect taxes will rise. The domestic indirect taxes such as excises, sales and transaction taxes and profits of government enterprises become important.

(d)**Modern stage:** Here modern direct taxes are introduced but at first their yield is smaller and less elastic than that of foreign trade taxes and domestic consumption taxes. That is modern direct taxes grow while the indirect taxes and traditional direct taxes diminish. The modern direct tax includes the taxation of net income of individual and businesses.

Thus the classification suggests that the structural move has been from taxation of agriculture, to foreign trade, to consumption, and to income. Hinrichs has also noted the unavailability of exception to this argument. That is, the pattern described doesn't necessarily mean that all countries will follow this sequence always.

The generalizations made by Hinrichs and Musgrave regarding tax structure were tested statistically in the 1980s with the data from more than 100 non-major oil producing countries. The data on the composition of central government revenues for these countries suggested that: (a)the contribution of taxes on international trade and transactions is inversely related to the level of income and the degree of industrialisation;(b) In least developed countries taxes on income and profits contribute the smallest percentage of revenues; (c) The degree of reliance on domestic taxes on goods and services is greatest in the semi-industrial countries; (d) taxes on income and profits are distinctly more important in industrial countries (Goode,1984).

2.2.2. The Levels, Composition and Structure of Ethiopian Government Tax Revenue

In this section we examine the level of tax revenue, contribution of tax revenue to total government revenue as well as the structure of tax revenue and composition of the tax system. The growth rate of total and individual tax is also considered. For this purpose we will use the figures in table 2.1.

As shown in table 2.1, the total revenue , total tax revenue and non tax revenue ratios during the period are 14.06,10.5,and 3.4% respectively. The ratios and growth rate of the ratios during each decade and each regime for the period under review are also shown in the table. During the 1960s, 1970s, 1980s and 1990s the total revenue ratio has been 9.6 , 14.4, 18.2 and 14.12; for total tax revenue the ratios have been 8.12, 11.32 13.16 and 10.06%, and for non tax revenue 1.5, 2.06, 5.01 and 3.9. The ratio for the three revenue types is highest in the 1980s and during the Derg regime. This ratio is lowest during the transition and started to improve after 1992. In general, the revenue ratio is similar to that of many other LDCs.

One can also observe the revenue ratios ratio for individual taxes from the table. The ratio for direct tax was increasing up to 1990 but declined during the 1990s, mainly due to the poor economic performance between 1990-92 and downward revision of the rates of many components of the tax. The ratio for indirect tax increased only up to 1980 and has been declining since the 1980s. From the two component of indirect tax, domestic indirect tax had the highest ratio up to 1980s while after 1980s the foreign trade tax ratio was higher. Comparisons of the ratios for direct and indirect tax revenue indicate that the ratio is highest for total indirect tax through out the period.

The average annual growth rate of non-tax revenue as a share of GDP was 0.22, 11.1, 6.9, and 6.1% during the 1960s, 1970s, 1980s and 1990s respectively. The growth rate in non-tax revenue in the 1970s was highest due to emergence of new sources of revenues for the government, which resulted from the nationalization of private property and enterprises and their consequent operation under government ownership.

Overall, the revenue GDP ratio for the three types of government revenue was increasing up to the end of the 1980s, being highest is the 1980s. The revenue GDP ratio was 18.17%, 13.16% and 5.01 percent for total revenue, for total tax revenue and for non-tax revenue respectively. The ratios are lower for the period starting 1990, but have been increasing since 1992.

Table 2.1 Summary of growth rates, levels and structure of Ethiopian central Government Domestic Revenue (1960/61-1995/96)

Description	1961-70	1971-80	1981-90	1991-96	1961-79	1975-89	1981-90	1990-92	1993-96	1991-96
I. Revenue as % of GDP										
1.1 Total Domestic Revenue	7.59	14.34	18.17	14.12	9.89	17.02	14.04	14.02	14.06	14.06
1.2 Total Tax Revenue	8.12	11.32	13.16	10.06	8.45	13.07	10.87	10.13	10.51	10.5
1.2.1 Direct Tax	1.95	3.17	5.38	3.64	2.18	4.62	3.5	4.21	3.65	3.58
1.2.2 Indirect Tax	6.17	8.14	7.87	6.59	6.27	8.37	7.39	5.92	7.17	6.7
a) Domestic Tax	2.25	3.15	3.99	2.46	2.67	3.67	3.13	3.56	2.62	4.0
b) Foreign Trade Tax	3.64	5.02	3.79	3.58	3.38	4.74	4.15	2.35	4.27	3.87
1.3 Non Tax Revenue	1.48	2.06	5.01	3.88	1.44	4.05	2.85	3.89	4.27	3.4
II. Structure of Domestic Revenue (percentage contribution)										
2.1 Total Tax Revenue	84.44	84.83	72.62	71.68	85.23	76.96	80.63	73.62	70.22	76.14
2.1.1 Direct Tax	26.52	23.96	29.59	26.9	22.05	26.84	24.69	30.07	28.09	25.97
2.1.2 Indirect Tax	65.92	60.86	43.03	46.79	64.61	50.29	56.6	42.50	48.09	51.7
2.1.2.1 Domestic	25.52	23.96	21.95	20.62	24.49	21.63	23.84	25.46	17.87	23.3
2.1.2.2 Foreign Trade	37.97	36.91	21.08	24.87	28.71	28.71	28.71	17.08	47.29	20.8
a) Import Tax	29.51	23.73	13.61	23.49	28.39	17.18	22.28	16.09	24.5	22.3
a) Export Tax	8.79	13.19	7.54	1.39	8.55	11.58	5.84	1.78	7.71	20.8
2.2 Non-Tax Revenue	15.56	15.17	27.4	28.02	14.77	23.87	19.37	27.38	27.8	20.8
III. Structure of Tax Revenue (percentage contribution)										
3.1 Total Direct Tax	24.4	28.24	40.85	36.48	25.9	35.3	31.17	41.44	34.3	33.83
3.1.1 Business profit tax	8.53	11.02	24.68	21.88	9.48	19.41	14.73	24.2	21.08	18.31
3.1.2 Agricultural Tax	5.2	6.37	5.41	3.19	5.35	5.4	5.34	2.95	3.61	4.26
3.1.3 Personal	17.5	11.69	10.64	11.07	16.45	10.39	13.27	14.23	9.2	12.17
3.1.4 Other average Tax	0.91	0.34	0.12	0.27	0.65	0.11	0.46	0.06	0.38	0.37
3.2 Total Indirect Tax	75.62	71.76	59.15	64.5	71.11	64.71	68.84	58.56	68.46	67.12
3.2.1 Domestic Indirect Tax	30.23	28.22	30.3	28.53	30.7	28.17	29.58	35.03	25.32	29.41
3.2.2 Foreign trade Tax	45.4	43.55	28.85	35.91	40.41	36.55	39.26	23.52	40.37	37.14
a) Import Tax	34.98	27.94	18.6	32.0	33.37	21.91	27.17	22.11	37.8	30.1
b) Export Tax	10.39	15.6	10.26	2.0	10.07	14.84	12.07	1.41	2.6	7.03
IV. Structure of Non-Tax Revenue (percentage contribution)										
4.1 Charges and fees	29.17	17.13	3.33	6.3	28.04	6.71	16.54	5.5	6.12	11.4
4.2 Sale of Goods and Services	10.15	16.05	6.67	6.83	12.08	10.3	11.0	6.3	8.81	8.6
4.3 Surpluses, Capital charges and interest	30.5	46.79	71.4	47.2	37.66	64.36	49.54	56.1	44.7	48.4
4.4 Others	30.23	20.02	17.62	29.81	27.23	18.62	26.62	24.7	30.8	26.2
V. Growth Rates										
5.1 Tax Revenue	12.3	13.7	5.4	16.4	11.5	10.8	10.5	5.4	31.3	11.5
5.1.1 Direct Tax	12.8	14.4	9.8	13.5	11.93	13.4	12.4	-14.4	28.8	12.9
5.1.1.1 Personal Income Tax	30.9	10.1	9.0	2.7	18.2	9.4	13.32	-0.06	5.02	8.0
5.1.1.2 Business profit Tax	-	18.25	14.43	18.5	15.1	19.2	16.4	-10.35	35.9	16.9
5.1.1.3 Agricultural Tax	-17.5	23.34	-0.74	-4.3	-11.0	15.91	1.86	-26.5	20.4	1.71
5.1.1.4 Other Direct Tax	13	5.5	7.53	14	-2.48	4.7	9.22	-2.83	45.8	10.4
5.1.2 Indirect Tax	13	13.62	3.3	18.9	11.9	11.9	10.0	9.53	34.0	11.4
5.1.2.1 Domestic	28.2	15.3	-0.68	29.6	8.83	16.4	16.4	-11.0	28.2	15.9
5.1.2.2 Foreign Trade	8.4	15.3	6.5	68.4	7.17	6.9	8.4	4.92	45.5	18.5
a) Import Tax	9.0	9.7	8.2	6.9	1.12	12.4	6.06	-23.9	132.2	19.3
b) Export Tax	17.2	11.1	6.9	6.06	1.12	12.4	6.06	-23.9	22.2	4.1
5.2 Non-Tax Revenue	0.22	11.1	7.52	16.93	10.6	12.5	10.9	-14.34	33.3	12.4
5.3 Total Domestic Revenue	11.1	14.02	7.52	16.93	10.6	12.5	10.9	-14.34	33.3	12.4

Source: Computed based on data obtained from (a) Appendix 1, (b) Ministry of Finance, Central Government Revenue and Expenditures, Various Years.

The pattern of movement in the revenue GDP ratio discussed above can be explained by a number of factors. These are: (a) the change in the composition of GDP and gradual rise in nominal per capita income; and (b) changes and improvements in fiscal policy as well as associated changes in the composition of total revenue and total tax revenue

In relation to the first factor the contribution of agriculture to GDP declined from 70 to 40% between 1960/61 and 1989/90. on the other hand during the same period the share of industry and services showed a gradual rise. Therefore changes in the structure of the economy played a role in effecting the ratio.

As regards the second factor we have briefly discussed the tax policy changes that took place during the period under review. The detailed empirical study of their impact is presented in chapter four. Since the overall change of the revenue GDP ratio is accompanied and or explained by changes in composition of total revenue and tax revenue, we examine the latter change in what follows. Table 2.1 illustrates.

The composition of tax revenue is dominated by indirect taxes, which on the average, contributed 67% throughout the period under review. However while the share of direct tax in total tax revenue is on an increasing trend, that of indirect tax is on a decreasing trend. The share of direct tax revenue in total tax revenue was 24.4, 28.2, 40.9 and 36.5 while that of indirect tax was 75.6, 71.8, 59.1 and 64.5% during the 1960s, 1970s, 1980s and 1990s respectively.

From the components of direct tax, business profit tax is the most important followed by personal income tax. During the period under review the average contribution of business profit tax, personal income tax, agricultural tax and other direct tax to total tax revenue was 18.3, 12.2, 4.3 and 0.37 percent respectively. The implication of this is that apart from the first three components, other components of direct taxes are insignificant in contributing to total tax revenue.

Within the indirect tax, tax on international trade contributed more than domestic indirect tax even though the difference is not very large. The taxation of domestic transaction and taxation of international trade respectively contributed 29.4 and 37.14 % to total tax revenue during the period under review. Within the international trade tax, import trade tax constitutes about 81.1% of the total during the period on the average, and this contribution has increased in recent years.

Examination of the role and structure of non-tax revenue suggests that it contributed 20.8% of total revenue through out the period under review. This share is pushed up by the higher shares in the 1980s and 1990s, the shares being 27.4 and 28.02% for the two periods respectively. From the components of the non-tax revenues the largest share is contributed by revenue from surpluses, capital charges and interest, which on the average contributed 48.4% of total non-tax revenues. The average contribution for the period is pushed down by lower shares in the 1960s.

The structure and composition of Ethiopian domestic revenue shows that the average percentage contribution of tax revenue to total revenue ranged between 72% and 84.4%, the average for the period being 76.2 %; while the rest, 23.8 %, was contributed by non-tax revenue. Overtime the percentage contribution to total revenue by tax revenue is 84.4, 84.8, 72.6, and 72%; while that by non-tax revenue is 15.6, 15.2, 27.4 and 28%, during the 1960s, 1970s, 1980s, and 1990s respectively.

Closer observation of these percentages suggests that the share of total tax in total domestic revenue is declining while that of non-tax revenue is increasing. Despite this fact tax revenue have remained the main source of government revenue in Ethiopia.

The larger part of Ethiopian government revenue was drawn from taxes on international trade up to the end of 1970s, but their share has been declining overtime. However, it showed a slightly upward trend in 1990s due to the increase in revenue from import tax, which resulted from the elimination of restrictions on imports. The shifts between taxation of domestic transaction and taxation of foreign will be empirically analyzed in chapter five.

The average percentage contribution for the two components of foreign trade tax is 22.3 and 7.7 % for import and export tax respectively. Similarly non-tax revenue contributed on the average 20.8 percent of total revenue.

In general the structure of Ethiopian tax system discussed in this section is in line with the tax structure of most other developing countries. This specially relates to the dominance of indirect tax in tax structure and the level of government revenue GDP ratio, which is relatively low but similar to that of many developing countries. This latter argument is based on the evidence that tax revenue GDP ratio for most LDCs lies between 10 and 20 percent. Up to the 1970s foreign trade taxation dominated the tax structure, but during the same period, followed a decreasing trend. Since the 1970s the importance of domestic indirect tax and that of direct tax has been increasing; while that of foreign trade has been decreasing.

2.3. The Relationship Between Revenue and Expenditure

In this section we examine the relationship between tax revenue and expenditure with a view to assess the ability of the tax system to meet the revenue needs of the country to undertake its expenditure programs. The discussion of this section is based on the figures in table 2.2.

It can be seen from the table that the growth in tax revenue has not kept pace with the growth in government expenditure (both recurrent and total expenditure) throughout the period under review. The table shows the growth rates, and the ratio of total tax revenue, recurrent expenditure, capital and total expenditure to GDP. Over the period under review on the average tax revenue covered 67.9 % of recurrent expenditure and 54.94 % of total expenditure.

Table 2.3: Comparison of Tax Revenue and Expenditure (1960/61-95/96)

	Total Tax Revenue				Recurrent Expenditure			Total Expenditure	
	Growth Rate	as a% of GDP	as a% of Recurrent expenditure	as a% of Total expenditure	Growth Rate	as a% of GDP	as a% of total expenditure	Growth Rate	as a% of GDP
1961-70	12.3	8.12	81.82	68.5	8.34	9.27	69.84	12.84	12.07
1971-80	13.7	11.32	86.21	61.5	15.25	13.5	71.7	14.2	18.63
1981-90	5.44	13.16	73.50	47.4	9.5	18.07	64.43	10.9	28.21
1991-96	16.4	10.06	66.31	42.44	8.07	15.24	64.2	10.7	23.9
1961-74	11.5	8.45	85.35	67.9	10.3	8.7	69.4	11.01	12.61
1975-89	10.8	13.07	76.64	52.2	14.3	17.11	72.6	15.33	25.51
1961-90	10.5	10.87	80.51	59.11	11.03	13.61	68.7	12.6	18.7
1990-92	5.8	10.13	58.02	40.01	-6.35	17.42	68.0	10.4	25.24
1993-96	31.2	10.51	70.45	43.71	18.0	15.01	61.9	21.44	24.4
1961-96	10.5	10.5	73.41	54.94	13.9	14.43	67.9	11.6	21.3

Source: Computed from Appendix 1

The main component of government expenditure is recurrent expenditure, which accounted on average for not less than 64% of total expenditure in every decade in the period under review. Within recurrent expenditure the largest share is national defense expenditure. For example: its average share during the period under review is 23.7 %; while its average share in the 1960s, 1970s, 1980s, and 1990s was 25.1, 30.3, 43.51 and 22.83 % of total recurrent expenditure respectively. The inability to match increased expenditure needs with government revenue has resulted in poor saving performance by the government and the widening of the budget deficit.

In general, therefore, the examination of the relationship between government revenue and expenditure programs suggests that tax performance is low. In this connection it should be noted that in

developing countries, where the need for development finance is great and pressing, it seems that resort to some amount of deficit financing seems to be inevitable. Thus from the discussion of this section what we can conclude is that despite a substantial tax revenue increase over the past few years, there has been poor saving performance due to the concomitant rapid increase in government expenditure.

Finally an important question which one has to answer is whether adequate effort has been made to mobilize as much revenue as the capacity could allow and thus avoid the need for substantial deficit financing. The answer to such a question and whether or not there is a capacity for increasing tax revenue in the future will be discussed in the next chapter.

CHAPTER THREE

REVIEW OF LITERATURE

3.1. Review Of Theoretical Literature

3.1.1. Buoyancy and Built-in-Tax Elasticity

3.1.1.1. Theoretical Framework

The degree of responsiveness of tax revenue to changes in national income is a common measure of revenue productivity of a tax system and is considered to be crucial in the criteria of a tax system in both developed and developing countries (Mansfield, 1972; Teame, 1985). The term tax system is mostly defined as a set of laws and regulations governing the process of estimation, assessment and collection of tax revenue (Ehdaie, 1990)

The tax revenue responds to national income as a result of two factors (Byrne, 1983; Mansfield, 1972; Osoro, 1993). These are : (a) changes in economic activity or the base to which tax collection is related. The base, i.e. what is being taxed, may grow resulting in the growth in tax revenue. This is the automatic response of tax revenue to income changes , and is commonly known as the built-in-elasticity of the tax system. Thus the built-in elasticity of a tax system is the built-in responsiveness of its revenue yield to movements in national income or GDP or some other measure of total income or output, abstracting from the effect of discretionary tax measures (DTMs) over the period. This elasticity is often subdivided into a tax- to- base elasticity and a base- to- income elasticity. (b) Discretionary changes made in the tax system. These include changes in rates and structure involving such changes as widening or

extending the tax base, introducing new and changing existing statutory rates, and improvements in tax administration. Therefore, revenue impact of discretionary changes refer to changes in tax revenue in response to changes in tax rates and tax bases or changes in DTMs in general.

The total response of tax revenue due to built-in (automatic) changes and discretionary measures is called the buoyancy of the tax system. For example, a buoyancy coefficient of 1.2% would imply that, on average, revenue from tax is growing at 1.2% for every 1% increase in GDP; while a built-in elasticity coefficient of 1.2% would imply that for every 1% increase in GDP, with tax laws and rates unchanged, revenue from the tax will grow by 1.2% (Osoro, 1993).

The tax system must be sufficiently elastic, both in terms of buoyancy and built-in elasticity, in order to enable the government to generate high revenue yield. In developed countries a high income-elastic tax system is needed mainly for its anti-cyclical impact; while in LDCs the rate of economic development depends on the income elasticity of the tax system. That means to mobilize a substantial portion of the additional income generated by the economy, the tax system must be structured in a way that it enables the revenue generated to increase by more than the proportionate growth in national income (Teame, 1985). "It is, by and large, a desirable property of a tax that its revenue growth keep pace with that of GDP without frequent discretionary changes having to be made to its rates and structure. This of course requires that the tax elasticity coefficient be equal to or exceed one" (Osoro, 1992:10). An elastic tax structure requires that either each individual tax system be income elastic, or elastic taxes dominate in the tax structure. Such a tax structure enables growth in development expenditure to be financed by raising tax revenue without increasing existing rates and/ or introducing new taxes, which are politically difficult decisions and which may also have adverse effects on incentives to invest and take risks.

The importance of having an income elastic tax structure also arises from the view that in LDCs frequent changes in tax policy are rarely implemented. Evidence from extensive studies on taxation experiences in LDCs suggests that in these countries frequent changes in tax policy do not generate the desired yields. This is because it is hard for tax payers to comply, and for the administration to enforce the changes in tax policy. On the one hand, it is hard for the tax payer to comply as the tax payer must learn new sets of rules each time there is a change, and on the other hand enforcement is harder as all changes require reforms in procedure, training and means of collection. As a result, it is argued that, when the changes are many either they are altogether abandoned or only the convenient ones chosen or else the administration is crippled when trying to implement all (A.Radian,1980). Most of these problems can be solved by having a tax structure with high built-in elasticity. This would facilitate not only the mobilization of an increasing proportion of national income for development finance, but also it would ensure higher compliance by the tax payers as tax payers are more willing or less reluctant to let the government collect higher revenue at existing rates of taxation than to permit rate increases and the imposition of new taxes.

Discretionary tax measures cannot be ruled out, however, because of the need to improve traditional tax systems and the fact that in practice major sources of government revenue may have a low built-in elasticity. In such cases the government may seek additional revenue by introducing discretionary changes. This makes the buoyancy of the tax revenue, which measures the historic responsiveness of the tax revenue structure, an important criterion of tax systems in LDCs.

3.1.1.2. Definition of The Tax Elasticity

The discussion of this section is based on the model originally developed by Mansfield (1972:37).

Denote T_i = Total tax revenue, $ET_i Y$ = elasticity of total tax revenue to income, T_i = Revenue from i th tax, $ET_i Y$ = elasticity of i^{th} individual tax to income, Y = income (GDP), B_i = Base of

i^{th} tax , $ET_i B_i$ = elasticity of i^{th} individual tax to base, and $EB_i Y$ = elasticity of i^{th} individual base to income.

Conventionally the elasticity of total tax revenue in relation to income is presented in aggregate models as a single number. This is given as follows:

$$ET_{t,y} \equiv \frac{\Delta T_t}{\Delta Y} X \frac{Y}{T_t} \dots (1)$$

A tax structure contains many individual taxes of diverse nature and rates, such that changes in national income affect the yield of individual taxes in a dissimilar manner.

The elasticity of i^{th} individual tax to income is :

$$ET_{t,y} \equiv \frac{\Delta T_i}{\Delta Y} X \frac{Y}{T_i} \dots (2)$$

The elasticity of the tax system is more realistically visualized as a weighted average of the sum of the elasticity of separate taxes. That is:

$$ET_{t,y} \equiv \frac{T_1}{T_t} \left(\frac{\Delta T_1}{\Delta Y} X \frac{Y}{T_1} \right) + \dots + \frac{T_k}{T_t} \left(\frac{\Delta T_k}{\Delta Y} X \frac{Y}{T_k} \right) + \dots + \frac{T_n}{T_t} \left(\frac{\Delta T_n}{\Delta Y} X \frac{Y}{T_n} \right) \dots (3)$$

Where $i = 1, 2, \dots, n$ and, the weights are the share of individual tax to total tax revenue.

The elasticity of a tax system can be broken down into two elements: the elasticity of the tax to the base, and the elasticity of the base to income. In symbols these elasticities are defined as follows:

Elasticity of i^{th} individual tax to base:

$$E_{T_i B_i} \equiv \frac{\Delta T_i}{\Delta B_i} X \frac{B_i}{T_i} \dots \dots \dots (4)$$

Elasticity of i^{th} individual base to income :

$$E_{B_i Y} \equiv \frac{\Delta B_i}{\Delta Y} X \frac{Y}{B_i} \dots \dots \dots (5)$$

Therefore, the elasticity of any individual tax (equation (2)) may be decomposed into the product of the elasticity of the tax to its base, and the elasticity of the base to income :

$$E_{T_i Y} \equiv \left(\frac{\Delta T_i}{\Delta B_i} X \frac{B_i}{T_i} \right) \left(\frac{\Delta B_i}{\Delta Y} X \frac{Y}{B_i} \right) \dots (6)$$

Lastly, using (3) and (6) in a system of n taxes the elasticity of total tax revenue to income depends on the product of the elasticity of each separate tax, weighted by the importance of that tax in the total tax system.

$$E_{T_i Y} \equiv \frac{T_i}{T} \left[\left(\frac{\Delta T_i}{\Delta B_i} X \frac{B_i}{T_i} \right) \left(\frac{\Delta B_i}{\Delta Y} X \frac{Y}{B_i} \right) \right] + \dots \frac{T_k}{T} \left[\left(\frac{\Delta T_k}{\Delta B_k} X \frac{B_k}{T_k} \right) \left(\frac{\Delta B_k}{\Delta Y} X \frac{Y}{B_k} \right) \right] +$$

$$\dots \left(\frac{T_n}{T} \left[\left(\frac{\Delta T_n}{\Delta B_n} X \frac{B_n}{T_n} \right) \left(\frac{\Delta B_n}{\Delta Y} X \frac{Y}{B_n} \right) \right] \right) \dots (7)$$

presumptive

presumpt

This decomposition of elasticity is very important for analytical purposes in the following sense: (a) it enables us to identify the sources of fast revenue growth, and or, conversely the sources of lagging revenue growth; (b) it allows identification of that part of growth in tax revenue that policy makers can control (mansfield,1972, Osoro, 1992). In relation to the latter,for example, the tax to base component of elasticity may be improved by introducing progressive tax structure and/ or by improving tax administration, which means that this component of tax elasticity is partly within the control of tax authorities. However, the growth of tax base is mainly determined by the way in which the structure of the economy changes as the economy grows and thus it is largely outside the influence of tax policy. The implication of this is that designing income elastic tax structure requires strong consideration of both the predicted response of tax base to income and the potential for an effective tax administration.

3.1.2 Inappropriateness Of Traditional Methods Of Estimating Tax Elasticity

From the above definition of buoyancy it follows that the buoyancy of the tax revenue indicates the overall ability of the tax system to mobilize financial resources regardless of factors stimulating the revenue. Therefore, it is measured by the historic aggregate responsiveness of tax revenue to GDP changes. That is tax buoyancy measures the responsiveness of tax revenue to changes in income or output with no attempt to control for changes in discretionary tax measures. The traditional way to estimate the buoyancy of a particular tax, i , is from a tax model such as (Osoro, 1993: 12):

$$T_i = \alpha_i Y^{\beta_i} e_i \dots\dots\dots (8)$$

Its logarithmic transformation is:

$$\ln T_i = \alpha_o + \beta_i \ln Y + U_i \dots\dots\dots (9)$$

where T = tax revenue, y = GDP and U = a stochastic disturbance term.

The estimates of equation (9) provide tax buoyancy estimates; since the equation is in double log form, these estimates measure the percentage response.

If during the period under consideration no discretionary changes were made, the historical tax series could be used to estimate the built-in elasticity of the tax revenue. In such a case, which is analogous to the above definition of buoyancy, the built-in elasticity coefficient of the total and individual taxes can be estimated by using models (8) and (9) above.

In practice, however, discretionary tax changes are frequently made, in which case the historical tax series reflects the combined effect of the growth in income and discretionary tax changes. Therefore, it is necessary to separate the change in tax revenue accounted for by discretionary changes from the historical series in estimating the built-in elasticity of a tax system. Most of the studies on this subject have employed three major approaches. These methods and associated problems are discussed below.

3.1.2.1. Proportional Adjustment (PA) and constant Rate structure(CRS)

These are the two major adjustment methods employed to eliminate discretionary tax changes from historical time series data (HTSD).

(a). Proportional adjustment Method (PA)

This method was first used by A.R. Prest (1962) to clean revenue series of discretionary effects. But a comparable method was used earlier by G.S.Sahota (1961). The separation of discretionary effects involves two steps in this method: First, revenue observations affected by discretionary changes are adjusted to the preceding-year basis by removing the estimated revenue impact of discretionary measures in the respective years of enactment, except for the first year (for which actual revenue is taken). Revenue changes between any two successive

years are then taken to reflect automatic growth during the period. second, the adjusted revenue series is further refined by applying to each observation a sequence of multiplicative factors which measure the continuing revenue impact of discretionary changes in each year. The "cleansed" series is developed using the following formula (W.J.Byrne,1983:155):

$$T_{i,j} = T_{j-1,j} \times \frac{T_{j-2,j-1}}{T_{j-1}} \dots \frac{T_{2,3}}{T_3} \times \frac{T_{1,2}}{T_2} \dots (10)$$

Where T_j = the actual yield in the jth year

T_{ij} = the collection of the jth year adjusted to the structure of the ith year chosen as the reference or base year, and

$$T_{j-1,j} = T_j - D_j$$

where D_j is the revenue effect (positive or negative) in the jth year of the discretionary change in that year.

The resulting series are taken to reflect automatic changes in revenue resulting from the evolution of the size and distribution of tax base only.

There are many problems associated with this method. First, the estimates of the revenue impact of discretionary changes are derived from annual budget speeches. These estimates, however, are of an ex-ante type, and ex-post revision of the initial estimate is not provided. That means there are no means of checking the accuracy of the estimates (Byrne 1983) and the estimates from the budget speeches must be accepted largely in faith. Moreover, in most cases even such data is not available.

Secondly, this method assumes that changes in an individual tax system result directly in an exogenous change in its tax revenue, but do not affect its own and other individual tax bases endogenously. This assumption is theoretically not supported and the studies, which have used this method, didn't test its empirical validity (Belassa, 1989; prest, 1962; mansfield 1972; Jeetun, 1978; Sury, 1985; Gillani, 1986; Lambert and Suckling, 1986; and Sahota, 1961 to mention few).

Thirdly, the impact of changes in the degree of evasion or of administrative efficiency on tax revenue is not taken in to consideration by this method.

(b).Constant Rate Structure(CRS)

The CRS technique requires data on income brackets, rates and disaggregated information on the growth and the distribution of the reported tax bases (Bahl, 1972; Andersen, 1973; Chelliah and Sheetal, 1974; and Choudhry, 1975). Once this data is available, a constant rate-base series, which represents hypothetical yields under a system assumed to remain unchanged during the period under review, can be constructed. This is done using the following formula :

$$T_t = \sum_{i=0}^{i=n} (M_i)_0 (B_{it}) \dots \dots \dots (11)$$

Where

T_t =HTSD adjusted for discretionary changes in year t

$(M_i)_0$ =base year statutory tax rate on the i^{th} income bracket

n=number of income brackets

B_{it} =reported tax base in the i^{th} income bracket in year t.

The use of this method also faces a number of problems. (a) Since the method incorporates only the discretionary tax changes resulting from changes in statutory tax rates, discretionary tax changes resulting from changes in administrative efficiency and in tax base, tax credit and tax allowances are ignored. (b) The process of adjustment doesn't consider the own-and cross-DTM indirect responses of tax revenues. (c) Data necessary for the application of CRS method, particularly data on distribution of tax bases by rate categories, is not readily available. (d)It is argued that the CRS method is inefficient where a tax system has many progressive elements and where tax bases grow at the same rates (Choudhry, 1979).

To sum up "the adjusted HTSD to discretionary tax changes by means of any of the existing methods (PA and CRS) involve measurement errors which, in turn, create specification bias in the estimate of tax elasticity" (Ehdaie, 1990: 8-9).

3.1.2.2 Use of Proxies for Discretionary Tax Measures (DTMs).

This is the second major approach in the estimation of built-in tax elasticity directly from HTSD. The two methods employed under this approach are the Dummy variable (DV) and Divisia Index (DI) methods, which involve using dummy variables and time trends as proxy for DTMs, respectively.

(a) Divisia Index Method

As originally developed, this method was meant to measure the impact of changes in technology on the productivity of labour and it was first employed for this purpose by Choudhry (1979). The method involves introducing time trends as a proxy for DTMs in the tax revenue and tax base functions. The procedures involved in this method are (a) derivation of a formula, which generates an index representing the revenue impact of DTMs; (b) calculation of the ratio which measures the growth rate of tax revenue resulting from DTMs in terms of a one percent increase in the base. This ratio is obtained by dividing the growth rate of this index by that of the tax base; and (c), calculation of tax elasticity is undertaken by subtracting this (the above) ratio from the tax buoyancy.

The DI method, though practically helpful, where reliable information on discretionary changes is not available, causes a downwards or upwards bias depending on whether

discretionary changes produce positive or negative revenue impacts. This will result in over or underestimation of tax elasticity (Dlimni, 1995; Choudhry, 1979; and Ehdaie, 1990).

(b) Dummy Variable Method

The dummy variable method was developed by Singer(1968) and improved upon by Chand and Wolf (1973), Khan(1973) and Artus(1974). Under this technique, one dummy variable is used as a proxy for each of the discretionary measures undertaken by fiscal authorities during the period under review and the tax elasticity is estimated using a single equation. This is presented in the following model:

$$\ln T_t = \beta_0 + \beta_1 \ln Y_t + \sum_{i=1}^n \beta_i D_i + U_t \dots\dots\dots (12)$$

Where:

- T=tax revenue
- Y_t=aggregate GDP at time t or tax base
- β₁=income elasticity coefficient
- β_{2i}=coefficient for each respective dummy
- β₀=constant

An estimate of tax elasticity obtained by this technique will be unreliable due to multicollinearity. The latter problem results from entering more than one dummy variable into the tax function and the omission of variables which could best explain movements in the tax system. The degree of multicollinearity problem greatly depends on the time interval that exists between two successive discretionary actions undertaken by fiscal authorities. The method can work only if sufficiently large number of observations are available for each structure to the extent that a minimum of two observations per dummy must be available for each structure (Chelliah and Sheetal,1974). This means, as Ehdaie(1990) argued, that it is empirically impossible to get a precise and reliable estimate of tax elasticity using this

technique, particularly when there are frequent discretionary changes in the period under review.

3.2 Review Of Empirical Literature

3.2.1 Overview

A considerable number of studies on elasticity and buoyancy measurements have been conducted for both developed countries and developing countries. Studies on developed countries include Prest (1962), Singer (1968), Graytak and Thursby (1970), Baase and Dixon (1974), and Wasylenko (1975), to mention a few. Studies on developing countries include those by Sahota ((1961), Mansfield (1972), Khan (1973), Chand and wolf (1973), Arthus (1974), Choudhry (1975), Wildford and Wildford (1978), Rao (1979), Byrne (1983), Sury (1985), Mtatifikolo (1990) and Osoro (1992;1993).

While all the above studies used more or less the same method for estimating buoyancy coefficients, they used various methods for the estimation of built-in elasticity of tax systems. This is because estimating built-in elasticity requires separating discretionary tax measures from the Historical Time-series Data (HTSD). Thus the difference between the studies relates to the type of techniques they used to remove or separate the revenue impact of Discretionary Tax Measures (DTMs) from the HTSD. These techniques include: the Proportional Adjustment (PA) method; Dummy Variable (DV) method ; Constant Rate Structure (CRS) method; and Divisia Index (DI) method which we have discussed above. In what follows we review the studies that have focused on developing countries in general, and Ethiopia in particular.

3.2.2 Review Of Empirical Evidence In Developing Countries

G.S.Sahota undertook a study on tax performance of the tax system of India for the period 1948-58 using the PA method and found that the tax system was inelastic, despite the fact that the country had a highly progressive income tax at that time. The reason was found to be a defective tax structure and rate schedule, widespread tax evasion and income distribution in favour of the “ non-income tax payers group”, or in favour of the low income brackets within the tax paying group. C.Y. Mansfeild (1972) applied the analysis of buoyancy and elasticity (using the PA and DV method) to the tax system of Paraguay for the period 1962-70 and the result pointed to a picture of expanding tax bases and significant discretionary changes, which however were offset by evasion, exemptions, and weak administrative efforts in collecting taxes at existing rates. Mohammed Khan (1973) applied the dummy variable method to eliminate the effect of discretionary tax measures in his study of the tax system of Pakistan. F.p.Mtatifikolo (1990) used the CRS method to separate the effects of discretionary changes in measuring tax elasticity of the Tanzanian tax system. W.J.Byrne (1983) studied built-in responsiveness of the major types of taxes in Zambia to movements in their bases for the period 1966-77. The result was that except for import duties the other tax components were elastic. The reason for this result was found to be the growth of the industrial and service sectors, and rapid growth in consumption of bottled beer. For the case of import duties its low elasticity was due to the impact of government's import substitution policy and also because of administrative difficulties. Another important study of this kind was by N.E. Osoro (1992) on the revenue productivity of the tax system of Tanzania for the period 1979-89. After analyzing the components of overall tax elasticities, he found that the tax to base elasticity relative to base to income elasticity was a key factor in explaining the fairly low elasticity of the tax system. In a 1993 study, he applied the same method to the data for the period 1969-90 to analyze the revenue implication of the Tanzanian tax reform. The result suggested that the tax reform had failed to raise revenue productivity.

In Ethiopia no such study has been undertaken recently. However, some similar studies have been done for different and earlier periods. Also most of the earlier studies focused on evaluating component taxes rather than the tax system as a whole. The major analytical studies on the Ethiopian tax system include Wogene Yirko (1983), Kibre Mogos (1983), Melaku Kifle (1982), Eshetu Chole (1983), Tashome Mulat (1979 and 1987), Teame Ghirmay (1985) and Mesfin Midekssa (1994).

Wogene Yirko (1983), in an attempt to examine the contribution of taxation towards establishing the material basis of socialism, estimated the buoyancy and built-in elasticity of the total tax revenue and examined the difference between the two measures to reflect the impact of the tax reforms on tax revenue for the period 1975-81. He used the CRS method to separate the revenue impact of discretionary tax measures. His result indicated that the tax reforms have significantly contributed to increasing tax revenue in the country. In estimating the built-in elasticity he used the proportional adjustment method to remove the revenue effects of the tax reforms. Kibre Moges (1983) examined the role of taxation in primitive socialist accumulation process. He simply examined the tax revenue data and showed that taxation is the only method as compared to the other methods used to mobilize and transfer resources from the private sector to the public sector. He did not estimate and analyze the elasticity of the tax system.

The study by Melaku Kifle (1982) examined agricultural taxation and its contribution to capital formation in Ethiopia. He used various ratios and percentages to achieve this objective. His analysis of agricultural tax share to total tax revenue and the share of agricultural income tax to agricultural GDP suggested that the amount collected was indeed low. Eshetu Chole (1983) used the buoyancy approach in comparing the productivity of the pre-and post-revolution income taxes.

Another important work is the study by Teshome Mulat (1979), which used a variant of the built-in elasticity method to examine the revenue effectiveness of the coffee export taxes. In his analysis, he related tax revenues to the value and volume of coffee exports, and also

derived the relevant revenue equation from the tax laws themselves. The empirical finding suggested that the revenue was volume and price inelastic. He, therefore, concluded that “ the present coffee tax formula requires constant revisions of tax laws whenever significant changes in prices and or volume of coffee export occur” (Teshome, 1979 :382). Also Teshome Mulat (1987) employed the concepts of buoyancy and built-in elasticity in the study of personal income taxation and found that the tax was highly elastic.

The study by Teame (1985) was on resource mobilization through taxation in Ethiopia for the period 1968-1983. He employed the CRS and Dummy variable methods to separate the revenue impact of discretionary tax measures. He found overall buoyancy coefficient of 1.80. However, the built-in elasticity was found to be less than unity. He, thus, concluded that the tax revenue structure in Ethiopia was inadequate, unstable, and inflexible. This, as he indicated, could be attributed to among others, faulty tax policy and weakness in implementation of the tax laws. Finally, Mesfin Midekssa (1994) studied the budgetary impact of import tax reform. He estimated the effect of changes in the import tax system on total tax revenue and other key macroeconomic variables. He also forecasted the changes in future tax revenue that would be brought about by the 1993 change in import taxation. The findings indicated that the tariff reduction would result in a decline in import tax and total tax revenue in the future. He, thus, recommended that the revenue loss arising from tariff reduction be compensated by other sources of tax revenue.

It is necessary, as we argued previously, that the tax system be flexible enough to evolve with the changing requirements of socio-economic conditions. In Ethiopia, however, despite the strategic importance which taxation assumes in the development efforts of the country, there has been no comprehensive quantitative study of the overall tax system since 1985. Moreover, most of the studies we have reviewed focused only on structure and rates of taxes and did not address the problems related to revenue collection, which have considerable impact on revenue productivity. These problems, most importantly, are related to tax administration. It is widely believed that tax administration plays a crucial role in determining a

country's real (or effective) tax system. In order for the tax laws to have their intended effects, tax administration must be effective and efficient.

In addition all the studies on tax elasticities in Ethiopia (except those of Mesfin Midekssa) discussed above used either one or a combination of the four techniques to estimate tax elasticities. These methods, however, have several limitations which weaken the policy recommendations drawn from them. All the above estimation methods of tax elasticity suffer from a specification bias resulting mainly from lack of an observable quantitative variable, which can represent all changes in an individual or overall tax system. Ehdaie (1990) developed an econometric model of taxation, which can take care of these shortcomings, and applied the method to the analysis of the tax system of two developing countries, namely Malawi and Mauritius. This study employs such an econometric method for estimating the tax elasticity and the revenue impacts of DTMs in Ethiopia. The detailed development and specification of the model is provided in the next chapter.

CHAPTER FOUR

MODEL SPECIFICATION AND THE DATA

The tax elasticity "measures percentage increases in the tax revenue resulting from the endogenous changes in its base caused by a one percent rise in GDP"(Ehdaie,1990:1-2) and it is the product of elasticities of the tax yield to its base and the base to GDP. Given the definition of tax elasticity, tax revenue responds directly and indirectly to changes in the tax system and changes in the tax base. Firstly , "an individual tax revenue directly responds to changes in its own tax system (own-DTM direct response) and to "endogenous changes" in its base"(Ehdaie,1990:5). The base,in turn, is endogenously affected by : (a) changes in its own and other tax rate structure ; and (b) non-DTMs factor, particularly variations in GDP. Therefore, it follows that "the tax revenue indirectly responds to changes in its own tax system ("own-DTM indirect response") and other individual tax systems ("Cross-DTM indirect response") through their impacts on its base"(Ehdaie,1990:5).

A general equilibrium model, which captures the interactions between individual tax revenues, individual tax bases, individual tax rate structure, and GDP, is ideally suited for estimating elasticities. This study follows such a modelling strategy, using a dynamic simultaneous equation model of taxation developed by Ehdaie(1990).

This chapter discusses the data ,specification and identification of the model. The first section describes the specification of the model, disaggregating it into its three blocks and discussing each blocks separately. This is followed, in the second section, by a presentation of the entire framework for estimating tax elasticity and the revenue impact of DTMs. The last section describes the data and its sources.

4.1 SPECIFICATION OF THE MODEL

The total tax revenue is classified into six major categories. These are: (a) personal income tax ; (b) business tax; for the purpose of this study, this includes business profit tax, dividend and lottery income tax, urban land lease tax, rental income tax and capital gain tax. It should be recalled from previous discussions of the tax structure that apart from the business profit tax the role of the other components of this category in the tax structure of Ethiopia is insignificant, contributing on the average only about 0.37% of total tax during the period of our study. Therefore a separate analysis of these components is not necessary. Throughout this study we will use "business tax" to refer to the aggregate of business profit tax and other business tax. (c) Agricultural tax (this includes agricultural income tax and rural land use tax); d) import tax; (e) export taxes; f) tax on domestic consumption or domestic indirect tax.

Because of the unavailability of data on legal base for each individual tax, proxies for potential tax bases are selected. The choice of the proxy base used here is similar to that applied to other SSA countries (Ehdaie, 1990; Osoro, 1992; and Skinner, 1988). The proxy bases for the potential bases of domestic consumption tax (T_d), import tax (T_m), export tax (T_x), personal income tax (T_p), business tax (T_b) and agricultural tax (T_a), are private consumption (X_d), imports (X_m), exports (X_x), expenditure on wages and salaries or wage bill (X_p), gross domestic product (X_b) and share of agriculture in GDP (X_a) respectively.

4.1.1 Individual Tax Revenue Equations Block¹

Each individual tax revenue assessed by tax assessors (T_i^*) is treated as a function of its own potential tax base (X_i) and its own tax structure (τ_i), in order to separate out the direct revenue impact of these two factors. That is,

¹For more details on these and other equations of the model, see Ehdaie(1990).

$$\log(T_i^*)_i = \alpha_0 + \alpha_1 \log(X_i)_i + \alpha_2 (\tau_i)_i + \varepsilon_{ii} \dots \dots \dots (1)$$

Where

ε_i =disturbance terms as representative of other explanatory, variables excluded from the model,

i = d, tax on domestic transactions,

= m, tax on imports,

= x, tax on exports,

= p, personal income tax

= b, business tax, and

= a, agricultural tax.

This function is specified in semi-log-linear form for convenience and also because it is the preferred functional form used in previous studies. The model assumes that tax inspectors" adjust actual individual tax revenues, $(T_i)_t$, toward their assessed level, $(T_i^*)_t$, by adding a fraction of the difference between the assessed tax yield, $(T_i^*)_t$, and the actual tax revenue of the previous period, $(T_i)_{t-1}$, to the actual tax revenue collected in the previous period, $(T_i)_{t-1}$ " [Ehdaie, 1990: 18]. This is done using a partial adjustment method, which is written in its log-linear form as follows:

$$\Delta \log(T_i)_i = \lambda_i [\log(T_i^*)_i - \log(T_i)_{i-1}] \dots \dots \dots (2)$$

Where

λ_i is the coefficient of adjustment of the i^{th} individual tax yield, and $1 > \lambda_i > 0$.

The average period of time needed by tax inspectors to complete inspection of the tax files related to the i^{th} individual tax is measured by $(1-\lambda_i)/\lambda_i$, which is the average time lag of adjustment of the i^{th} individual tax revenue.

The actual individual tax revenue function is derived by substituting (2) in (1).

$$\log(T_i)_t = \lambda_i \alpha_{i0} + \lambda_i \alpha_{i1} \log(X_i)_t + (1 - \lambda_i) \log(T_i)_{t-1} + \lambda_i \alpha_{i2} (\tau_i)_t + U_{it} \quad (3a)$$

where $U_{it} = \lambda_i \epsilon_{it}$, stochastic term

Estimating parameters of this equation requires time series data on T_i , X_i , $(T_i)_{t-1}$, and τ_i . Time series data on tax revenue (T_i) and proxy bases (X_i) can easily be obtained following the previous specification. $(T_i)_{t-1}$ can also be generated from time series data on $(T_i)_t$. However, obtaining data on the representative of the i^{th} individual tax system, τ_i , has been impossible.

"...it has been the lack of an observable quantitative variable as representative of an individual (or overall) tax system in public finance which has complicated the issue of estimating individual and overall tax elasticities..." [Ehdaie, 1990: 19]. To deal with this problem, Ehdaie derived the following formula for τ_i .

$$(\tau_i)_t = \frac{\frac{(T_i)_t}{(1 + \lambda_i \alpha_i l g_i)_t}}{(X_i)_t} = [(v_i)_t \frac{(1 + g_i)_t}{(1 + \lambda_i \alpha_i l g_i)_t}] \dots \dots \dots (4)$$

For $i=p, b, a, d$, and m

where

τ_p = Personal income tax system

τ_b = business tax system

τ_a = agricultural tax system

τ_d = domestic indirect tax system

τ_m = import tax system

$(v_i)_t = (T_i/X_i)_t$ = average effective individual tax rate

T_i = individual tax revenue

X_i = individual proxy bases

$\lambda_i \alpha_{i1}$ = the coefficient of X_i and

g_{it} = percentage endogenous changes in the i^{th} individual tax base during the first year through the t^{th} year of the period under review.

The formula is expressed in terms of the parameters and observable variables included in the complete model to be developed. Equation (4) says:

" τ_i is the ratio of the i^{th} individual tax yield (T_i) deflated by the index of that part of the tax revenue gained from endogenous changes in its base, $(1 + \lambda_i \alpha_{i1} g_i)$, over its base (X_i) deflated by the index of that part of the base which is not directly affected by changes in its potential base made by fiscal authorities, $(1 + g_i)$ " [Ehdaie, 1990: 22-23].

An individual tax yield equation with estimable parameters can be obtained by substituting (4) in (3a).

$$\log(T_i)_t = \lambda_i \alpha_{i0} + \lambda_i \alpha_{i1} \log(X_i)_t + (1 - \lambda_i) \log(T_i)_{t-1} +$$

$$\lambda_i \alpha_{i2} [(V_i)[1 + g_i]/(1 + \lambda_i \alpha_{i1} g_i)]_t + U_{it} \dots (3b)$$

where

$U_{it} = \lambda_i \epsilon_{it}$, stochastic term

λ_i = coefficient of adjustment,

α_{i1} = long-run elasticity of T_i with respect to X_i

$\lambda_i \alpha_{i1}$ = short-run elasticity of T_i with respect to X_i ,

$\lambda_i \alpha_{i2}$ = percentage changes in T_i due to one percentage point increase in τ_i (own-DTM direct response) in the short-run

α_{i2} =percentage changes in T_i due to percentage point increase in τ_i (own-DTM direct response) in the long-run.

Equation (3a), for $i=d, m, b, x, p$ and a , represents the individual tax yield functions block of the model. Its parameters are estimated by estimating parameters of equation (3b). After estimating the parameters of equation (3b) and by using simulation techniques, time series data on τ_i s can be generated by means of equation (4). In what follows we discuss the individual tax base equations block.

4.1.2 Individual Tax Base Equations Block

The development of each individual tax base equation is discussed separately using the proxy variables for potential tax bases specified in the previous section. The specification made here is similar to the one followed in studies of tax systems of other Sub-Saharan African (SSA)

countries, whose economic and tax system is similar to Ethiopia.

Domestic Consumption Tax Base Function

The proxy base for domestic indirect tax is private consumption (X_d). This base is function of disposable income (Y_d), which is gross domestic product (GDP) less total direct taxes (i.e.the sum of personal income tax (T_p), business tax (T_b), and agricultural tax(T_a)). Also to capture the impact of indirect taxes on private consumption the ratio of import tax system to indirect tax system is included in the tax base equation. The relationship of these explanatory variables to the tax base is expected to be positive.

The Equation for this tax base can take the following functional form

$$\ln(X_d)_t = \beta_d 0 + \beta_d 1 \ln(Y_d)_t + \beta_d 2 (\tau_m / \tau_d)_t + v_{dt} \dots \dots \dots (5a)$$

where

X_d = nominal private consumption ,

Y_d = GDP- T_p - T_b - T_a , nominal disposable income,

$B_{d1}>0$, elasticity of X_d with respect to Y_d ,

$B_{d2}>0$, percentage changes in X_d due to one unit increase in (τ_m/τ_d) ,

v_{dt} = disturbance terms as representative of the explanatory variables excluded from the model, with standard classical assumptions.

The domestic consumption tax base function with estimable parameters is derived by substituting (4) in (5a) as follows:

$$\ln(X_d)_t = \beta_d 0 + \beta_d 1 \ln(Y_d)_t + \beta_d 2 \left[\frac{v_m [(1+g_m)/(1+\lambda_m \alpha_m 1 g_m)]}{v_d [(1+g_d)/(1+\lambda_d \alpha_d 1 g_d)]} \right]_t + v_{dt} \dots (5b)$$

Import Tax Base Function

The proxy base for import tax is the value of import net of the import tax². This base is a function of nominal GDP at factor cost, the ratio of import tax system and domestic indirect tax system, and business tax system. The value of import is treated as a function of GDP based on the traditional approach of import demand analysis, while the other explanatory variables, (τ_m/τ_d) and τ_b , are included to capture the effect of changes in import tax, domestic consumption tax and corporate income tax systems. Thus the function is written as:

$$\ln(X_m)_t = \beta_m 0 + \beta_m 1 \ln(GDP)_t + \beta_m 2 (\tau_m / \tau_d)_t + \beta_m 3 (\tau_b)_t + v_{mt} \dots (6a)$$

where

X_m = nominal value of imports net of T_m ,

²Although this should exclude imports that don't bear import taxes, no reliable series on free imports for the period is available.

v_{at} = disturbance terms as representative of other sources of variation of X_a resulting from the factors excluded from the model,

$\beta_{a1}>0$, elasticity of X_a with respect to GDP, and

$\beta_{a2}<0$, percentage changes in X_a due to one percentage point change in τ_b and

β_{a3} , percentage changes in x_a due to a one percentage point increase in (τ_m/τ_d)

The impact of τ_b and GDP is realized through investment channels. Any change in the corporate income tax system will affect the marginal rate of return to capital in the non-agricultural sector which, in turn, will influence the level of investment in the agricultural sector resulting in a change in X_a . The impact of changes in indirect individual tax systems (changes in import tax system (τ_m) and domestic indirect tax system(τ_d)) on value added in the agriculture sector is realized through the price mechanism. Therefore (τ_m/τ_d) is included as another explanatory variable to capture this impact of the DTMs on X_a . Regarding the signs of the explanatory variables, τ_b and GDP are positively related to X_a ; while the sign of the coefficient of the ratio of import to domestic indirect tax system, τ_m/τ_d , is ambiguous.

The agricultural tax base function with estimable parameters, as specified above, is derived by substituting (4) in (7a) as depicted below:

$$\ln(X_a)_t = \beta_{a0} + \beta_{a1} \ln(GDP)_t + \beta_{a2} \left(v_d \left[\frac{(1+g_d)}{(1+\lambda_d \alpha_d I g_d)} \right] \right)_t +$$

$$\beta_{a3} \left[\frac{V_m \left[\frac{(1+g_m)}{(1+\lambda_m \alpha_m I g_m)} \right]}{V_d \left[\frac{(1+g_d)}{(1+\lambda_d \alpha_d I g_d)} \right]} \right]_t + v_{at} \dots (7b)$$

Personal Income Tax Base Function

The proxy base for the potential tax base of personal income tax is taken to be the wage bill. First, because such a proxy base has been used in other studies (see Osoro,1993) and second, because the personal income tax is imposed or calculated based on expenditure on wages and salaries. In this paper personal income tax revenue derived from the non public

sector during the period under study is assumed to be insignificant and omitted. Moreover reliable data on the personal income tax revenue derived from and data on the base of the tax from the non public sector is not available.

This proxy base is treated as being influenced by the variations in GDP, the Personal income tax system(τ_p),and the ratio of import and domestic indirect tax system, τ_m/τ_d ,which is entered as representative of the impact of indirect taxes.The function is written as:

$$\ln(X_p)_t = \beta_{p0} + \beta_{p1} \ln(GDP)_t + \beta_{p2} (\tau_m/\tau_d)_t + v_{pt} \dots (8a)$$

Where

$\beta_{p1} > 0$, the elasticity of x_p with respect to GDP

X_p =The wage bill

v_{pt} =Disturbance terms

The personal income tax base function with estimable parameters is derived by substituting (4) in (8a).

$$\ln(x_p)_t = \beta_{p0} + \beta_{p1} \ln(GDP)_t + \beta_{p2} \left[\frac{v_m [(1+g_m)/(1+\lambda_m \alpha_m (1+g_m))]}{v_d [(1+g_d)/(1+\lambda_d \alpha_d (1+g_d))]} \right]_t + v_{pt} \dots (8b)$$

Export Tax Base Function

In the Ehdaie's model, the proxy for an export tax base, i.e. the nominal value of export net of export taxes, is defined as a function of the weighted average of GDP of importer countries and individual tax systems(τ_i). However, as in Ehdaie, the export tax revenue and base functions are excluded from the entire model for the following reasons. Firstly, the primary objective of this study is to estimate individual and overall tax elasticities with respect

to the GDP of the home country, whereas the export tax is levied on the products exported to foreign countries and the main base of this tax is the weighted average of GDP of importer countries. Secondly, due to the urgent need to encourage the competitiveness of Ethiopia's export sector, there is a tendency to reduce export taxes. Therefore, the need for using the elasticity of this tax is not immediate for policy purposes. Moreover, the diversity of the level of GDP of the importer countries poses econometric problems.

In general, therefore, the individual tax base functions block of the model is given by equations (5a), (6a), (7a), (8a) and (9a). Estimating the parameters of (5b), (6b), (7b), (8b) and (9b) by means of a simultaneous- equation econometric estimation method provides estimates of the parameters of the four individual tax base equations.

4.1.3 Identities Block

This block deals with the functional relationship of identities with their related variables. The identities are disposable income and total tax revenue net of export tax revenue. Disposable income is GDP minus direct taxes. That is

$$(Y_d)_t = (GDP)_t - (T_b)_t - (T_a)_t - (T_p)_t \dots\dots\dots (9a)$$

As all the variables included in (9a) appear in logarithmic form in the equations developed above; for convenience (9a) is also transformed into a log-linear form and expanding around the geometric mean value of the variables included in it by using Tailor's series gives:

$$\ln(Y_d)_t = \delta_0 + \delta_1 \ln(GDP)_t + \delta_2 \ln(T_b)_t + \delta_3 \ln(T_a)_t + \delta_4 \ln(T_p)_t \dots (9b)$$

where
 $\delta_1 > 0, \delta_2 < 0, \delta_3 < 0, \delta_4 < 0.$

That is, given our definition of disposable income and apriori assumptions the coefficient of GDP is positive, while the components of direct taxes are expected to have coefficients with a negative sign.

The total tax revenue net of export taxes is the sum of the other individual tax yields. This is presented as:

$$(T)_t = (T_b)_t + (T_a)_t + (T_d)_t + (T_m)_t + (T_p)_t \dots (10a)$$

Again for reason of convenience, equation (10a) is converted into the following log-linear form by employing the method mentioned above and expanding equation (10a) around the geometric mean value of the variables included in it and then making a simple manipulation.

$$\ln(T)_t = \sigma_0 + \sigma_b \ln(T_b)_t + \sigma_a \ln(T_a)_t + \sigma_d \ln(T_d)_t + \sigma_m \ln(T_m)_t + \sigma_p \ln(T_p)_t \dots (10b)$$

where

$\sigma_i > 0$, and $i = p, b, a, d, m$.

The identity equations (which are presented in log-linear form (i.e. 9b and 10b)) are deterministic functions. The mean value of time series data on the variables included in them or OLS estimation method can be used to estimate the parameters of these identity equations.

4.2 Entire Model and Its Dynamic Multipliers

The structural form of the model is provided by equations (3a) (for $i = p, b, d, m, a$), (5a), (6a), (7a), (8a), (9b) and (10b). This is presented in table 4.1. The table also clearly shows the

nature of the variables, exogenous or endogenous, and defines the variables. Estimating the parameters of equations (3b)(for i=p,b,d,m,a), (5b), (6b), (7b), (8b), (9b) and (10b) (Table 4.2) by means of a simultaneous equation econometric estimation technique provides efficient and consistent estimates of the parameters of the structural form of the model. Then using the estimated parameters and equation (4), time series data on τ_i s are generated. These data are used to linearize the ratio of import tax and domestic indirect tax system, τ_m/τ_d , to keep the entire model in semi-log linear form. The following linear form is obtained by expanding it around the mean value of τ_i s using Taylor's series.

$$(\tau_m / \tau_d)_t = \theta_0 + \theta_1(\tau_m)_t + \theta_2(\tau_d)_t \dots\dots\dots (11)$$

where:

$\Theta_0 > 0$, $\Theta_1 > 0$, and $\Theta_2 < 0$.



This linearization also helps to derive the revenue impact of changes in each individual tax system from the estimated parameters of the model. Equation (11) is a deterministic equation. Similar to the case of other identities either the mean value of the generated time series data on τ_i s or the OLS estimation technique can be used to estimate its parameters.

The structural form of the model with estimated parameters is, then, obtained by substituting the estimated value of the parameters in the model presented in table 4.2. Therefore, the structural form of the model with estimated parameters contains: eleven equations ((3a) (for i=d, b,a,p, m), (5a),(6a), (7a), (8a), (9b), (10b) and (11)); eleven endogenous variables; six exogenous variables; and five predetermined endogenous variables. That is it is a simultaneous equations system.

In summary the short run and long-run elasticities of individual tax yields and base and overall tax revenue with respect to GDP can be obtained by using the estimated parameters or by substituting the estimated parameters into the formulas presented in Table 4.3.

4.3 THE DATA

This study uses data covering the period 1960/61 to 1995/96 (Ethiopian fiscal year). The choice of this period is based on the availability of data, the data requirement of the model and the period also includes attempts at tax reform. The data required for the application of the model is historical time series data on component and overall tax revenues, data on various tax bases (proxy bases) and GDP. Due to the lack of data on their legal or true bases, proxy bases are used as representative of each legal base. The data is shown in appendix 3.

The data relating to government revenue and expenditure, in particular data related to actual tax revenue, changes in tax rates and coverage, and information regarding exemptions are collected from the Ministry of Finance. Data on GDP, its components and tax bases are collected from the Ministry of Planning and Economic Development, Central Statistical Authority (CSO), and National Bank of Ethiopia (NBE).

Table 4.1: Structural Form of the Model

$$\begin{aligned}
\log(T_d)_t &= \lambda_d \alpha_{d0} + \lambda_d \alpha_{d1} \log(X_d)_t + (1 - \lambda_d) \log(T_d)_{t-1} + \lambda_d \alpha_{d2} (\tau_d)_t + U_{dt} \\
\log(T_m)_t &= \lambda_m \alpha_{m0} + \lambda_m \alpha_{m1} \log(X_m)_t + (1 - \lambda_m) \log(T_m)_{t-1} + \lambda_m \alpha_{m2} (\tau_m)_t + U_{mt} \\
\log(T_p)_t &= \lambda_p \alpha_{p0} + \lambda_p \alpha_{p1} \log(X_p)_t + (1 - \lambda_p) \log(T_p)_{t-1} + \lambda_p \alpha_{p2} (\tau_p)_t + U_{pt} \\
\log(T_b)_t &= \lambda_b \alpha_{b0} + \lambda_b \alpha_{b1} \log(X_b)_t + (1 - \lambda_b) \log(T_b)_{t-1} + \lambda_b \alpha_{b2} (\tau_b)_t + U_{bt} \\
\log(T_a)_t &= \lambda_a \alpha_{a0} + \lambda_a \alpha_{a1} \log(X_a)_t + (1 - \lambda_a) \log(T_a)_{t-1} + \lambda_a \alpha_{a2} (\tau_a)_t + U_{at} \\
\ln(X_d)_t &= \beta_{d0} + \beta_{d1} \ln(Y_d)_t + \beta_{d2} (\tau_m / \tau_d)_t + v_{dt} \\
\ln(X_m)_t &= \beta_{m0} + \beta_{m1} \ln(GDP)_t + \beta_{m2} (\tau_m / \tau_d)_t + \beta_{m3} (\tau_b)_t + v_{mt} \\
\ln(X_p)_t &= \beta_{p0} + \beta_{p1} \ln(GDP)_t + \beta_{p2} (\tau_m / \tau_d)_t + v_{pt} \\
\ln(X_a)_t &= \beta_{a0} + \beta_{a1} \ln(GDP)_t + \beta_{a2} (\tau_b)_t + \beta_{a3} (\tau_m / \tau_d)_t + v_{at} \\
\ln(T)_t &= \sigma_0 + \sigma_d \ln(T_d)_t + \sigma_m \ln(T_m)_t + \sigma_b \ln(T_b)_t + \sigma_a \ln(T_a)_t \\
\ln(Y_d)_t &= \delta_0 + \delta_1 \ln(GDP)_t + \delta_2 \ln(T_b)_t + \delta_3 \ln(T_a)_t + \delta_4 \ln(T_p)_t \\
(\tau_m / \tau_d)_t &= \Theta_0 + \Theta_1 (\tau_m)_t + \Theta_2 (\tau_d)_t
\end{aligned}$$

Where

- T_p = Personal income tax (endogenous variable),
 T_d = Tax on domestic transactions (endogenous variable),
 T_m = Import tax (endogenous variable),
 T_b = Business tax (endogenous variable),
 T_a = Agricultural tax (endogenous variable),
 X_d = Private consumption (endogenous variable),
 X_m = Imports (endogenous variables),
 X_a = Share of agriculture in GDP,
 X_p = Wage bill
 X_b = GDP = gross domestic products (exogenous variable),
 τ_i = The i^{th} individual tax system or realized tax rate (exogenous variable), for $i = d, m, b, a, p$
 Y_d = Disposable income (endogenous variable),
 T = Total tax revenue net of export taxes (endogenous

Variable)

Table 4.2: Entire Model With Estimable Parameters

$$\ln(T_m)_t = \lambda_m \alpha_m 0 + \lambda_m \alpha_m l \ln(X_m)_t + (1 - \lambda_m) \ln(T_m)_{t-1} + \lambda_m \alpha_m 2 \left[v_m \frac{1 + g_m}{1 + \lambda_m \alpha_m l g_m} \right] J_t + U_{mt}$$

$$\ln(T_d)_t = \lambda_d \alpha_d 0 + \lambda_d \alpha_d l \ln(X_d)_t + (1 - \lambda_d) \ln(T_d)_{t-1} + \lambda_d \alpha_d 2 \left[v_d \frac{1 + g_d}{1 + \lambda_d \alpha_d l g_d} \right] J_t + U_{dt}$$

$$\ln(T_a)_t = \lambda_a \alpha_a 0 + \lambda_a \alpha_a l \ln(X_a)_t + (1 - \lambda_a) \ln(T_a)_{t-1} + \lambda_a \alpha_a 2 \left[v_a \frac{1 + g_a}{1 + \lambda_a \alpha_a l g_a} \right] J_t + U_{at}$$

$$\ln(T_b)_t = \lambda_b \alpha_b 0 + \lambda_b \alpha_b l \ln(x_b)_t + (1 - \lambda_b) \ln(T_b)_{t-1} + \lambda_b \alpha_b 2 \left[v_b \frac{1 + g_b}{1 + \lambda_b \alpha_b l g_b} \right] J_t + U_{bt}$$

$$\ln(T_p)_t = \lambda_p \alpha_p 0 + \lambda_p \alpha_p l \ln(X_p)_t + (1 - \lambda_p) \ln(T_p)_{t-1} + \lambda_p \alpha_p 2 \left[v_p \frac{1 + g_p}{1 + \lambda_p \alpha_p l g_p} \right] J_t + U_{pt}$$

$$\ln(X_d)_t = \beta_d 0 + \beta_d l \ln(Y_d)_t + \beta_d 2 \left[\frac{v_m [(1 + g_m)/(1 + \lambda_m \alpha_m l g_m)]}{v_d [(1 + g_d)/(1 + \lambda_d \alpha_d l g_d)]} \right] J_t + U_{dt}$$

$$\ln(X_m)_t = \beta_m 0 + \beta_m l \ln(GDP)_t + \beta_m 2 \left[\frac{v_m [(1 + g_m)/(1 + \lambda_m \alpha_m l g_m)]}{v_d [(1 + g_d)/(1 + \lambda_d \alpha_d l g_d)]} \right] J_t + \beta_m 3 \left[\frac{v_b (1 + g_b)}{(1 + \lambda_b \alpha_b l g_b)} \right] J_t + U_{mt}$$

$$\ln(X_a)_t = \beta_a 0 + \beta_a l \ln(GDP)_t + \beta_a 2 \left[v_d \frac{(1 + g_d)}{(1 + \lambda_d \alpha_d l g_d)} \right] J_t + \beta_a 3 \left[\frac{v_m (1 + g_m)/(1 + \lambda_m \alpha_m l g_m)}{v_d (1 + g_d)/(1 + \lambda_d \alpha_d l g_d)} \right] J_t + U_{at}$$

$$\ln(x_p)_t = \beta_p 0 + \beta_p l \ln(GDP)_t + \beta_p 2 \left[\frac{v_m [(1 + g_m)/(1 + \lambda_m \alpha_m l g_m)]}{v_d [(1 + g_d)/(1 + \lambda_d \alpha_d l g_d)]} \right] J_t + U_{pt}$$

$$\ln(T)_t = \sigma_0 + \sigma_d \ln(T_d)_t + \sigma_m \ln(T_m)_t + \sigma_b \ln(T_b)_t + \sigma_a \ln(T_a)_t + \sigma_p \ln(T_p)_t$$

$$\ln(Y_d)_t = \delta_0 + \delta_1 \ln(GDP)_t + \delta_2 \ln(T_b)_t + \delta_3 \ln(T_d)_t + \delta_4 \ln(T_p)_t$$

$$g(i)_t = \ln(X_i)_t - \ln(X_i)_0 \text{ for } i=d,m,b,a,p$$

Table 4.3: Short Run and Long Run individual and Overall Tax elasticities in Terms of the Parameters Included in the Model

A. Short Run:

Total Tax

$$\begin{aligned} & \sigma_m \alpha_{m1} \beta_{m1} + \sigma_d \alpha_{d1} \beta_{d1} (\delta_1 + \alpha_{b1} \delta_2 + \delta_3 \alpha_{a1} \beta_{a1} + \delta_4 \beta_{p1} \alpha_{p1}) + \sigma_b \alpha_{b1} + \sigma_a \alpha_{a1} \beta_{a1} + \sigma_p \alpha_{p1} \beta_{p1} \\ & (T) \\ & - \text{Import Tax} \quad \alpha_{m1} \beta_{m1} \\ & (T_m) \\ & - \text{Consumption Tax} \quad \alpha_{d1} \beta_{d1} (\delta_1 + \alpha_{b1} \delta_2 + \delta_3 \alpha_{a1} \beta_{a1} + \delta_4 \alpha_{p1} \beta_{p1}) \\ & (T_d) \\ & - \text{Business Tax} \quad \alpha_{b1} \\ & (T_b) \\ & - \text{Agricultural Tax} \quad \alpha_{a1} \beta_{a1} \\ & (T_a) \\ & - \text{Personal Income Tax} \quad \alpha_{p1} \beta_{p1} \\ & (T_p) \end{aligned}$$

B. Long Run:

Total Tax

$$\begin{aligned} & \sigma_m \alpha_{m1} \beta_{m1} / 1 - \alpha_{m2} + \sigma_d \alpha_{d1} \beta_{d1} / 1 - \alpha_{d2} [\delta_1 + \alpha_{b1} \delta_2 / 1 - \alpha_{b2} + \delta_3 \alpha_{a1} \beta_{a1} / 1 - \alpha_{a2} + \delta_4 \alpha_{p1} \beta_{p1} / 1 - \alpha_{p2}] / 1 - \alpha_{p2} + \\ & \sigma_b \alpha_{b1} / 1 - \alpha_{b2} + \sigma_a \alpha_{a1} \beta_{a1} / 1 - \alpha_{a2} + \sigma_p \alpha_{p1} \beta_{p1} / 1 - \alpha_{p2} \\ & (T) \\ & - \text{Import Tax} \quad \alpha_{m1} \beta_{m1} / 1 - \alpha_{m2} \\ & (T_m) \\ & - \text{Consumption Tax} \quad \alpha_{d1} \beta_{d1} / 1 - \alpha_{d2} [\delta_1 + \alpha_{b1} \delta_2 / 1 - \alpha_{b2} + \delta_3 \alpha_{a1} \beta_{a1} / 1 - \alpha_{a2} + \delta_4 \alpha_{p1} \beta_{p1} / 1 - \alpha_{p2}] \\ & (T_d) \\ & - \text{Business Tax} \quad \alpha_{b1} / 1 - \alpha_{b2} \\ & (T_b) \\ & - \text{Agricultural Tax} \quad \alpha_{a1} \beta_{a1} / 1 - \alpha_{a2} \\ & (T_a) \\ & - \text{Personal Income Tax} \quad \alpha_{p1} \beta_{p1} / 1 - \alpha_{p2} \\ & (T_p) \end{aligned}$$

CHAPTER FIVE

EMPIRICAL ANALYSIS

In this chapter we estimate the parameters of the model developed in chapter four and use the estimates to test the hypothesis of the study. Accordingly, in the first section the estimation method and results are discussed. In the subsequent sections the interpretation of results and policy implications are presented using the obtained results.

5.1. Methods of estimation and Empirical Results

5.1.1 Model Identification

In a system of simultaneous equation model, it is essential to resolve the identification problem before proceeding to estimation. The order and rank conditions are widely used to determine whether a model is just identified, over identified or under identified.

In brief, in a system of (n) equations, an equation is said to be identified according to the rank conditions if it is possible to form a determinant of order $(n-1)$ rows and columns, whose elements are not all zero, from the coefficients of the variables excluded from the equation under consideration but included in other equations. An equation is identified under the order condition if the total number of variables (endogenous and exogenous) excluded from it is equal to or greater than the number of endogenous variables in the model less one (Maddala, 1992).

In our simultaneous equations model, the structural form of the model contains eleven equations, eleven endogenous variables, six exogenous variables, and five predetermined endogenous variables. Applying the order condition, every equation in the model is over identified. We can, therefore, proceed to the estimation of the model.

5.1.2 Estimating Simultaneous Equation System

There are several methods of estimating simultaneous equation models such as the one developed in the previous chapter. These methods are classified into two major categories: Single-equation methods and system methods. In the systems method all equations in the model are estimated simultaneously, taking due account of all restrictions on every equation by the omission or absence of some variables. The systems methods are also known as full information methods. On the other hand, in single equation methods, also known as limited information methods, each equation in the system of simultaneous equations is estimated individually without worrying about the restrictions on the other equations in the system. For identification purposes, however, the other equations in the system may be taken into account.

In principle, therefore, limited information methods are less efficient than the corresponding full information estimators, except in certain special cases. It follows that to preserve the spirit of simultaneous-equation models, ideally one should use the systems methods. In practice, however, such methods are not commonly used for a variety of reasons such as (a) the enormous computational burden involved; (b) solutions that are highly non linear in the parameters and are therefore often difficult to determine, and (c) if there is a specification error in one or more equations of the system, that error is transmitted to the rest of the system. This makes the system method very sensitive to specification errors.

In practice, therefore, single-equation methods are by far the most popular. The three commonly used single equation methods are Ordinary Least Squares (OLS), Indirect Least Squares (ILS) and two Stages Least Squares (2SLS). While OLS, in general, is not applicable in the context of simultaneous equation models, it can be applied to the case of recursive models. In the recursive models there is a definite but unidirectional cause-and-effect relationship among the endogenous variables. The ILS method, on the other hand, is suited for exactly

identified equations. This method involves applying OLS to reduced-form equations and then estimating the original structural coefficients from the reduced form coefficients.

In this study the method of 2SLS is employed. This is because this method is especially designed for over identified equations, such as in our case. It can also be applied to exactly identified equations, in which case the results of both the 2SLS and ILS are identical. The procedure in 2SLS is to replace each endogenous explanatory variable by a linear combination of the predetermined variables in the model and use this combination as the explanatory variables in lieu of the original endogenous variable. Thus the 2SLS estimation method is similar to the instrumental variable method in that the linear combination of the predetermined variables is used as an instrument, or proxy, of the endogenous regressors.

5.1.3 Potential Problems

5.1.3.1 Time series Characteristics of the Data

As we have seen in chapter four, the model of taxation which we use in this study has formulas for computing short and long run tax elasticities. Therefore knowledge of the time series properties of the data is necessary to decide on whether to estimate the variables at their levels or in their differenced form. If there exist some long run equilibrium relationship between the variables in our model, we can run the regression on the level of variables. Such regressions will maintain all the information about the long run relationship between variables. At this point it should be stated that we don't apply the error correction mechanism to our model even if the variables cointegrate, since the model is uniquely developed in such a way that the partial adjustment method can be employed to distinguish between short and long run tax elasticities. On the other hand, if the variables don't cointegrate in the long run, estimation of the equations should be made after differencing the variables to induce stationary series³.

³ Stationary series is a series with spectrum, which is finite but non zero at all frequencies. such series are called integrated of order zero (Granger, 1986).

The other important problem is heteroscedasticity (i.e. violation of the assumption of the classical linear regression model that residuals have a common variance). The presence of this problem doesn't destroy consistency properties of the usual OLS estimators, but the estimators are no longer efficient. However, this problem occurs mostly in cross-section data rather than with time series data. Even then appropriate methods in the Microfit package are used to test the presence of this problem and to solve it where it is observed.

Finally, there is the possibility of serial correlation in our study as we are using time series data. In any time series data serial correlation (i.e. violation of OLS assumption that residuals are independent) is possible. This is because in such data successive residuals tend to be highly correlated due to reasons such as sluggishness of several economic time series and exclusion of some relevant variables from the model. In the presence of autocorrelation, OLS estimators remain unbiased and consistent but are no longer efficient. Durbin Watson (DW) and Lagrange Multiplier (LM) autocorrelation tests are employed to detect the presence of autocorrelation. Where the tests indicated the presence of autocorrelated disturbances, the iterative cochrane-ocut process is used (Johnston, 1972)⁴.

In addition, problems of normality and incorrect functional forms will be detected and corrected as required. For the test of functional form Ramsey's Reset test using the square of the fitted values is applied; while the test of normality is made based on a test of skewness and kurtosis of residuals. For the test of overall significance of the model the F-statistic and the coefficients of determination are used. These are supported by the plots of actual and fitted values of variables in the estimated models.

The Microfit computer package permits tests of structural stability and parameter constancy. To test for structural stability the CUSUM and CUSUMQ tests are applied. These tests are graphical tests, in which the critical values of the test are given by the lines indicating the critical boundaries of the test. To test the constancy of parameters, plots of the coefficient of each parameter against the bands of its standard errors based on recursive least squares are examined.

⁴This process results in an estimate with a smaller sampling variance than does the ordinary least squares method and also results in consistent estimation of error variances.

5.1.4. Empirical Results

Time series data for the period 1960/61-1995/96 (Ethiopian fiscal year) are used to estimate the parameters of the model. The data used and their sources are shown in appendix 2. Time series data on individual tax system, τ_i s, are also generated. This is done, based on their definition and the formula provided in chapter four, in the process of estimating the model. To generate the series the following procedure is used. First, simulation is performed for the endogenous variables included in the model to generate time series data on g_i s. This data and estimates of λ_i s and α_i s are then used to generate time series data on τ_i s by means of the formula provided by equation (4).

Before proceeding to estimation, the series characteristics of all the variables were considered. Based on the DF and ADF tests of unit roots, all the variables are non-stationary in levels but found to be stationary after at least first differencing. After testing for unit root, the test for cointegration based on the Engle-granger two-step procedure was employed to determine the nature of the long run relationship between the dependent and the explanatory variables. Both DF and ADF tests, with and without trend, indicate stationarity of the saved residuals from the long run regressions. Therefore the hypothesis of no cointegration is rejected.

In the model the first five equations are the individual tax revenue equations, the next four equations the tax base equations, and the last three equations are identities. Efficient and consistent estimates of the parameters of the model were obtained by means of two-stages least squares regression. In the first estimation all the parameters had the expected signs and plausible sizes except for the lagged dependent variables in personal income tax and business tax revenue equations, which had unexpected signs but were insignificant. Therefore the two equations were re-estimated without their lagged dependent variables. The structural form of the model, with estimated parameters, is presented in table 5.1. The estimation results show that every parameter has the correct sign and a plausible size. The coefficients of all the explanatory variables in the model are significantly different from zero at more than 80 percent probability

level, except for lagged dependent variables in the tax revenue equations which are insignificant. However, these variables are kept in the because they have the right signs and also because they help to maintain the stability of the estimated equation.

The F statistic, coefficient of determination and residual sum of squares are used to assess the overall significance of the model as well as the goodness of fit of the predicted values and they support the suggestion of an overall good fit. In every equation the residual sum of squares are very small, the F statistic indicates that the line is a good fit at 1% level of significance, and R-bar squared shows that the regressors in every equation explain not less than 85% of variation in the dependent variable series.

The actual and predicted values plotted, and inspection confirmed that the model captured the historical movement in the dependent variables in all equations. These plots are presented in appendix 5.

Also the CUSUM and CUSUMQ graphic tests for structural break, discussed in section 5.1.2, was applied⁵. The test indicates that there is no structural break in the tax revenue equations. Furthermore, the test of stability of parameters indicate the stability of all parameters.

Finally, the efficient and consistent estimates of parameters of the structural form of the model we obtained in this section are used to achieve one objective of the study. The short run and long run elasticities of individual and overall tax yields, and of tax bases to GDP are obtained by substituting the estimated parameters of the structural form of the model into the formulas presented in chapter four. The obtained results are presented in table 5.2 - 5.3.

⁵Controlling for the impact of the regime change and separation of Eritrea from Ethiopia improves stability of the model and parameters.

Table 5.1 Econometric Model of Taxation in Ethiopia (2SLS Estimation Results)

A Tax Revenue Equations			
$\ln(T_m)_t = -0.324 + 0.737 \ln(X_m)_t + 0.034 \ln(T_m)_{t-1} + 0.012(r_m)_t$			
(-1.2)	(3.7)	(0.136)	(4.142)
$R^2=0.97 \quad DW=2.09$ $RSS=0.6339 \quad F(5,29)=216.22$			
$\ln(T_d)_t = -3.23 + 0.86 \ln(X_d)_t + 0.06 \ln(T_d)_{t-1} + 0.17(r_d)_t$			
(-7.4)	(10.2)	(1.03)	(14.11)
$R^2=0.99 \quad DW=1.91$ $RSS=0.18991 \quad F(4,30)=1114.5$			
$\ln(T_p)_t = -1.49 + 0.8566 \ln(X_p)_t + 0.2473(r_p)_t$			
(-10.5)	(39.43)	(9.274)	
$R^2=0.98 \quad DW=1.69$ $RSS=0.2055 \quad F(3,31)=914.3$			
$\ln(T_b)_t = -2.406 + 0.589 \ln(X_b)_t + 0.9682(r_b)_t$			
(-0.68)	(1.33)	(4.124)	
$R^2=0.85 \quad DW=1.94$ $RSS=11.5897 \quad F(3,32)=49.6$			
$\ln(T_a)_t = -5.5 + 1.3 \ln(X_a)_t + 0.01 \ln(T_a)_{t-1} + 0.65(r_a)_t$			
(-3.2)	(3.8)	(0.074)	(2.5)
$R^2=0.72 \quad DW=1.9$ $RSS=11.37 \quad F(5,29)=18.3$			
B. Tax Base Equations			
$\ln(X_m)_t = -1.89 + 0.948 \ln(GDP)_t + 0.1638(r_b)_t - 0.027(r_m/r_d)_t$			
(-1.8)	(7.4)	(2.4)	(-4.2)
$R^2=0.96 \quad DW=1.77$ $RSS=1.2962 \quad F(5,30)=180.6$			
$\ln(X_d)_t = -0.38 + 1.02 \ln(Y_d)_t + 0.0014(r_m/r_d)_t$			
(-3.0)	(73.4)	(1.62)	
$R^2=0.998 \quad DW=2.04$ $RSS=0.027922 \quad F(4,30)=5715.3$			
$\ln(X_p)_t = -3.54 + 1.083 \ln(GDP)_t + 0.003(r_m/r_d)_t$			
(-5.16)	(14.7)	(1.3)	
$R^2=0.988 \quad DW=2.14$ $RSS=6.6712 \quad F(4,30)=741.6$			
$\ln(X_b)_t = 0.91 + 0.557 \ln(GDP)_t + 0.2562(r_b)_t + 0.002(r_m/r_d)_t$			
(0.39)	(2.09)	(2.3)	(0.292)
$R^2=0.88 \quad DW=1.6$ $RSS=1.9783 \quad F(6,28)=43.35$			
C Identities			
$\ln(T)_t = 1.556 + 0.292 \ln(T_m)_t + 0.312 \ln(T_d)_t + 0.118 \ln(T_p)_t + 0.229 \ln(T_b)_t + 0.051 \ln(T_a)_t$			
$\ln(y_d)_t = -0.224 + 1.043 \ln(GDP)_t - 0.013 \ln(T_p)_t - 0.025 \ln(T_b)_t - 0.005 \ln(T_a)_t$			
$(r_m/r_d)_t = 1.16 + 0.2026(r_m)_t - 0.15(r_d)_t$			

Note: Figures in parenthesis are t values

Table 5.2 Short Run and Long Run Individual and overall Tax elasticities in Ethiopia 1961-96.

Description	Short Run Elasticities	Long Run Elasticities
Total Tax	0.758	0.783
Import Tax	0.699	0.723
Domestic Indirect Tax	0.877	0.933
Personal Income Tax	0.928	0.928
Business Tax	0.589	0.589
Agricultural Tax	0.724	0.731

Source: Computed from table 5.1

5.2 Analysis of Built-in-tax Elasticity

In this section we deal with the analysis and interpretation of the empirical results provided in the previous section. The discussion is based on the results presented in tables 5.1-5.3.

5.2.1 Overall Elasticities

The short run and long run elasticities of all individual tax revenues with respect to their respective bases are significantly different from zero at 99% probability level, except for the base of business tax which is significant at the 81% probability level. The elasticities of import tax, domestic indirect tax, personal income tax, agricultural tax and business tax with respect to base are 0.737, 0.86, 0.8566, 1.3 and 0.589 in the short run; While they are

0.763, 0.915, 0.8566, 1.313 and 0.589 in the long run, respectively. This means that a 1% increase in the bases will lead to all increase in respective tax revenues by the percent of the magnitude of respective elasticities. It can be observed that all the long run elasticities exceeds short run elasticities, except that of business tax and personal income tax which are equal. Also it can be observed that all short run and long run elasticities with respect to their base are less than one, except in the case of agricultural tax which is elastic in both the short and long-run.

The elasticities of all individual tax bases to GDP are also significant at the 95% probability level, the elasticities being 0.948, 1.02, 1.083, and 0.557 for import tax, domestic indirect tax, personal income tax and agricultural tax bases, respectively. The implication of this is that a 1% increase in nominal GDP will result in 0.948, 1.02, 1.083 and 0.557 % increase in import tax, domestic indirect tax , personal income tax and agricultural tax bases. It can be seen that the elasticities for personal income tax and domestic indirect tax are greater than unity, while that of agricultural tax and import tax are less than unity.

The product of the above tax-to-base and base-to-income elasticities yields the built-in elasticities. As table 5.2 shows most of the individual taxes are inelastic both in the short and long run. The built-in elasticities are 0.928, 0.724, 0.589, 0.877 and 0.699 in the short run, and 0.928, 0.731, 0.589, 0.933 and 0.723 in the long run, for personal income tax, agricultural tax, business tax, domestic indirect tax and import tax respectively. As a result the built-in elasticities of the overall tax system are less than one both in the short and long run, the elasticity being 0.758 and 0.783 respectively.

5.2.2. Decomposition Analysis

We have demonstrated that the tax elasticity of a given tax system is the product of the tax-to-base and base-to-income elasticities. The relationships for individual taxes are summarized in table 5.3. and are discussed below.

In assessing the performance of individual taxes it should be noted that low tax- to- base elasticities could arise because of one or more of the following factors. These are poor administration , high tax avoidance and evasion, existence of numerous allowances and exemptions, and the use of specific instead of ad valorem rates. These factors explain the degree to which the government can influence the tax- to- base elasticity. On the other hand base- to- income elasticity is greatly influenced by the change in the structure of the economy, as a result this elasticity is largely beyond the control of the government.

Import tax

In principle import tax should be levied on all imports. However, in practice exemptions are generally granted to imports of some capital goods, raw materials and even consumer goods. The long run built-in elasticity of this tax is 0.723, which is less than unity. This elasticity is particularly low given the importance of import tax in the indirect tax structure of Ethiopia. This low elasticity is largely due to the low tax-to-base elasticity, while the base to income elasticity approaches. The low tax-to-base elasticity is due to the rate structure of import tariffs, the exemption of some importable products from paying tax and the policy of import substitution followed in the past. This low tax-to-base elasticity

Table 5.3: Decomposition of Long run Elasticities

	Import Tax	Domestic Indirect Tax	Personal Income Tax	Agricultural Tax	Business Tax
Built-in elasticity	0.723	0.933	0.928	0.731	0.589
Tax to Base Elasticity	0.763	0.915	0.8556	1.313	
Base to Income Elasticity	0.948	1.02	1.083	0.557	

Source: Computed from Table 5.1

means that as the base grows, the tax grows by less than the growth in the base. The base-to-income elasticity, on the other hand, is 0.948, suggesting that the base grows proportionally with GDP.

The inelasticity of this tax seems to support the view that heavy dependence on international trade taxes is an undesirable attribute of a tax system as this may cause instability of receipts.

Both the elasticity of tax to-base and base-to-income as well as the built-in elasticity of this tax were greater than unity in the study by Mesfin and Haksar (1994).

Domestic Indirect Tax

This includes all taxes related to domestic transactions. The main ones are those levied on locally produced manufactured goods and/or products, and on services. This category of tax represented about 30% of total tax revenue over the period of study. Its long run built-in elasticity coefficient is 0.933, which can be interpreted to mean that a 1% increase in income as the economy grows will lead to 0.933% increase in revenue from this source.

The tax-to-base elasticity coefficient is 0.915, which shows that as the base grows by 1% the tax grows by 0.915%. The base-to-income elasticity coefficient is 1.02 and together with the tax-to-base elasticity produces an inelastic domestic indirect tax structure. The inelasticity of this tax is due to the low tax-to-base elasticity, and evidence suggests that this is due to weak administration of domestic indirect taxation.

Personal Income Tax

The tax yield from personal income tax shows built-in elasticity of 0.928, which is less than unity. This results from low tax-to-base elasticity, which is 0.8556, whereas the

base to income elasticity is slightly greater than unity, at 1.083. This low tax-to-base elasticity result is quite interesting in that the rate of this tax is not low by developing country standard and is the tax with possibly the highest compliance. Also this low elasticity is in contrast to the fact that income taxes are typically highly elastic and to the past empirical findings. This low elasticity is mainly due to the reduction of rates of this tax in recent years.

Agricultural Tax

The built-in elasticity of this tax is 0.7314. This is the result of a very low base-to-income elasticity which, in turn, may be due to the poor performance of the agricultural sector.

Although Ethiopia is an agrarian country, the tax from the sector is not elastic. The magnitude of tax revenue generated from the sector is relatively small, contributing only about 4.26% to total tax revenue during the period under review on the average. This weak performance could be explained by the inadequacy of the tax law, and inefficiencies in the administration and collection of the tax. Relating to the tax law the land use tax, which is one component of this tax, is characterized by the rigidity of the tax rate structure. In addition, the administration and collection of most of this tax is the duty of peasant associations which may not be qualified.

Business Tax

Business tax, mainly business profit tax, is the most important component of direct tax. The built-in elasticity of this tax is 0.589, which means that an increase in the GDP by 1% will lead to 0.589% increase in revenue from business tax. This low elasticity is mainly due to low tax-to-base elasticity. The inelasticity of this tax is common in LDCs, as indicated by the studies of the on tax systems of Tanzania (Osoro, 1993) and Malawi (Ehdaie, 1990), for example.

To sum up, the analysis of the built-in-tax elasticity suggests that the Ethiopian tax system as a whole is inelastic due mainly to relatively tax-to-base elasticities. This empirical finding confirms the first hypothesis of this study stated in chapter one. This result is also in line with the results of studies undertaken by Teame (1985) and Mesfin (1994). Similar results have also been found in the case of Tanzania and Malawi.

5.3. The Role of Discretionary Tax measures

In this section we analyze the role of DTMs. We seek to determine whether they are an effective policy instrument to mobilize resources from the private to public sector. For this purpose we will examine the difference between the estimates of buoyancy and built-in elasticity, which will permit us to see the extent to which buoyancy is attributed to automatic transfer of resources based on a given tax structure or new measures taken during the period of study to increase tax revenues. Since we are mainly concerned with long run trends and the potential to accelerate revenue collection for the treasury from higher rates of economic growth, the analysis is confined to long run elasticities and buoyancies of the major taxes as well as the whole tax system.

The long run total and individual tax elasticities and buoyancies, as well as the difference between the two is presented in table 5.4. The difference between the two measures shows the importance of DTMs, whereas comparison of the two measures for individual tax helps to identify the taxes for which DTMs were most important.

According to the results, buoyancy and built-in elasticity for total taxes are 1.29 and 0.783 respectively. This can be interpreted to mean that as GDP grows by 1% tax revenue will grow by 1.29%, and that controlling for DTMs made to tax structure, tax revenue will grow by 0.783%. This shows that the Ethiopian tax system as a whole is income inelastic. Therefore the major cause of the increase in total tax revenue can be attributed to DTMs undertaken over the period by the tax authorities. Given that DTMs seem more effective than the automatic changes, most of the increase in revenue is within the control of the government.

In relation to the buoyancy of individual taxes, the entries in table 5.4 show that all the individual taxes have buoyancies exceeding unity (except buoyancy of personal income tax which is less than unity). The major contributions to the buoyancy of the tax system are from business tax, domestic indirect tax and agricultural tax. But the highest difference between buoyancy and built-in elasticity is registered by business tax followed by agricultural tax. The implication of this is that the major cause of growth in business, agricultural and domestic indirect taxes lies in discretionary changes, since the responsiveness of these taxes to income is very small. Finally, personal income tax had a buoyancy of 0.91 against an elasticity of 0.928, reflecting the limited extent to which discretionary changes were used to increase additional personal income tax revenue over the period. The negative impact of DTMs may be due to the decline in the rate of this tax since 1990.

Table 5.4 Individual and overall Long Run Tax Elasticities and Buoyancies in Ethiopia, 1961-96

	Buoyancy	Elasticity	Difference
Total Tax	1.292	0.783	0.509
Import Tax	1.067	0.723	0.344
Domestic Indirect Tax	1.317	0.933	0.384
Personal Income Tax	0.91	0.928	-0.018
Business Tax	1.752	0.589	1.163
Agricultural Tax	1.56	0.731	0.829

a) From appendix VI

b) From Table 5.2

In general as shown in the table 5.4, the difference between individual and overall tax buoyancy and elasticities is relatively large, suggesting that during the period

under review DTMs played an important role in raising additional tax revenue.

Also the empirical results in table 5.1. clearly suggest that DTMs have been effective policy instruments in mobilizing resources. All the coefficients of τ_i s in the estimation results have positive and highly significant impact on all individual revenues. All the coefficients of individual tax systems in the model are significant at more than 98% probability level.

This means that we should reject the second hypothesis of the study that says DTMs are not effective policy instrument for raising additional revenue. In this connection it should be noted that the effectiveness of DTMs in this respect doesn't mean that raising of more revenue through continuous changes in DTMs is desirable. But the latter requires evolving income elastic tax structure and the importance of this empirical finding is to test the established hypothesis for Ethiopia and also to show the extent to which DTMs have been used to mobilize revenue as the latter could be used as a background for future policy making in this line.

This result is similar to those found in the cases of Tanzania (osoro, 1993), Malawi and Mauritius (Ehdaie, 1990).

5.4. The Relative Importance of Economic Growth and Discretionary Tax Measures

During the period 1961-96, the tax effort (total tax revenue over GDP) has grown by an annual average rate of 2.82 percent in Ethiopia. The tax effort for total direct tax, and total indirect tax grew at an average annual growth rate of 3.56 and 2.8 respectively. Within indirect tax the tax effort grew at an average annual growth rate of 3.0 and 2.48 for domestic transaction tax and foreign trade taxes respectively.

As regards the tax share, the average annual growth rate of the share of total direct tax, which contributed about 33% of total tax revenue during the period, was 1.8%.

The tax share of total indirect tax, which contributed about 67% of total tax revenue, grew at an average rate of 0.7% during the same period.

The individual tax revenues as a ratio of GDP and their share in total tax provided in Table 2.1 indicate that the two measures were increasing for domestic indirect tax, business tax and agricultural tax; while figures for import tax and personal income tax were decreasing. For instance within the category of direct tax the percentage share of business profit tax revenue in total tax has been 8.53%, 11.02%, and 24.7% in the 1960s, 1970s, and 1980s; while the share of personal income tax revenue has been 17.5%, 11.7%, and 10.6% during the periods respectively. The implication of this is that the overall positive trend of total direct tax and indirect tax mentioned above is due to the larger role played by the domestic indirect tax, business, and agricultural tax.

In this section an attempt is made to isolate the role DTMs and economic growth played in the trends of tax effort. Also the direction of shifts between domestic indirect taxation and import taxation (as representative of foreign trade taxation), and the factors responsible for affecting it are examined.

To achieve the objective of this section we use the buoyancies and built-in elasticities of the trends of tax effort and tax shares. The computation is based on table 5.4 and the results of computation are presented in table 5.5⁶.

The following observations emerge from Table 5.5:

1. The growth of tax effort is due mainly to DTMs, contributing 174.3% of the overall growth rate of total tax share.
2. DTMs contributed more than 100% to the overall average annual percentage change in the shares of domestic indirect tax, personal income tax business tax and agricultural tax, the contribution being negative for the first two

⁶For similar application see Ehdaie (1990, pp.59-61)

while it is positive in the case of the latter two types of taxes.

3. Economic growth has been the principal contributor to the upward trend of the domestic indirect tax share, contributing 600% of its overall positive growth rate.
4. Both economic growth and DTMs have contributed to the downward trend of the import tax share, contributing -26.67% and -73.33% respectively.

Table 5.5: Contribution of Discretionary Tax Measures and Economic Growth to Trends of Tax shares and effort in Ethiopia

	Buoyancy(a)	Built-in Elasticity(b)	Contribution of discretionary Tax shares(c)
Tax effort	0.292	-0.217	0.509
Import tax share	-0.225*	-0.06 ⁺	-0.165
Domestic Indirect Tax share	0.025*	0.15 ⁺	0.125
Personal Income Tax share	-0.382*	0.145 ⁺	-0.527
Business Tax share	0.46*	-0.194 ⁺	0.654
Agricultural Tax share	0.268*	-0.052 ⁺	0.32
Domestic Indirect Tax over import Tax	0.25**	0.21 ⁺⁺	0.04

Source: Computed based on Table 5.4

Note:

c=a-b

* obtained from $u_i - u$

**obtained from $u_d - u_m$

+obtained from $e_i - e$

++obtained from $e_d - e_m$

Where u =buoyancy of total tax revenue, u_i = buoyancy of the i^{th} individual tax yield, e =built-in elasticity of total tax yield, e_i =built- in elasticity of i^{th} individual tax yield, u_d and u_m are buoyancy of domestic indirect tax and import tax respectively, and e_d and e_m are built-in elasticity of domestic indirect tax and import tax respectively.

It is apparent from the above description that Ethiopia is shifting from taxation of international trade to taxation of domestic transaction and both economic growth and DTMs

are working in favour of this shift. An examination of the trend of the ratio of the two trends depicts that economic growth is contributing 84% while DTMs is contributing 16% of the total trend of the shift.

The analysis of this section implies that in Ethiopia DTMs have been the main policy instrument for increasing total tax revenue and it was also used to bring about a shift from taxation of international trade to domestic transaction. In relation to the latter, however, it should be noted that economic growth has played a larger role than DTMs. This result is similar to the empirical findings on the tax system of Malawi and Mauritius and other similar developing countries.

5.5. The Performance of Tax Administration in Revenue Collection

The main causes of tax evasion are high rates, and poor and inefficient tax administration. In relation to the first factor, like in many LDCs, Ethiopia has recently reduced the rates of several taxes. There was reduction in the rates of income taxes, import taxes, and the removal of import duty on the import of some goods and raw materials. However, the impact of the reform on compliance is not yet known. Nonetheless not much has been done to improve the inefficiency of the tax administration. As in most LDCs, tax reform has emphasized only tax structure. But in principle tax administration can be seen as a link between the statutory foundation and the operative tax system. This implies that a well structured tax reform or tax structure may fail to achieve its desired objective unless it is combined with effective tax administration.

Poor tax administration is widely acknowledged in Ethiopia. This view is supported by the findings of our study in that the low elasticity of most individual tax is a result of inelastic tax to base elasticity, which is a sign of poor tax administration. For example, there

is evidence that large amounts of overdue tax payments in the past several years have remained uncollected.

A review of the various documents and reports of the various branches of the ministry of finance suggests that the main causes of the inefficient tax administration are the complexity of most of the tax laws, which are very hard to understand even by the staff, and which requires from the tax payer the kind of information and attention that is difficult to provide; lack of resources; lack of the necessary degree of professionalism; lack of a clear strategy for improving efficiency; lack of compliance on the part of tax payer; lack of improved technology and lack of incentives. The problem of poor tax administration is serious in the areas of business tax, domestic indirect tax and agricultural tax. All this calls for the improvement of the tax administration, which can be done by equipping it with the necessary resources and means.

5.6. Policy Implications of Empirical Results

The above analysis of elasticity has important policy implications. As we have discussed in previous sections, an elastic tax structure is essential in a developing economy since it enables tax collections to grow automatically with the growing income without resorting to politically sensitive increases in tax rates (Due, 1981). Towards this end the above results help to identify those taxes which are elastic and those which are not. These results are useful since raising the overall elasticity of the tax system requires utilizing taxes which are most income elastic.

The tax-to-base elasticity coefficients for import tax, domestic indirect tax, business tax and personal income tax were lower than those for base-to-income elasticities. This shows that the income elasticities of the respective taxes and the overall tax system would have been much higher if the tax-to-base elasticity coefficients were high. The low tax-to-base elasticity is mainly due to poor tax administration (which resulted in low compliance

and high evasion) and to exemptions mainly in the case of import tax. Thus the tax reform should also aim at improving tax administration (to minimize evasion and improve compliance), substantially reducing or totally eliminating exemptions (which erode the tax base). Such reform will help not only to effectively tax existing bases but also to expand them.

In the case of Base-to-income elasticity coefficients, the elasticities for agricultural tax, business tax and import tax are less than unity. Improving these coefficients is largely out of the control of the authorities due to the fact that the growth of the tax base is outside their control. In this line, designing income elastic taxes requires due consideration of the predicted response of the tax base to income.

In sum, tax reform should focus on improving tax administration, broadening the base, rationalizing rate reduction and reducing or eliminating exemptions. In the next chapter the relevance of each of the above recommendations to the individual and overall tax system is considered in some detail.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1. Conclusions

The intense need for development financing and for reducing budget deficits is a major concern in Ethiopia. The main strategy to reduce these deficits is to generate more revenues through increase in tax efforts. This requires making projections of the additional revenues that can be mobilized within the existing tax systems as GDP grows. Also the projections may indicate the need to activate additional means of revenue generation.

For this reason it is essential to estimate built-in elasticity and the revenue impact of discretionary tax measures. Earlier attempts to do so suffered from several limitations mainly due to lack of an observable quantitative variable capable of reflecting all changes in individual (or overall) tax systems. This study used an econometric method of estimating tax elasticity and the revenue impact of DTMs developed that deals with this gap.

The objectives of this study has been to analyze the structure of the Ethiopian tax system and it's evolution over time; to estimate tax elasticities and the revenue impacts of DTMs; and to use the estimated parameters as an empirical frame work to highlight the contribution of DTMs to trends of tax effort and tax share and evaluate the direction of shift between taxation of international trade and taxation of domestic transaction. The major findings of the study are summarized below.

First, the review of the tax policy of the country suggests that the tax system and tax structure of Ethiopia has been undergoing constant changes and amendments. Before the Derg regime income tax was imposed on personal income and business incomes, followed by introduction of rental income tax and the taxation of income from agricultural activities.

During the Derg regime many upward revisions of tax rates were made and the income tax base was broadened. After the Derg regime income tax rates were revised downward and there were some further broadening of tax bases. However, a comprehensive change in policy relating to land taxation was introduced in the early period of the Derg regime.

Relating to the development of indirect tax policy, excise taxes were first levied on tobacco and alcoholic products. In the later years and decades the coverage of the excise tax expanded and other components of indirect tax were gradually introduced. The scattered and multiple components of indirect taxes were consolidated into a general sales tax by special decree of 1990 and later by proclamation No.68 of 1993. These latter proclamations also broadened the bases of indirect tax by introducing taxation of service sectors.

Second, the analysis of the Ethiopian tax structure shows that Ethiopia displays many of the features common to other DCs. The structure of taxation is dominated by indirect taxation. The share of indirect tax in total tax revenue throughout the period has been 67%, out of which 37% and 30% were derived from foreign trade tax and domestic indirect tax revenues respectively. While the structure of indirect tax is dominated by foreign trade taxation, within foreign trade taxation import taxation is the main one. For example, in 1990s the share of import tax revenue in total foreign trade tax revenue has been more than 94% on the average. In the 1970s and 1980s the share of domestic indirect tax in total tax was increasing, while that of import tax was decreasing. However, this trend was reversed in the 1990s due to the elimination of restriction on imports.

The structure of direct tax is dominated by business profit tax and personal income tax followed by agricultural tax, contributing 18.3, 12.2, and 4.3% of the total tax revenue respectively. The share of this category of tax in total tax revenue has been consistently rising through out the period. The total tax yield has increased significantly during the period of study. The ratio of tax revenue to income increased over time, the ratio being 8.1, 11.3, 13.2 and 10.1 in the 1960s, 1970s, 1980s and 1990s. The decrease in the ratio in the 1990s is

due to poor performance in 1990-92.

Third, the overall tax system is found to be income-inelastic. The implication of this is that by and large the additional tax revenue generated was obtained through DTMs rather than automatic increases in GDP at a given rate of taxation. During the period of study tax collection grew by less than GDP without resorting to DTMs, which means that in the future it is impossible to channel an increasing proportion of national income into government hands at the current tax structure. In order to raise the income elasticity of the total tax system efforts should concentrate on taxes that are more income elastic, although how best to improve the inelastic taxes should be addressed.

The long run and short run tax elasticities of all individual taxes are found to be low. The long run elasticities are 0.93, 0.59, 0.73, 0.93 and 0.72 for personal income tax, business tax, agricultural tax, domestic indirect tax, and import tax respectively. The main reason for the inelasticity of personal income tax, business tax, and domestic indirect tax has been the low tax-to-base elasticity, which can largely be attributed to poor administration; while both low tax-to-base and base-to-income elasticity explain the inelasticity of import tax, which is largely due to exemptions. For agricultural tax the inelasticity resulted from low base-to-income elasticity.

6.2. Policy Recommendations

Based on the findings of the study the following policy recommendations are suggested.

First, the long run elasticity of personal income tax is less than unity, the elasticity being 0.93. This is as a result of low tax-to-base elasticity. The rate structure of this tax has been highly progressive, and some downward revisions of the general level of rates were made in the last decade. The reduction in rates of this tax could be accompanied by

strengthening the administration of this tax to effectively tax the non public sector.

Second, business tax shows a very low elasticity of 0.59, which is the result of low tax- to- base elasticity. The inelasticity of this tax is common in most LDCs. Like in the case of personal income tax the rate of this tax is also highly progressive, although downward revisions of rates were made in the recent years. The top business profit tax rate was lowered to 35% and 40% of taxable annual income of bodies and persons respectively, a move that is consistent with recent international trends. The Lowering of the business tax rate was in response to the pressure from the business lobby, which argues that domestic and foreign investment can be discouraged by high rates of business taxation.

Also exemptions have been provided to attract investment. A sensible policy course would remove exemptions and introduce reasonably lower tax rates where providing tax incentive is very important. This recommendation is based on the evidence from some developing countries which indicates that tax concessions are not essential to capital formation but that growth in private investment is largely a function of the whole economic policy and economic climate rather the fiscal incentives. Also one has to consider the fact that while the positive effect of fiscal incentives is uncertain, the opportunity cost of fiscal incentive can be very high.

Interviews with tax officials suggested that there is widespread evasion of this tax by private businesses. This view is supported by the findings of low tax- to- base elasticity. Also the insignificant amount of revenue collected from the newly introduced tax bases in this category such as capital gains tax and rental income tax is due to partial implementation of the laws, which suggests deficiencies in tax administration.

Thus a means of increasing the productivity of business tax is to improve its administration. This means improvements in of the process of assessing taxable incomes and enforcement of the laws could improve the revenue performance.

The future prospects of generating higher revenue from this source are promising, assuming that the current economic reforms to improve economic growth will be sustained and accelerated. In this case since investment in business activities is expected to further grow; effective administration of this tax could in the long run play a leading role in establishing an income elastic tax structure.

Third, agricultural taxation is characterized by long run tax elasticity of less than unity as a result of low base- to- income elasticity, which is 0.56. This inelastic base to income is due to the fact that the base of this tax grew at a rate which is less than national income during most of the period under study. Therefore the possibility of raising the income elasticity of this tax lies largely in the possibility of improving the performance of its base.

Although the weak administration of this tax is widely acknowledged, the result of this study that showed high tax- to- base elasticity of this tax is unexpected. The two components of agricultural tax are land use tax and agricultural income tax. Land tax has flat (fixed) rate and appears inflexible to base; the agricultural income tax, even though it is progressive, is subject to widespread tax evasion of private enterprises in agricultural sector because of its poor administration.

Therefore the improvement of the income elasticity of this category of tax can be achieved by solving the deficiencies in the two components of this tax. In relation to land use tax the law currently in operation in most federal states of the country is flat rate, which doesn't reflect the fertility, size and use of land. This is an old law which was passed about 20 years ago. Recently, in 1995, the oromia regional state declared and put into operation a new law. But even in this law the tax that applies to land use doesn't vary depending on the fertility of land, although it varies depending on sizes of occupation of land.

Reform in agricultural taxation along the lines of the new proclamation passed by the oromia region is recommended for all federal states. But the new reform should revise the rates of this tax downward and these should vary depending not only on the level of income but depending on the fertility of land. That is the reform should take into consideration the adverse effects of heavily taxing agriculture from welfare, equity, efficiency and long term development point of view. It is generally argued that heavily taxing agriculture is not desirable in LDCs where the sector is less developed, the majority of the peasants live at subsistence levels, and a small or no surplus is generated from the sector.

The reform of tax system should be combined with the reform of its administration. So far the main duty of tax collection has been given to peasant associations. But this posed many practical problems.

Fourth, the long run elasticity coefficient of import tax is 0.723, which is the result of both low tax- to- base and base- to- income elasticity. The low elasticity of this tax is due to several factors, including the shortage of foreign exchange, the need to encourage import of some capital and other essential goods by providing zero or low rates (in an attempt to encourage long term development), policies of import restrictions followed in the past, the low rate structure and the limited elasticity of the base- to-income. Relating to the extent of exemptions, it is argued that only less than half of the value of imports items is subject to the tax. Even the new tariff code, which is currently in operation, has increased the number of freely imported products. However, because of the absence of data the revenue loss due to the exemption is not known.

At present, there are pressures applied by the World Bank to scrap import taxes and move to a simpler and more uniform tariff system. This process began in 1993. Still moving of at least most of the exempted items to smaller tariff rate category is recommended.

Fifth, the long run elasticity of domestic indirect tax is 0.93. The inelasticity of this tax resulted from the less than unity tax- to- base elasticity.

In relation to this tax, there is a widespread view that there exists a high degree of evasion and low standard of compliance of the tax payers and high administrative demand to assess a very large number of retail tax payers, who keep very rudimentary or even have no accounts. Therefore improving the productivity of this tax can be attempted by eliminating administrative constraints.

Sixth, we have noted in chapter two that in Ethiopia the introduction of export tariff was originally for revenue objective. Currently the World Bank and IMF are recommending a move to a simpler and more uniform tariff system. This recommendation is based on the need to encourage the export sectors of the economy in an attempt to achieve long term economic development. This recommendation is also supported by this study. The Ethiopian government has already taken several steps towards this end. The measures taken include removal of all types of taxes on exports, except those levied on coffee export. In this connection also domestic indirect tax, mainly sales tax , that is imposed on exportable products must be reconsidered or at least minimized. For example currently there is a tendency to tax coffee production both at producers and exporters level, the burden of both of which is transferred to coffee producers through price mechanism. The result of this is the reduction in export tax doesn't fully bring about the intended effect.

Seventh, from the discussion of chapter five we have noted that there are serious deficiencies in the Ethiopian tax administration. The reform of tax administration has to be made based on the detailed study and identification of the causes or bottlenecks that hinder the effectiveness of tax administration as well as by drawing on the experience of other LDCs.

Although there are no general guidelines, the reform should aim at achieving the following: organization of tax administration that can reduce the complexity of the tax system; encouraging tax payers' voluntary compliance; timely registration of tax payers and differential treatment of tax payers by their revenue potential; enhancing accounting and returns processing; improving technological requirement of tax administrations; attracting qualified staff; strengthening collection enforcement; and improving legal services. The reform should also allow for differences in revenue potential of areas and differences among various category of tax payers.

Such reforms require capable and dedicated officials, a well-defined and appropriate strategy, relevant training for staff, additional resource for the tax administration or, at least some re-allocation of resources, and changes in incentives for both tax payers and tax administrators. It should be noted that the present tax collection may be at low cost but pure cost minimization or profit maximization may not be optimum in revenue collection. This is because the expenditure requirement in the short run can be covered by the increased revenue productivity of a more developed tax system in the long run if carefully designed and implemented. In addition tax administrators must strive to balance immediate revenue objectives with the need to support changes designed to produce a "better" tax structure in terms of the efficiency, equity, and stabilization goals.

In general, therefore, these are the proposals forwarded which could help to bring about an efficient and effective tax system. As we have seen the proposals include both tax policy and implementation aspects.

However, in view of the massive savings requirement in the country, high revenue productivity of the tax system alone may not be enough to increase the saving rates of the government. This also requires controlling government expenditures. The government has to keep a close watch on recurrent expenditure, which takes about 70% of total expenditure on the average. These expenditures have to be closely monitored because they may not sustain

long term development of the country. On the other hand, capital expenditures have to be welcomed if projects being undertaken are recording positive net present values. In general optimal allocation of generated revenue should be made.

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Appendices

- I. The composition of Ethiopian central Government Domestic Revenue and Expenditure (1960/61- 1995/96)
- II. Individual and Total Tax Revenues and Their Proxy Bases
- III. Unit Root Tests
- IV. Estimation Results of Buoyancy
- V. Plot of Actual and Fitted Values of Tax Revenue and Tax Base Equations

Appendix I: The Composition of Ethiopian Central Government Domestic Revenue and expenditure (1960/61-1995/96)
(In million of birr)

Direct Taxes							
	Personal Income Tax	Rental Income Tax	Business Profit Tax	Agricultural Income Tax	Tax on dividends and chance winning	Rural Land use Tax	Urban Land Lease fee
1961	25.1	-	15.5	0.2	-	15.1	-
1962	29.9	-	19.9	0.3	-	15.5	-
1963	31.0	-	22.2	0.4	-	13.3	-
1964	36.4	-	30.5	0.2	-	15.7	-
1965	42.9	-	32.5	0.3	-	15.9	-
1966	46.5	-	35.9	0.3	-	16.4	-
1967	60.0	-	49.5	0.2	-	16.9	-
1968	69.0	-	-	0.3	0.6	7.2	-
1969	89.8	-	-	0.5	7.5	-	-
1970	47.4	-	39.9	15.4	1.1	7.8	-
1971	56	-	39.5	18.9	1.0	7.4	-
1972	61.7	-	43.6	20.0	1.2	7.9	-
1973	67.0	-	47.4	14.0	-	13.2	-
1974	72.8	-	55.3	11.3	-	12.3	-
1975	85.9	-	74.3	10.4	-	6.2	-
1976	75.1	-	76.5	9.7	-	13.0	-
1977	74.6	-	98.3	18.7	-	17.4	-
1978	84.2	-	104.1	18.2	-	19.3	-
1979	102.3	-	117.4	48.7	-	47.2	-
1980	119.0	-	161.5	51.3	0.2	48.3	-
1981	128.3	-	256.8	53.6	0.6	50.2	-
1982	136.7	-	326.2	50.3	2.1	49.8	-
1983	153.5	-	344.7	52.6	2.2	51.3	-
1984	171.4	-	384.5	48.6	4.3	48.1	-
1985	186.1	-	416.5	41.9	2.1	41.4	-
1986	203.4	-	467.9	46.9	3.8	44.0	-
1987	226.5	-	582.1	50.0	1.9	45.8	-
1988	244.3	-	662.1	57.0	1.6	47.4	-
1989	270.3	-	683.9	61.54	1.1	45.2	-
1990	280.9	-	553.4	54.2	1.4	34.6	-
1991	267.7	-	473.9	54.7	1.6	33.5	-
1992	269.1	-	386.7	3.5	0.8	3.6	-
1993	267.84	-	361.78	48.7	1.2	44.04	-
1994	270.85	3.66	555.62	53.4	1.24	45.86	-
1995	290.57	0.40	848.7	67.78	2.91	57.8	22.75
1996	325.69	4.89	1218.8	82.56	3.62	77.69	27.84

Source: Ministry of Finance, Central Government Budgetary Revenue and Expenditures, various years.

Appendix 1 continued

	Total Tax Revenue	Total non-tax Revenue	Total tax and non-tax Revenue	Total recurrent expenditure	Total Government expenditure
1961	155.4	36.3	191.7	176.5	207.1
1962	174.0	41.8	215.8	190.2	251.1
1963	183.9	34.9	218.8	203.1	297.4
1964	321.8	40.3	362.1	247.1	308.0
1965	264.1	33.6	297.7	356.2	400.5
1966	287.3	42.9	330.2	390.5	470.6
1967	309.7	60.2	369.9	416.2	493.3
1968	315.5	70.3	385.8	439.5	542.2
1969	332.1	73.3	405.4	454.5	531.6
1970	371.8	57.3	429.1	478.9	585.2
1971	407.1	58.9	466.0	507.1	631.5
1972	433.2	61.5	494.7	521.7	671.7
1973	483.8	72.4	556.2	563.1	716.2
1974	537.1	81.0	618.1	599.2	777.4
1975	589.8	121.8	711.6	811.2	1048.4
1976	613.3	167.7	781.0	917.7	1200.5
1977	855.9	155.3	1011.2	1019.8	1344.4
1978	938.8	169.2	1108.0	1367.2	1696.5
1979	1146.5	188.9	1335.4	1477.2	1846.0
1980	1298.2	269.3	1567.5	1694.7	2137.9
1981	1361.8	394.6	1756.4	1791.2	2296.3
1982	1436.4	440.3	1876.7	1934.6	2649.7
1983	1558.0	616.4	2174.4	2562.4	3807.8
1984	1731.5	562.4	2293.9	2265.0	3198.1
1985	1677.1	611.6	2289.1	2737.5	3924.6
1986	1876.3	744.0	2620.3	2659.4	4131.1
1987	2092.4	722.8	2815.2	2754.0	4137.1
1988	2317.8	1006.4	3324.2	3596.2	4997.55
1989	2371.0	1149.5	3520.5	3972.63	5912.23
1990	2158.9	983.4	3142.3	3929.10	5369.2
1991	2053.4	652.9	2706.3	3698.9	4913
1992	1618.3	589.7	2208.0	3305.12	4256.92
1993	2221.71	767.21	2988.92	3520.8	5305.7
1994	2706.86	825.8	3832.66	4579.34	7983.08
1995	3891.27	1950.42	5841.69	5518.71	8551.45
1996	4741.29	2098.51	6839.8	5478.20	8852.58

Appendix 1 continued

	Indirect Taxes					
	Domestic Indirect Taxes			Foreign Trade Taxes		
	Tax on Total Products	Service Taxes	Stamp Sales and Duties	Import Tax		Export Tax
				Customs Duty	Sales Tax	
1961	36.5	-	1.8	41.2	19.2	16.3
1962	39.7	-	2.0	48.4	20.8	17.4
1963	45.0	-	2.3	50.8	4.9	36.2
1964	155.1	-	2.6	62.0	24.7	25.1
1965	66.7	-	3.5	72.6	28.8	33.4
1966	74.1	-	4.2	84.6	36.6	24.6
1967	85.6	-	4.4	81.5	34.2	26.9
1968	99.6	-	4.5	77.2	31.3	25.8
1969	101.3	-	4.7	70.8	33.3	24.2
1970	110.8	-	4.9	77.9	34.7	40.1
1971	121.6	-	6.1	83.2	37.1	36.3
1972	139.0	-	6.8	80.3	40.8	31.9
1973	144.8	-	6.0	89.3	50.6	51.5
1974	161.2	-	7.0	100.4	65.9	50.8
1975	187.2	-	7.2	108.6	67.7	42.6
1976	167.7	-	6.3	119.0	59.8	86.2
1977	174.5	-	6.9	164.6	82.2	218.7
1978	180.3	-	6.5	168.8	75.6	281.8
1979	259.0	-	9.9	211.7	122	228.3
1980	363.7	-	9.9	138.0	109.2	297.1
1981	375.7	-	11.6	167.2	129.5	188.3
1982	385.6	-	10.6	155.6	129.1	190.4
1983	430.1	-	13.0	174.6	132.2	203.8
1984	481.3	-	14.2	188.4	132.8	257.9
1985	509.9	-	13.8	172.1	120.9	172.8
1986	539.7	-	14.5	172.1	121.1	262.9
1987	607.5	-	16.4	229.7	178.8	153.7
1988	687.9	-	32.5	235.6	202.3	147.1
1989	751.4	-	33.1	199.6	160.3	164.4
1990	731.2	-	28.1	244.3	173.8	57.0
1991	696.6	25.0	36.20	259.6	183.7	20.9
1992	476.7	22.4	35.4	217.0	193.8	9.3
1993	663.36	32.16	55.45	352.10	367.3	18.7
1994	404.22	43.95	72.68	602.60	602.2	50.50
1995	771.53	67.6	87.13	771.4	701.3	201.40
1996	964.17	77.26	116.23	909.34	814.35	118.84

Appendix 2. Individual and Total Tax Revenues and their proxy bases (1960/61-95/96)
(In Million of Birr)

Year	Individual and Total tax Revenues						Individual and Total Tax bases				
	Total Tax net of Export Tax	Import Tax	Domestic Indirect Tax	Personal Income Tax	Business Tax	Agricultural Tax	GDP at Market price	Value of Import	Private consumption	Wage bill	Agricultural GDP
1961	154.50	60.4	38.3	25.1	15.4	15.3	2434.4	175.2	1983.2	87.6	1504.5
1962	176.50	69.2	41.7	29.9	19.9	15.8	2533.9	188.1	2073.8	98.0	1510.4
1963	169.90	55.7	47.3	31.0	22.2	13.7	2636.4	220.4	2008.5	109.13	1550.3
1964	327.20	86.7	157.7	36.4	30.5	15.9	2986.0	220.9	2310.8	125.8	1723.0
1965	263.20	101.4	70.2	42.9	32.5	16.2	3148.6	274.2	2446.5	205.2	1703.2
1966	298.60	121.2	78.3	46.5	35.9	16.7	3340.9	283.1	2684.0	216.6	1803.8
1967	332.30	115.7	90.0	60.0	49.5	17.1	3609.0	137.0	2800.8	277.38	1902.6
1968	289.70	100.5	104.1	69.0	0.6	7.5	3827.5	324.0	2953.1	239.0	2010.9
1969	307.90	104.1	106.0	89.8	7.5	0.5	4041.7	284.2	3182.8	251.9	2119.5
1970	331.70	112.6	115.7	47.4	32.8	23.2	4460.5	316.5	3519.5	266.25	2327.2
1971	370.80	120.3	127.7	56.0	40.5	26.3	4710.4	349.2	3782.0	280.25	2404.8
1972	401.30	121.1	145.8	61.7	44.8	27.9	4743.7	314.5	3720.0	295.0	2286.0
1973	432.30	139.9	150.8	67.0	47.4	27.2	5005.2	308.3	3796.6	310.01	2331.4
1974	486.30	166.3	168.2	72.8	55.3	23.7	5551.2	419.7	4243.0	326.42	2605.2
1975	547.20	176.3	194.4	85.9	74.3	16.6	5524.5	436.8	4406.9	343.6	2623.4
1976	527.10	176.3	174.0	75.1	76.5	22.7	5966.7	557.9	4673.5	361.2	2738.8
1977	637.20	246.8	181.4	74.6	98.5	36.1	6826.3	564.1	5485.3	386.2	3197.9
1978	657.00	244.4	186.8	84.2	104.1	37.5	7265.3	836.4	5885.4	444.3	3467.5
1979	918.20	333.7	268.9	102.3	117.4	95.9	7988.5	840.9	6544.0	481.8	3656.3
1980	1001.1	247.2	373.6	119.0	161.7	98.6	8498.9	1246.1	6794.6	547.9	3871.9
1981	1173.5	236.7	387.3	128.3	257.4	103.8	10721.3	1229.9	8470.0	598.4	5579.2
1982	1246.0	284.7	396.2	136.7	328.3	100.1	11280.9	1338.7	8956.7	615.1	5657.5
1983	1354.2	306.83	443.1	153.5	346.9	103.9	12540.0	1506.5	9858.4	668.1	6589.0
1984	1433.6	321.2	495.5	171.4	388.8	96.7	11849.3	1629.9	9046.7	744.2	5265.6
1985	1504.7	293.0	523.7	186.1	418.6	83.3	13876.2	1753.4	11526.9	834.1	6866.0
1986	1615.4	293.2	554.2	203.4	471.7	90.9	14493.3	1985.5	11161.2	857.9	6941.1
1987	1933.7	408.5	623.9	226.5	584.0	95.8	15501.2	1871.0	12127.4	949.8	7113.8
1988	2170.7	437.9	720.4	244.3	663.7	104.4	15996.9	1808.0	11342.2	1055.5	7634.9
1989	2206.6	360.2	784.5	270.3	685.0	106.7	16873.4	1611.9	12323.5	1168.7	7858.0
1990	2101.9	418.1	759.3	280.9	554.8	88.3	17871.7	1809.9	13210.7	1441.3	8208.4
1991	2032.5	443.3	757.8	267.7	475.5	88.2	19815.6	533.3	16102.8	1626.7	10956.4
1992	1609.0	410.8	534.5	269.1	387.5	7.1	20393.8	1577.0	17660.8	1164.1	12507.6
1993	2203.0	719.4	750.97	276.84	362.98	92.7	26056.7	3132.9	22306.7	1448.2	14832.3
1994	2656.4	1204.8	520.96	270.85	560.52	99.33	27396.8	4886.2	23645.3	1737.5	14159.0
1995	3689.9	1475.7	926.26	290.57	871.85	125.58	34063.0	6744.3	27720.0	2053.1	16547.1
1996	4622.4	1723.7	1157.7	325.89	1251.6	160.25	38771.0	7848.3	31240.3	2244.6	19652.7

Source: 1) Data on Tax Revenue is obtained from appendix 1.

2) Data on proxy bases and GDP:

- for the period 1961-80 from statistical office, statistical abstracts, various years
- for the period of 1981-96 from National Bank of Ethiopia, quarterly bulletin, March 1997; and from internal document of Ministry of Economic Development and cooperation.

Appendix III. Unit Root Tests¹

¹Note: (a) Δ shows that the variables are in their first difference, and
(b) figures inside and outside the brackets are critical and calculated statistics or values

Appendix VIII: Unit Root Tests

A. Unit Root Test For Variables

Unit root tests for variable ΔT_d

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-8.8790(-2.9499)	-8.8117(-3.5468)
ADF(1)	1964 1996	33	-5.2665(-2.9528)	-5.2937(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔT_m

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-6.0700(-2.9499)	-6.2308(-3.5468)
ADF(1)	1964 1996	33	-3.9031(-2.9528)	-3.9283(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔT_p

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-6.9083(-2.9499)	-6.8655(-3.5468)
ADF(1)	1964 1996	33	-4.4127(-2.9528)	-4.4318(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔT_t

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-8.3788(-2.9499)	-8.2552(-3.5468)
ADF(1)	1964 1996	33	-5.7805(-2.9528)	-5.6892(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔT_n

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-7.4947(-2.9499)	-7.3823(-3.5468)
ADF(1)	1964 1996	33	-5.8119(-2.9528)	-5.7194(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔT (where T is total tax net of export tax)

statistic	sample	observations	without trend	with trend
DF	1964 1996	33	-13.1887(-2.9528)	-12.9894(-3.5514)
ADF(1)	1965 1996	32	-8.0992(-2.9558)	-8.4851(-3.5562)

95% critical values in brackets.

Unit root tests for variable ΔX_d

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-7.8111(-2.9499)	-8.4458(-3.5468)
ADF(1)	1964 1996	33	-3.2509(-2.9528)	-3.5543(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔX_m

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-7.4467(-2.9499)	-7.4614(-3.5468)
ADF(1)	1964 1996	33	-4.4484(-2.9528)	-4.5259(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔY_d

statistic	sample	observations	without trend	with trend
DF	1964 1996	33	-15.2419(-2.9528)	-15.0249(-3.5514)
ADF(1)	1965 1996	32	-6.5812(-2.9558)	-6.5515(-3.5562)

95% critical values in brackets.

Unit root tests for variable ΔX_p

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-5.9797(-2.9499)	-5.9211(-3.5468)
ADF(1)	1964 1996	33	-4.7873(-2.9528)	-4.7611(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔX_t

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-3.9673(-2.9499)	-3.9941(-3.5468)
ADF(1)	1964 1996	33	-3.5248(-2.9528)	-3.5911(-3.5514)

95% critical values in brackets.

Unit root tests for variable ΔX_n

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-7.3068(-2.9499)	-7.9348(-3.5468)
ADF(1)	1964 1996	33	-3.1832(-2.9528)	-3.5769(-3.5514)

95% critical values in brackets.

B. Unit Root Test For Residuals Saved From Equations

Unit root tests for residual saved from Import tax revenue equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-6.0131(-2.9499)	-5.9170(-3.5468)
ADF(1)	1964 1996	33	-4.4358(-2.9528)	-4.3833(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from domestic indirect tax revenue equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-6.1104(-2.9499)	-6.0742(-3.5468)
ADF(1)	1964 1996	33	-4.9930(-2.9528)	-5.2127(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from personal income tax revenue equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-4.8319(-2.9499)	-4.7617(-3.5468)
ADF(1)	1964 1996	33	-4.2818(-2.9528)	-4.2104(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from business tax revenue equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-5.4865(-2.9499)	-5.3986(-3.5468)
ADF(1)	1964 1996	33	-4.0635(-2.9528)	-3.9941(-3.5514)

95% critical values in brackets.

Unit root tests for residuals saved from agricultural tax revenue equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-5.4972(-2.9499)	-5.4054(-3.5468)
ADF(1)	1964 1996	33	-4.3332(-2.9528)	-4.2639(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from import tax base equation

statistic	sample	observations	without trend	with trend
DF	1962 1996	35	-5.1176(-2.9472)	-5.0400(-3.5426)
ADF(1)	1963 1996	34	-4.4169(-2.9499)	-4.3627(-3.5468)

95% critical values in brackets.

Unit root tests for residuals saved from domestic indirect tax base equation

statistic	sample	observations	without trend	with trend
DF	1964 1996	33	-11.9809(-2.9528)	-11.9021(-3.5514)
ADF(1)	1965 1996	32	-4.7373(-2.9558)	-4.7192(-3.5562)

95% critical values in brackets.

Unit root tests for vresidual saved from personal income tax base equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-6.4384(-2.9499)	-6.3276(-3.5468)
ADF(1)	1964 1996	33	-4.6114(-2.9528)	-4.5173(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from agricultural tax base equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-4.5105(-2.9499)	-4.4418(-3.5468)
ADF(1)	1964 1996	33	-4.5839(-2.9528)	-4.5125(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from total tax buoyancy equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-8.9689(-2.9499)	-8.8233(-3.5468)
ADF(1)	1964 1996	33	-5.0740(-2.9528)	-4.9899(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from agricultural tax buoyancy equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-5.6925(-2.9499)	-5.5917(-3.5468)
ADF(1)	1964 1996	33	-4.1740(-2.9528)	-4.0828(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from personal income tax buoyancy equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-5.7060(-2.9499)	-5.6096(-3.5468)
ADF(1)	1964 1996	33	-4.1884(-2.9528)	-4.0680(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from import tax buoyancy equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-5.4687(-2.9499)	-5.3740(-3.5468)
ADF(1)	1964 1996	33	-3.5964(-2.9528)	-3.5661(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from business tax buoyancy equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-5.5810(-2.9499)	-5.4984(-3.5468)
ADF(1)	1964 1996	33	-4.0386(-2.9528)	-3.9867(-3.5514)

95% critical values in brackets.

Unit root tests for residual saved from domestic indirect tax buoyancy equation

statistic	sample	observations	without trend	with trend
DF	1963 1996	34	-6.7570(-2.9499)	-6.6874(-3.5468)
ADF(1)	1964 1996	33	-8.2935(-2.9528)	-8.6135(-3.5514)

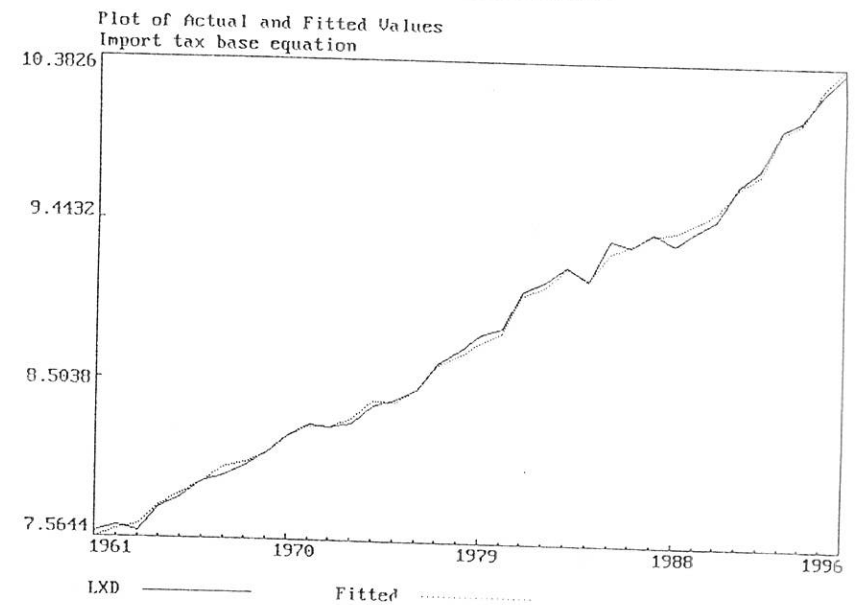
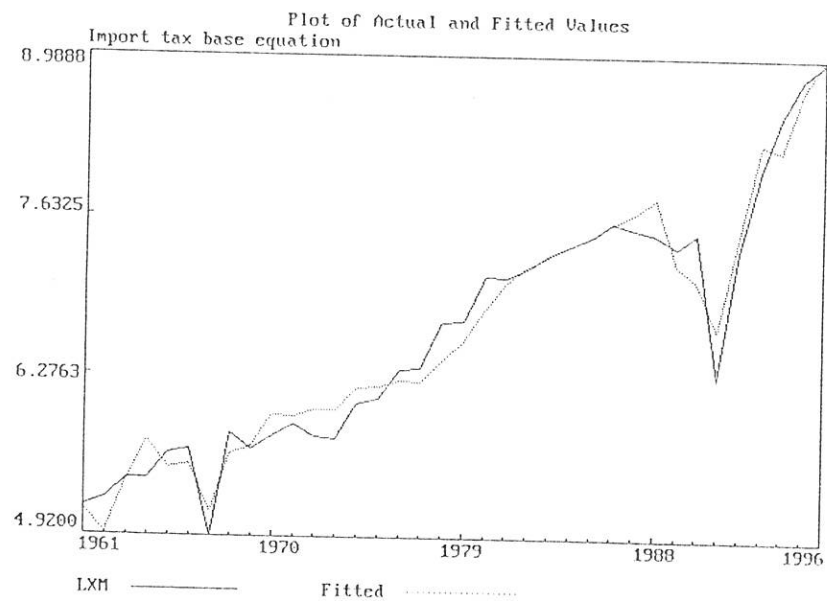
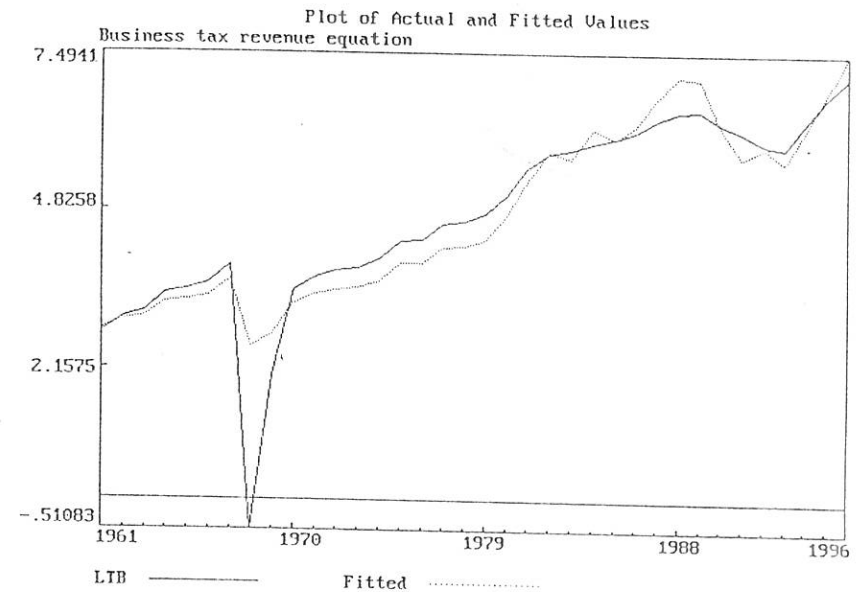
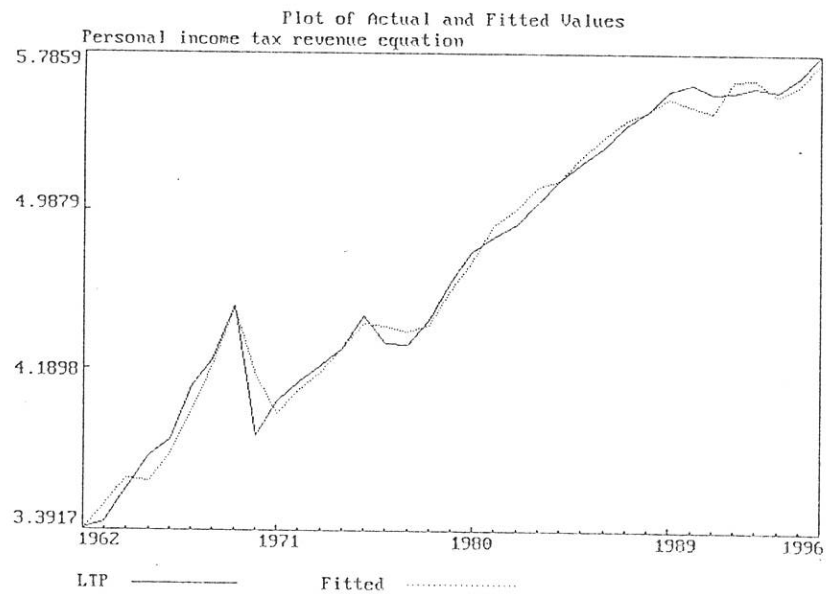
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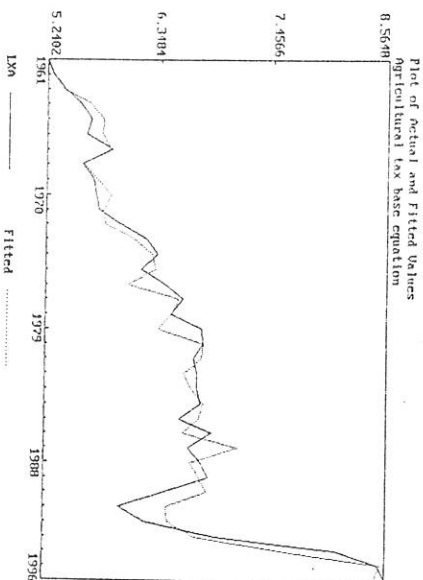
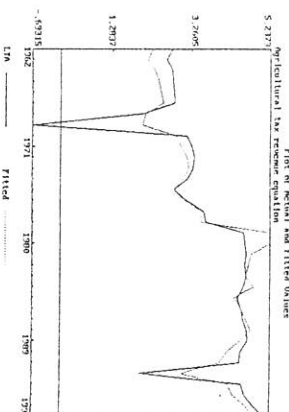
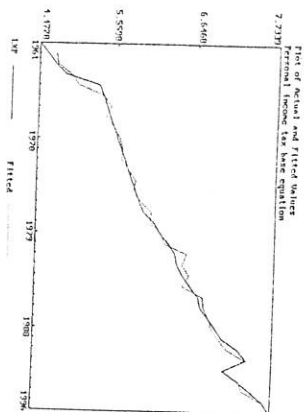
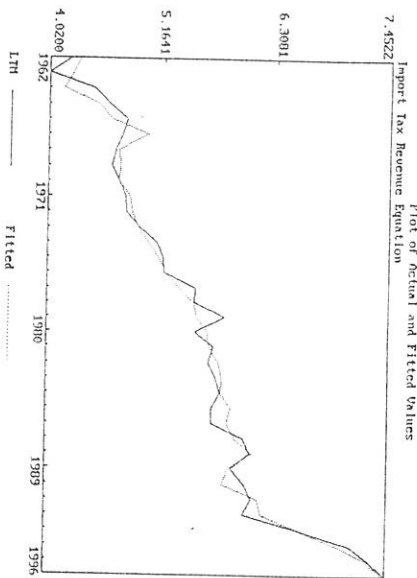
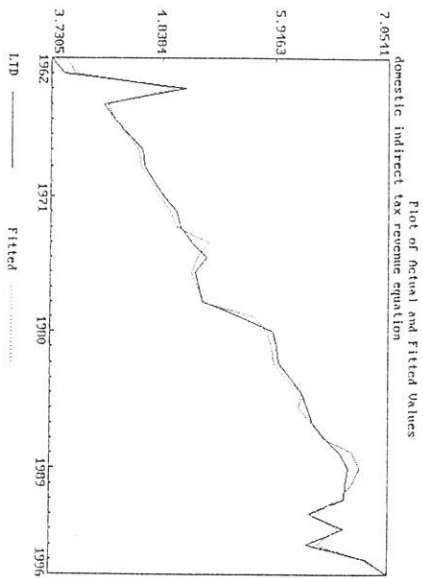
Appendix IV: Estimation Results of Tax Buoyancy

Types of Tax	Estimation Results			
Total Tax	$\ln(T)_t = -4.91 + 1.292\ln(GDP)_t$ (16.7) (38.5)	$R^2 = 0.986$ DW = 1.62	RSS = 0.4039 F(3,32) = 804.9	
Import Tax	$\ln(T_m)_t = -4.13 + 1.067\ln(GDP)_t$ (-4.5) (10.6)	$R_2 = 0.96$ DW = 1.9	RSS = 0.7265 F(4,30) = 231	
Business Tax	$\ln(T_b)_t = -11.08 + 1.752\ln(GDP)_t$ (-4.4) (6.3)	$R_2 = 0.755$ DW = 1.97	RSS = 19.66 F(3,31) = 36.0	
Domestic Indirect Tax	$\ln(T_d)_t = -6.25 + 1.317\ln(GDP)_t$ (-12.9) (24.04)	$R_2 = 0.95$ DW = 2.14	RSS = 1.1892 F(3,31) = 236.5	
Personal Income Tax	$\ln(T_p)_t = -3.5 + 0.91\ln(GDP)_t$ (-5.3) (12.25)	$R_2 = 0.96$ DW = 2.002	RSS = 0.62958 F(4,30) = 211.54	
Agricultural Tax	$\ln(T_a)_t = -10.23 + 1.56\ln(GDP)_t$ (-3.77) (5.114)	$R^2 = 0.6$ DW = 1.98	RSS = 18.7033 F(3,31) = 15.7	

Note: In every case coefficient of GDP is buoyancy coefficient. These tax buoyancies were estimated by running OLS regression on equation (9) in chapter three.

Appendix V: Plot of Actual and Fitted Values of Tax Revenue and Tax Base
equations

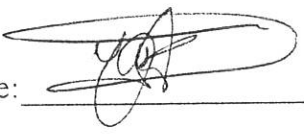




Declaration

I, the under signed, declare that this thesis is my work and that all sources of materials used for the thesis have been duly acknowledged.

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Signature: 

Place: Addis Ababa University

Date of Submission: May 22, 1998