

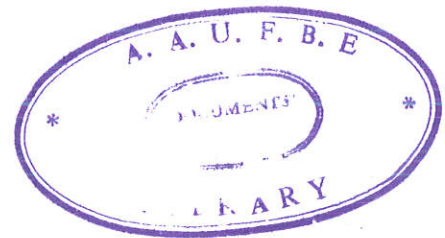
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ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES

**Economic Performance of Ethiopia  
(1972-1995):  
Growth Determinants and Implications**

BY  
SEYOUM CHANE



MAY, 1997  
Addis Ababa



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SCHOOL OF GRADUATE STUDIES

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**(1972-1995):**  
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BY  
SEYOUM CHANE



A Thesis Presented to the School of Graduate Studies  
Addis Ababa University  
in partial Fulfillment of the requirements for  
the Degree of Masters of Science in Economic Policy Analysis

MAY, 1996  
Addis Ababa



**ADDIS ABABA UNIVERSITY**  
**School of Graduate Studies**

*Economic Performance of Ethiopia (1972-1995):  
Growth Determinants and Implications*



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## LIST OF ABBREVIATIONS

CSA= Central Statistical Authority

ILRI= Institute of Livestock Research Institute

MEDaC= Ministry of Development and Cooperation

NBE= National Bank of Ethiopia

*Abstract*

*An assessment of the Ethiopian economy indicates poor performance of the commodity producing sector most notably agriculture, low domestic savings, weak private investment, extremely low foreign investment inflow, deterioration of living standards, unemployment and poor social and physical infrastructure.*

*This paper looks into the performance of the Ethiopian economy over the period 1971/72-1994/95. Looking into the empirical determinants of the Ethiopian economic growth (or the likely causes of the inadequate long term record growth) during 1968-1995 the result indicates that growth of population, share of government consumption to GDP, and growth in money supply affect GDP per capita growth negatively. Variables as lagged ratio of agricultural output to real GDP, real export growth, percentage change in real effective exchange rate, and share of real trade balance in real GDP on economic growth are found to be a significant contributing factors for the economic growth. In contrast growth of capital formation (substantially dominated by government investment), and human capital showed no evidence that explains at least the poor growth performance, which may be attributed to the measurement problems.*

*The paper further concludes that the specification for testing the possible export growth nexus through its direct and beneficial externality effects on the rest of the economy has shown no evidence and has no satisfactory explanatory power.*

*It follows that policies that favorably affect the agricultural sector; reduce government consumption (with out reducing government investment); maintain external competitiveness; improve real effective exchange rate; create conducive environment for private sector investment, foreign capital inflow, and export diversification; slow population growth, and encourage human capital development are found to be important.*



# CHAPTER 1

## INTRODUCTION

The growth trend followed by the Ethiopian economy during the period 1971/72-1994/95 was largely unsatisfactory. Factors underlying this poor trend include drought, civil war (1974-1991), high population growth rates, low investment levels, poor infrastructure, volatile terms of trade, debt burden, etc. Moreover, too much state intervention and a command economy structure crippled the economy during the 1974-91 socialist period.

The EPRDF took power in 1991, followed by four years of the Transitional Government (TG). Since 1991 the government has introduced reforms. A full Economic Reform Program (ERP) was launched with Structural Adjustment Facility (SAF) in October 1992. This was followed by devaluation, tariff and transport reforms, the deregulation of agricultural marketing, and limited privatization that began in 1995. Despite devaluation, inflation has remained low (E.I.U. p.13).

Although there are disagreements over many issues, both governments and donors remain confident that the reforms are on track. In this regard, it was said that "the transitional government of Ethiopia not only successful in curbing economic decline but also has made notable progress in putting the economy in the right track of promising growth".<sup>1</sup>

The study tries to investigate the facts behind the evolution of the Ethiopian growth process over the period 1972-1995.

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<sup>1</sup>Ethiopian Herald, 20 August, 1995, p.6.

## 1.1 Background of The Study

### 1.1.1 General overview

Ethiopia is one of the Least Developed Countries (LDCs) of the world. In spite of being richly endowed with a large and varied natural resource base and an ancient rich cultural heritage with a large population, the country remains very poor.

The major known resource of the country continues to be agriculture in which more than 80 percent of the population is engaged either directly or in-directly. Besides making the largest contribution to GDP (55 percent), the most important export items both by volume and value (80% of total exports) originate from this sector<sup>2</sup>. In spite of this, however, agriculture is constrained by backward farming systems, soil erosion, population growth, and drought. Apart from this, there are many problems: increasing rural landless, poverty, unemployment, food crises and famine. In the last twenty years or so, agricultural production in Ethiopia has shown negative growth rates. Agriculture growth stagnated at 0.6 percent in the 1970's and 1980's, mainly because of devastating droughts and pest infestations, land loss due to environment degradation, poor infrastructure, a legacy of disrupted agricultural production caused by civil conflict, and inappropriate policies (World Bank, 1995). Particularly since the 1960's the average rate of agricultural output has been consistently lower than population growth. If current trends of population growth and food production continues, food aid requirement would increase resulting in dependency on external assistance. Therefore, a development strategy that focuses both on demographic and socio-economic aspects becomes imperative for the country.

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<sup>2</sup> this taken from The World Bank (1995), pp.183.

The performance of the industrial sector (manufacturing and engineering) has been equally poor. Dealing with the sector's contribution to national income shows its being insignificant and also a stagnating trend over time. For instance, Ethiopia's industry sector accounts for about 12 percent of GDP (World Bank, 1994). The real industrial growth ( in terms of average annual percentage change in value added ) has been 1.4 percent in the period 1974-1980, 3.9 in 1981-87, -4.1 in 1988-93, -4.1 in 1992 and 11.6 in 1993 respectively.<sup>3</sup> The increased contribution in 1993 can be attributed to the expansion of the private sector. The sector's contribution to employment is also relatively small. As of December 1992, it consisted of about 120,000 workers about 70,000 of which are employed by industrial public enterprises. The foreign exchange generated by exports of manufacturing goods is low and these exports are hardly diversified. They represent about 25 percent of total export earnings and consist mainly of leather and leather products, processed food stuffs and textiles (World Bank, 1994). Moreover, the manufacturing sector has failed to fulfil one of its prime roles of spinning off multiplier effects and establishing backward and forward linkages with other sectors. One of the reasons that agriculture remains backward and at subsistence level can be attributed to this phenomenon. The industrial sector should have provided farm inputs like implements, fertilizers, and created demand for various raw materials as well as consumer goods and durable items in the agricultural sector.

Recent evidence suggests that rapid population growth in developing countries has been one obstacle rather than an aid to economic growth and that the more rapid the population growth, the greater the deterrent effects. The population of Ethiopia, which stood at 53 million in 1993<sup>4</sup>, is growing at 3.1 percent per annum, one of the highest rates in the world.

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<sup>3</sup>This is taken from Annual Report of the Global Coalition for Africa, 1994, p.37.

<sup>4</sup> In 1996, the figure has become 56.7 million (UNPF, The State of World Population, 1996)

What is more problematic is that the population is expected to continue growing at this rate in the decade to come. Thus the fact that the situation is posing a serious threat to development efforts has attracted attention<sup>5</sup>.

As has been summarized above, the period 1974-1994 was generally characterized by poor growth performance. GNP per capita for the period 1980-92 was -1.9 percent (Gibbon and Oluhushi, P.87). GDP growth rates have on average been uneven and only marginally out paced population growth.

A full economic reform program (ERP) has been launched with the support of a structural adjustment facility from the financial institutions in order to address the various impeding factors outlined earlier with an aim to achieve high medium and long term growth as well as reduce poverty. The reform package broadly includes: devaluation ; tariff and transport reforms (including tax cut with the exception of petroleum prices and transport tariffs); deregulation of agricultural marketing ; privatization of state enterprises ; foreign exchange liberalization; flexible interest rates as macro economic conditions demand, etc.

In spite of all the above measures, however, an assessment of the Ethiopian economy still indicates low levels of living standards, low domestic savings, weak private investment, extremely low foreign investment inflow, unemployment, and poor social and physical infrastructure. Thus, economic indicators suggest the need to examine the overall economy and the reforms in the monetary and financial sectors.

The crucial issue then is to determine how rapid growth can be achieved in the face of those numerous negative factors pointed out earlier. Though the extent to which those reform

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<sup>5</sup>Population and Development Program Unit (PDP), MOPED(1994), in Population and Development Bulletin, Vol.2, No.1, March, p.47.

packages are successful is an empirical issue, both complex and controversial, taking a longer view on growth policy enables us to identify the development problems and policy impediments that have prevented the economy from taking-off. In this regard, two searching questions that arise are :

(a) how has the Ethiopian economic growth process evolved during the period 1971/72-94/95.

(b) What valuable lessons are there in the growth mechanisms which could enhance future growth prospects.

These two questions which relate to identification and policy prescriptions provide the direction in the growth process analysis.

## **1.2 Significance of the Study**

In order to understand why countries differ dramatically in standards of living we should first try to understand why countries experience sharp divergences in long term growth rates. Even small differences in growth rates when cumulated over a generation or more have much greater consequences for standards of living. In this connection, learning about government policy options that have even small effects on the long term growth rate, can contribute more to improvements in standards of living than has been provided by the entire history of macroeconomic analysis.

This study will have great significance for macro- policy formulation aimed at achieving rapid economic growth in Ethiopia. In particular:

1- The study would identify the sources of growth, which provide a foundation for directing policy at the right targets using the right levers.

2- The empirical investigation would help policy makers in designing appropriate growth oriented adjustment programs and in setting priorities in their implementation.

3- Such empirical examination would highlight several areas requiring further research including model building , sectoral growth linkages, growth multipliers and sectoral analysis of factor productivity.

### 1.3 Objectives of the Study

Efforts to understand long term growth must start from the experiences of individual countries. Based on this, this study attempts to account for the growth trend experienced in the Ethiopian economy over the period 1971/72-1994/95. The difficult economic conditions which Africa in general, and Ethiopia in particular, face arise mainly from structural and policy based factors and cannot appropriately be attributed to a single regime or development strategy. Hence, isolating the various factors that characterized the economy on the one hand, and policy factors on the other and trying to weigh the extent to which such factors explained growth is the main objective of this thesis.

The following are the specific goals of the research:

- (1) to outline the determinants of long run economic growth and the extent of their effects;
- (2) to look into the extent that economic sectors such as exports (agriculture) and non agricultural sector affect economic growth directly and test for the possibility of indirect effects of each through their intersectoral linkages; and
- (3) to highlight the policy implications of these growth determinants.



## **1.4 Hypotheses Testing**

The following are the main ones to be tested:

- (1) Labor force expansion, capital formation, unexplained technological change (also efficiency) could explain the growth process of developing countries taking Ethiopia's data as a case for the period 1968-95.
- (2) Agriculture is important to the economic growth of Ethiopia.
- (3) Exports act as an engine of growth more than investment.

## **1.5 Scope and Limitations of the Study**

The thesis intends to identify the determinants of an aggregate growth process and their policy implications rather than measure wide and multi sectoral linkages and undertake a detailed structural analysis. Though economic performance analysis requires overall analysis of economic indicators, this thesis focuses primarily on growth and related issues. Moreover, the thesis attempts to evaluate the economic performance not in its totality but with reference to basic macroeconomic parameters.

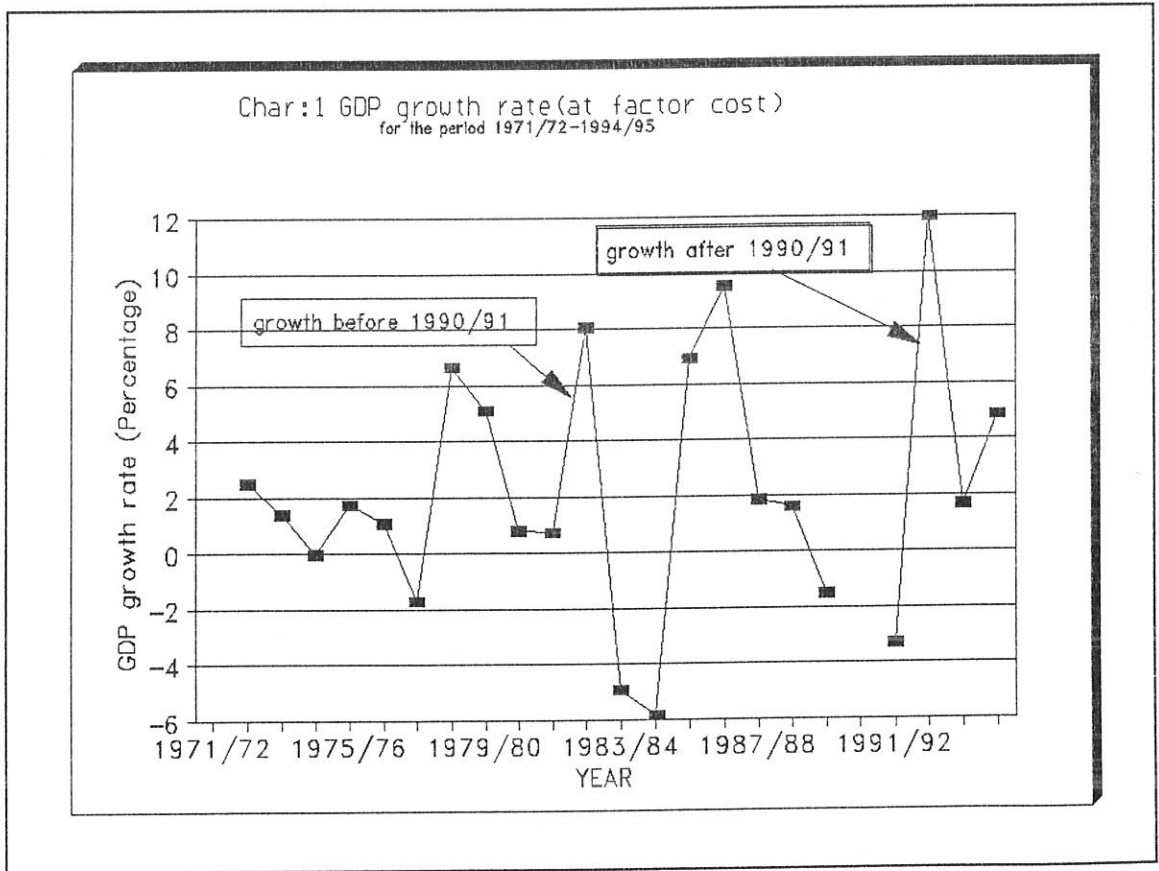
## **1.6 Organization of the Study**

In order for the study to fulfil its main objectives well, it is organized as follows: the second chapter is on overall performance of the economy, chapter 3 is a literature review, chapter 4 is on data and model specification, chapter 5 which is the heart of the study is on the determinants of economic growth in Ethiopia, where a model will be developed and results and interpretations will follow, the final chapter is devoted to conclusions and policy implications.

**CHAPTER 2**  
**OVERALL ECONOMIC PERFORMANCE:**  
**(1971/72-1994/95)**

**2.1 OVERALL ECONOMIC TRENDS**

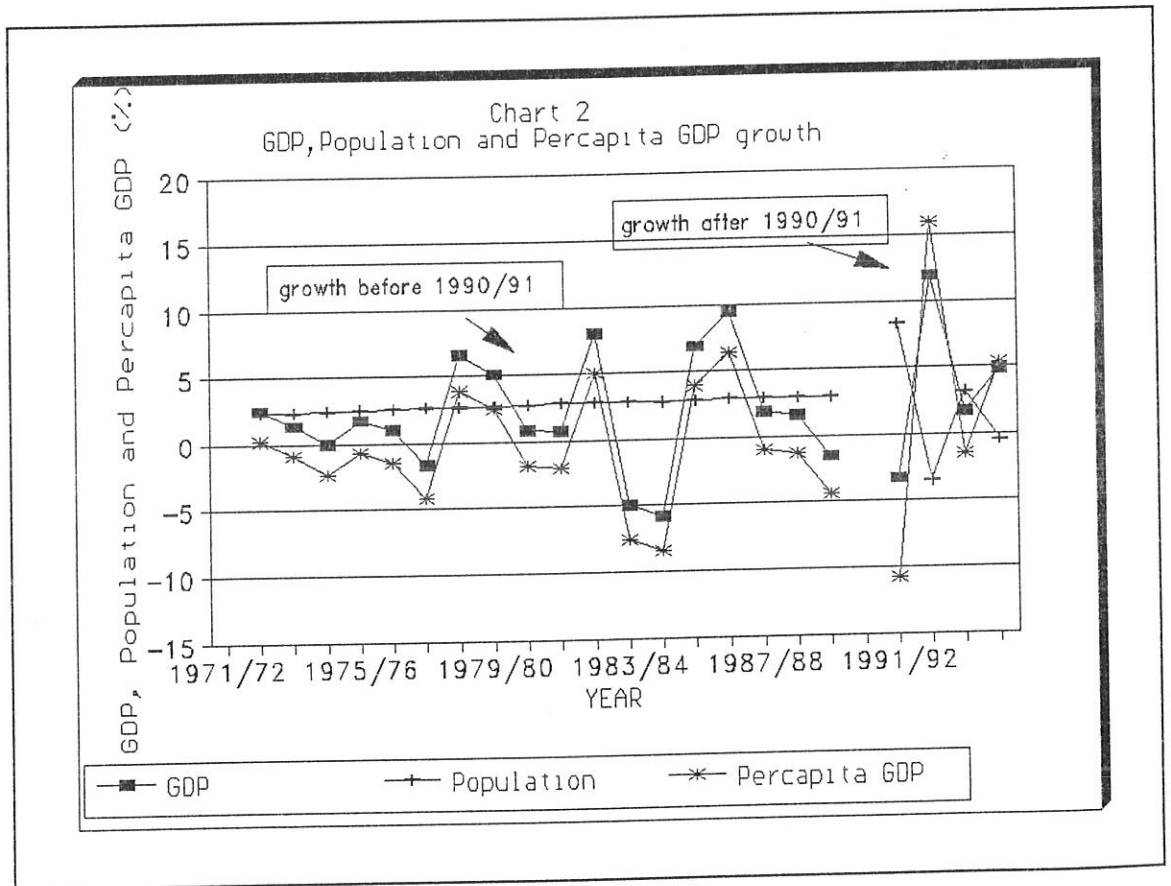
Considering the aggregate growth performance, the pace of economic growth slowed considerably during the period 1971/72-1994/95 (see Chart 1). While the average annual growth rate of GDP for the period excluding 1990/91 amounted to -0.14 percent, the average annual growth rate of per capita GDP declined by 0.19 percent. The section below considers the performance prior to 1989/90 and post 1990/91.



## 2.2 Performance Prior 1989/90

### 2.2.1 Overall Economic Trends

The average rate of growth in Gross domestic Product (at constant factor cost) for the period 1970/71-1972/73 was 3.5 percent per annum and in per capita terms the average growth rate was about 1.16 percent (see appendix 2.1). In 1973/74 both GDP and per capita GDP growth rates began to decelerate, amounting to 1.39 percent and -2.37 respectively.



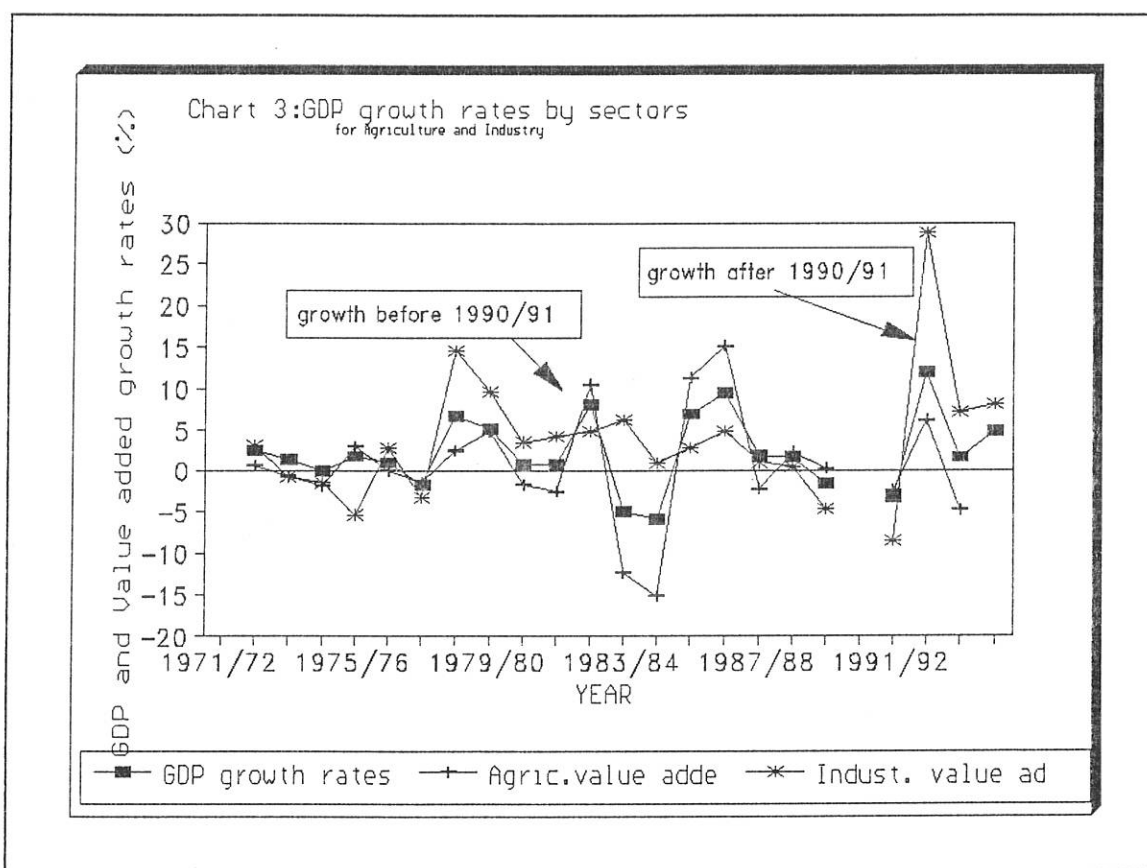
In the period 1973/74-1989/90 the overall GDP growth rate averaged 1.8 percent per annum. In contrast, the average population growth increased from 2.32 percent in 1971/72-1972/73 to some 2.75 percent during 1974-1990. As a result there was a decline in per capita income by about 0.95 percent (see appendix 2.1 and chart 2).

During 1973/74-1977/78 a period of internal conflicts and war with Somalia following the Ethiopian revolution, GDP grew by a mere 0.5 percent. Following this, the period 1978/79-1982/83 marked 4.27 percent GDP growth rate which might be attributed to an overall effort made to boost production on the basis of annual development campaigns. This situation was followed by the catastrophic drought and famine years of 1983/84-1984/85. As a result, the decline in GDP during this period was 5.39 percent which resulted in sobering socio-economic situations. Though annual average GDP growth of 8.23 percent was registered in the period 1985/86-1986/87 (mainly due to favorable weather conditions and terms of trade) it was short lived. This situation temporarily boosted the average annual GDP growth for the period 1985/86-1989/90 to 3.68 percent. The period 1987/88-1990/91 which marked the final years of the military rule and the command economy system were marked by declining GDP growth (averaged 1.95 percent), as shown in chart 1, and deepening social and economic crisis in the country.



## 2.2.2 Trends in Major Sectors

There are substantial variations in the growth rates of the agricultural and non-agricultural sectors over the period 1971/72-1989/90 (see appendix 2.3). The poor overall economic growth record especially in the period 1974-1991 was due to the poor growth of the commodity producing sector, most notably agriculture.



### A. Agriculture

Agricultural value added grew at an average annual rate of 2.09 percent during the period 1970/71-1973/74. In per capita terms, this translates into an average rate of decline of 0.23 percent per annum. In 1971/72 agricultural output grew by 3.54 percent. However, in 1972/73 growth in agricultural output stagnated, showing only a 0.68 percent increase. This

resulted in a 1.65 percent decline in per capita terms. Agricultural value added declined by 0.63 percent in 1973/74 due to the drought whereas per capita agricultural output declined considerably falling by 2.96 percent. Agriculture showed a 0.9 percent average increase in its value added in the period 1973/74-1989/90. The fact that this figure is clearly below the average growth rate of population indicates the sector's inability to feed the growing population let alone contributing to foreign exchange earnings. Due to this very low level of growth the overall GDP growth was severely affected. After 1977 industry has been growing faster than both GDP and agriculture (see chart 3). Besides, the growth trend followed by the industrial sector has been a direct reflection of the agricultural sector. As a result, the poor performance of agriculture (described earlier) had an adverse impact on industry and other sectors of the economy.

In spite of its poor performance the agricultural sector has been identified as the most promising sector for future growth. As a result, fostering agriculture through a strategy of diversification of the economy, creation of productive employment opportunities and promotion of rural development, provision of market freedom to farmers, and mobilization of the available resources becomes imperative. However, success in both rural and agricultural development depends on establishing effective linkages to activities beyond the agricultural sector.

## **B Industry**

The performance of industry (referring to manufacturing and construction) was relatively better than that of agriculture. During 1970/71-1972/73 the growth rate of the industrial sector showed a growth that averaged about 3.8 percent per annum. In 1972/73, however, industrial growth slowed to 3.1 percent. This performance in industrial sector is closely related to the performance of the manufacturing sector. During 1970/71-1972/73, manufacturing registered an average growth rate of 5.21 percent. In 1972/73 the growth rate

declined considerably (see appendix 2.3).

As can be seen from appendix 2.3, the industrial growth rate in the period 1978/79-1982/83 turned out to be 7.35 percent. The industrial growth rate in this period is mostly due to the growth of manufacturing which had an average growth rate of 10.92 percent. The negative growth rate observed in the earlier period 1973/74-1977/78, however, showed less emphasis given to the industrial sector and the outstretched dominance of the agricultural sector in the economy.

### **C Service Sector<sup>1</sup>**

In the service sector, a rapid and positive average growth rate has been observed with considerable variation within sub-sectors. An average annual growth rate of 6.14 percent, 3.49 percent and 7.37 percent was recorded in the periods 1971/72-1972/1973, 1973/74-1977/78 and 1991/92-1994/95 respectively. In the period marking the military rule, the highest rate of growth was accounted by public administration and defence. The ever expanding government bureaucracy during this period was at the expense of efficiency.

#### **2.2.3 Trends in Savings, and Investment**

As shown in appendix 2.4, average saving as percent of GDP which had been 12.1 percent during 1971/72-1972/73 declined to 5.2 percent in the in 1973/74-1989/80. During the period 1973/74-1990/91 gross domestic saving rate varied between 12.94 percent and -0.02 percent of GDP. This lowest saving effort is mainly a result of the dramatic increase in government consumption from an average of 10.67 percent of GDP to 18.4 percent of GDP respectively.

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<sup>1</sup> This includes Non-factor services such as transportation which are distinguished from factor services. Factor services are those which their receipts and payments to factors such as labor and capital are recorded.

In this regard, the country's aggregate saving rate has been very low such that it can not be compared to its pre-revolution level. In contrast, the trend in gross investment has generally been upward except in the period 1973/74-1977/78 when it declined to 8.89 percent of GDP from its pre-revolution (1971/72-1972/73) level of 11.99 percent of GDP. The investment rates in the period 1973/74-1989/90 were extremely low and about 70 percent emanated from the state sector. Similarly, in the final years of the military rule 1988/89-1990/91 gross investment showed a declining trend. Investment rates in the country are still low and compare unfavorably with the average rate of investment in developing countries <sup>2</sup>.

The problem becomes more complex when looking at the financing of investment. Throughout the period, with the exception of 1971/72-1972/73, domestic savings have been inadequate to finance such low levels of investment that fall short of the country's minimum requirement for economic growth. The domestic saving which was more than enough to finance investment in the pre-revolution years (12.1 percent) could finance only about one fourth of total investment by 1984-1985. Moreover, the gap between domestic saving and investment which represented 1.92 percent of GDP during 1974-78 had risen to about 9.29 percent during 1985/86-1989/90.

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<sup>2</sup> The average investment rate for low income countries was 28 percent in 1989, see World Bank (1991), pp.218-219.

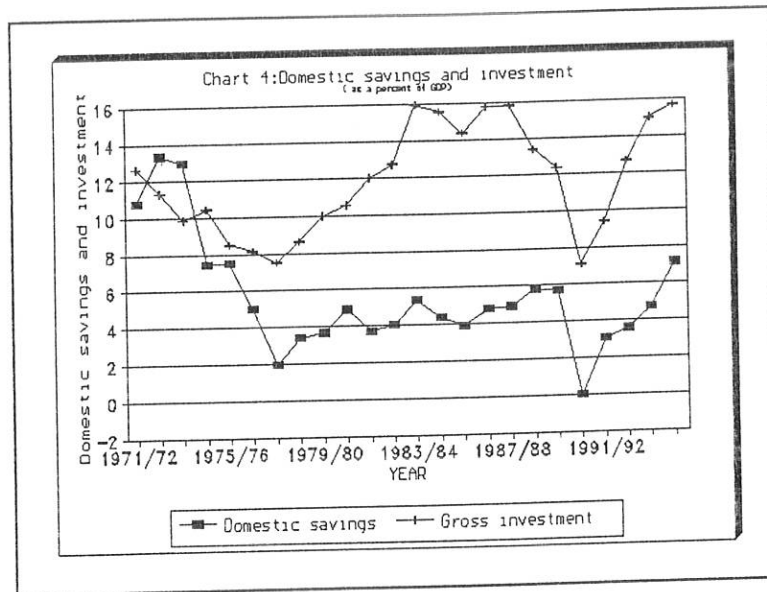
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<sup>2</sup> The average investment rate for low income countries was 28 percent in 1989, see World Bank (1991), pp.218-219.



As can vividly be seen from the figure above the domestic saving which was above the investment rate prior to the revolution has become far below it in the following years. Consequently, the absence of a domestic source to finance investment led to increasing dependence on external sources which could have negative consequences on the economy through debt servicing as such.

#### 2.2.4 Exports, Imports and the Terms of Trade

In the Ethiopian economy, foreign trade plays an important role as a major source of foreign exchange to finance imports and a source of tax revenue. As a result, the purchasing power of exports (in terms of imports) is important in determining the extent of economic growth.

**Table 1**

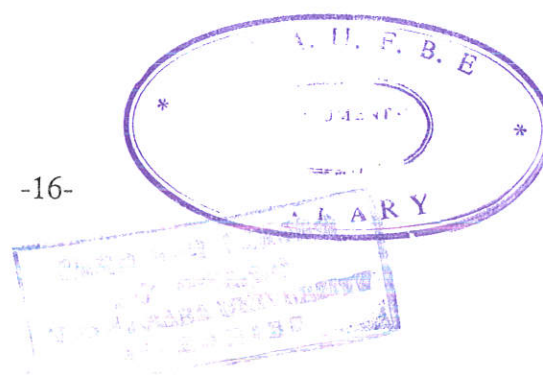
**Growth rate (percentage) of value of Exports and Imports (periodic averages for 1971/72-1994/95)**

Value of Exports and imports	Sub Periods						
	1971/72-1972/73	1973/74-1977/78	1978/79-1982/83	1983/84-1984/85	1985/86-1989/90	1990/91	1991/92-1994/95
Value of major Exports	22.31	9.58	5.54	-2.55	1.1	-26.69	78.47
Value of major imports	-10.63	14.64	18.07	1.93	1.37	16.79	38.48

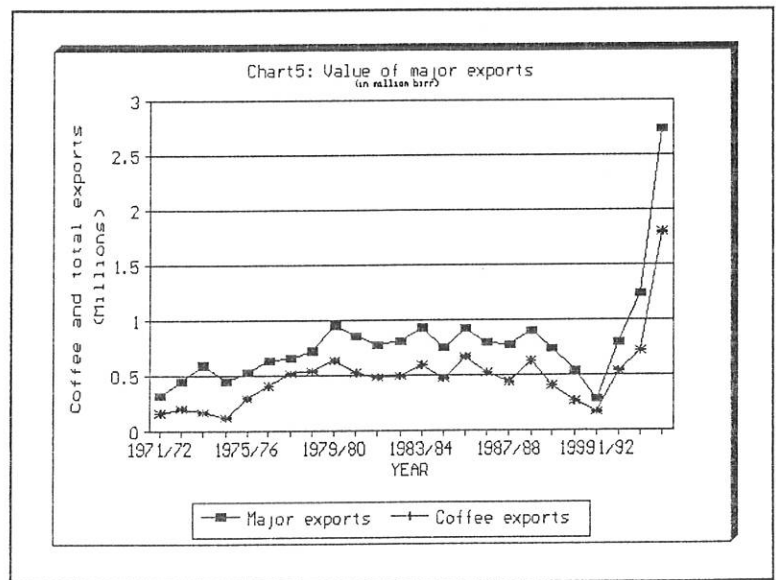
Source: annual Reports and Quarterly Bulletin of the NBE, (various issues)

As shown in table 1 (and chart 7) exports were sluggish over the period 1971/72-1994/95. The value of exports tended to fluctuate considerably with years of stagnation or decline due to the volume of exports and low prices for some of the major export commodities such as coffee (see chart 6 ). Thus the value of exports excluding net factor services had declined from 22.3 percent average growth rate in the period 1971/72-1972/73 fiscal year to 9.58 percent in period 1973/74-1977/78 and further declined to -2.55 percent in the period 1984-1985 mainly due to drought. There was an increase in 1985/86 attributed to coffee price boom. The value of exports declined in the period 1985/86-1989/90 by an average of 1.1 percent and dramatically dropped by -26.69 percent in 1990/91 from its previous level mainly due to deterioration in the terms of trade and instability in the country. In general, exports have fallen to their lowest level since 1974. Export earnings in the country are heavily dependent on coffee with livestock and livestock products such as hides and skins coming second. While 90% of Ethiopia's exports are agricultural products, coffee (the major export) accounts for about 60 percent of the value of merchandise exports<sup>3</sup>. In this regard, the growth

<sup>3</sup> See World Bank (1995),p.183



trend followed by major exports is closely related to that of coffee exports (see chart 5). Coffee exports have shown considerable fluctuations over the period 1973/74-1990/91. These considerable fluctuations over the period had an impact on major exports. On the other hand, imports of goods and non-factor services as percent of GDP was 19.53 percent during the period 1974-1990. Looking at the structure of imports, except in 1984/85, when consumer goods represented the single most important import category (owing to a rise in food imports ) it has been largely dominated by capital goods followed by fuel and semifinished goods.



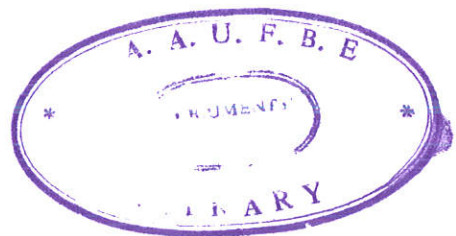
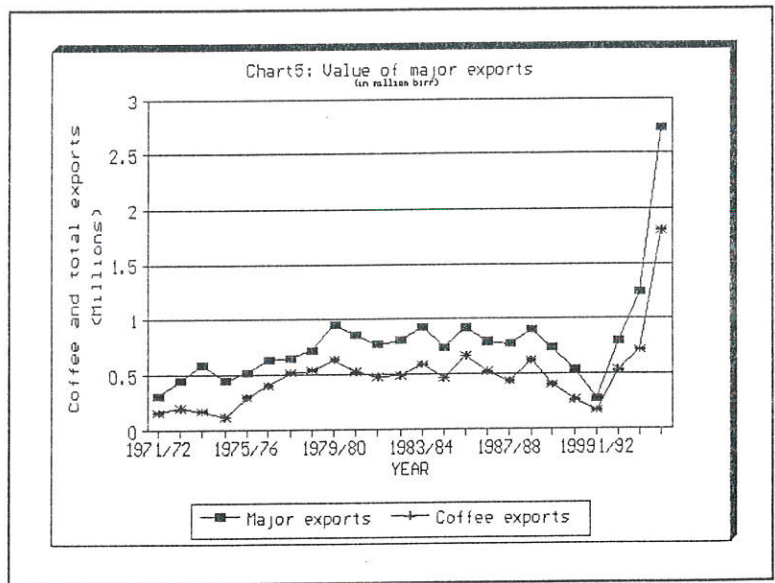
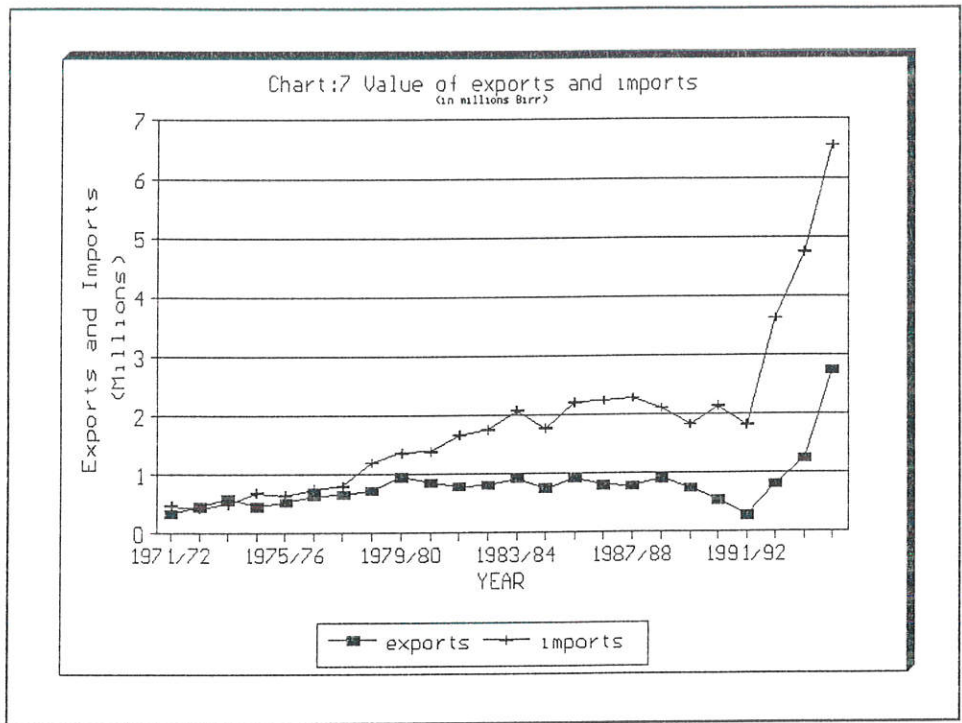
### 2.2.5 Terms of Trade

The terms of Trade which, simply refer to the purchasing power of exports, depend on various factors including changes in prices of goods bought or sold abroad and changes in exchange rates.

Both export and import prices have followed fluctuating trends during the period 1971/72-1990/91<sup>4</sup>. While import prices increased markedly between 1973 and 1981, it was offset by a significant increase in export prices due to the coffee boom of 1976-77. In 1981 a decrease in import prices due to world recession, and the coffee boom experienced in 1985 made terms of trade favorable; a sharp increase in import prices and a marked decline in export prices that observed since 1987, however, worsened the terms of trade. The deterioration in the terms of trade resulted in a cumulative loss of US \$ 542 million for the period 1971-1991 (Naude, PP. 61-62), implying widening deficits in the trade account. The fact that the pricing of this commodity is virtually beyond the country's control and is exposed to natural calamities makes the country's export earnings vulnerable to these factors.

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<sup>4</sup> The information below here is taken from Naude (1995), pp.61-62.



## 2.2.6 Major Reasons for the Deepening of the Crisis

A number of factors have contributed to the poor economic performance.

First of all it resulted from a combination of factors including too much state intervention (after the revolution) that resulted in restrictive economic policies; fluctuations in weather conditions, devastating war situations and the diversion of resources from productive to defence purposes, and the growth of government size (together with production inefficiency). These situations resulted in deteriorating economic situations that is reflected in low production in major sectors (i.e., agriculture and industry), and mounting debt in the country. As a result, of these and other factors, GDP growth in this period averaged only 1.95 percent (appendix 2.1).

Second, the main reason for the stagnation of agricultural output during this period can be attributed to poor performance including agricultural policies such as collectivist policies, poor support and extension services, an inadequate road network, severe fluctuations in weather conditions and war related disruptions in productions. The poor agricultural performance is also due to environmental degradation, backward technology, limited diffusion of modern inputs, inadequate resource allocation, and policy constraints in the form of low priority to peasant production and inadequate pricing policies.

Third, a major reason for low domestic saving is increased government consumption mainly due to increases in military spending very low private savings.

Finally, the very low level of investment is mainly the result of limited domestic savings. In addition, the unfavorable legal environment such as government's monopoly control over most areas of the economy, ceilings on private sector investments and malevolent licensing requirements; discriminatory credit and foreign exchange policies has severely restricted private sector participation in the economy.

## **2.3 Performance During Post-1990/91 Period**

### **2.3.1 Overall Economic Trends**

The transitional government of Ethiopia (TGE) was set up in July 1991, following the collapse two months earlier of the military rule. Thus the TGE took over an economy which was near to collapse. The government initiated an economic reform program supported by the International Monetary Fund's Structural Adjustment Facility (SAF), Structural Adjustment Credit (SAC) from the World Bank and other multilateral and bilateral financing institutions "with the principal aims of stabilizing the economy and deregulating economic activity". As a result, between 1991/92 and 1994/95 the Gross Domestic Product (at constant factor cost) rose at an annual average rate of 3.8 percent. As the average growth of GDP exceeded that of the population during this period, the average per capita GDP increased by 1.97 percent. The relatively higher economic growth in the period 1991/92-1994//95 was attributed to a cumulative effect of various reform measures. In addition the favorable weather conditions in the agricultural sector contributed significantly to growth. The only exception to this is the drought in 1993/94 which caused agricultural value added to fall from 6424.2 million Birr in 1992/93 to 6122 million in 1993/94 (see annex 1).

However, the recorded level of per capita GDP in the 1990's which remains low has made little changes in terms of welfare and standards of living. Moreover, following the recovery, per capita GDP in 1991/92 was much lower than it was near the end of the war (see annex 1 and chart 2). Thus issues that relate to economic development : extreme poverty, hunger, illiteracy, and destitution remain challenging realities of the country.

### **2.3.2 Trends in Major Sectors**

#### **A. Agriculture**

Considering the period 1991/92-1994/95 the official statistics indicate an increase in agricultural value added from 6051.5 million Birr in 1991/92 to 6424.2 million Birr in 1992/93. The decline from 6424.2 million Birr in 1992/93 to 6122 million Birr in 1993/94 is mainly a result of drought in some parts of the country (see appendix 2.1). Looking at the growth rates, this is an increase by 6.1 percent between 1991/92 and 1992/93 and a decline of 4.70 percent from 1992/93 to 1993/94. On average, during this period agricultural value added rose by 5.71 percent.

#### **B. Industry**

In the period 1990/91-1994/95 measures were undertaken to reduce the role of public enterprises in the productive sectors of the economy and eliminate the direct role of the public sector in production through divestiture of parastatals. With regard to the overall performance of the industrial sector, industrial output dramatically rose by 28.8 percent in 1992/93 from its 1991/92 level. However, it sharply dropped to 7.1 percent in the years 1993/94 and 1994/95. Nevertheless, structural adjustment measures have at least minimized constraints in foreign exchange availability for industries.

#### **C Service Sector**

During the period 1991/92-1994/95 an average growth rate of 7.37 was registered by this sector. This can be attributed to expansion in trade and transport sectors. While the structural adjustment measures taking place in the country have lowered government bureaucracy for efficiency gains, they have also contributed greatly to some sectors' expansion because of

incentives provided to private sectors. For instance, the average growth rate in the final period which was about 7.37 percent, can be related to the expansion in the trade and transport sub-sectors.

### 2.3.3 Trends in Saving and investment

In contrast, the period 1991/92-1994/95 has been characterized by changes in the composition and level of total investment (see chart 4). Gross investment as percent of GDP almost doubled in 1994/95 compared with 1990/91 where investment was about 7.12 percent of GDP. In spite of improvements observed in gross investment in the period 1992-1995, however, the domestic saving rate is not high enough to fully accommodate the investment needs. Public sector's savings during the period 1992-1995 was about 4.64 percent. Private savings, which has in the past accounted for the bulk of domestic savings, has not yet improved to fully accommodate the investment needs. Thus investment has been dominantly financed from foreign sources that take a form of loans or grants (see appendix 2.4).

On the other hand, considering the period 1991/92-1994/95, the share of public consumption expenditures in GDP declined steadily. The average share of government consumption declined from 22.8% of GDP in the period 1985/86-1989/90 to 10.9% during 1991/92-1994/95 (annex 4). This perhaps has to do with a decline in defence and public expenditure rationalization under structural adjustment programs.<sup>5</sup> By contrast, private consumption showed a rise from 72.2% to 84.5% (appendix 2.3).

Although some investments can be financed by foreign capital, high domestic saving rates are very important to pay for the accumulation of capital and thus bring about satisfactory

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<sup>5</sup> The change in government brought an end to the civil war and thus resulted in relatively lower military spending.

economic growth. The situation examined earlier, however, shows a slow growth of GDP and a pronounced increase in private consumption accompanied by a steadily declining government savings that is not compensated by increased private savings.

### **2.3.4 Exports, Imports and the Terms of Trade**

An increase in exports has been observed during the period 1992-1995, averaging 78.47 percent. While this was partly brought about by devaluation and market liberalization, it is also a result of the favorable weather conditions and the end of the civil war. The windfall gain from coffee exports due to the high international price had also an impact.

Though exports of goods and services in GDP declined to 5.67 percent in 1990/91 it has registered an annual average rise of 9.99% during 1991/92-1994/95. Coffee and other exports rose during the period 1991/92-1994/95 (mainly due to factors mentioned earlier). On the other hand the share of imports declined to 18.55 percent during 1992-95 from its 19.53 percent during the period 1974-1990 (see appendix 2.4). In contrast, the share of exports and imports in GDP showed a steady decline in the period 1991/92-1994/95.

### **2.3.5 Reasons for the Relatively good Performance**

The average increase of 5.71 percent in agricultural value added observed in the period 1991/92-1994/95 is partly assisted by good weather. Part of the reason has been a partial liberalization that included the lifting of controls on marketing and the pricing of grains. The principal objectives of agricultural policy in this period has been ensuring adequate food security through increased agricultural production and employment, and increase foreign exchange earnings through increased agricultural exports. To encourage non-traditional and high priced crops, through restructuring production, and strengthen the linkages between

agricultural and manufacturing sectors have also been medium and long term objectives.<sup>6</sup>

In spite of this, however, there are factors that inhibits growth in this sector. Among these the most important ones include the growing shortage of arable land for small-holder farmers, the declining productivity of labor in agriculture, vulnerability of agriculture to slight climatic shocks and food insecurity situations among the bulk of the rural population.

#### 2.4 Structure of the Economy

In Ethiopia there has been little structural transformation as related to the structure of the economy (Eshetu and Mekonnen(1991),p.15). The agricultural sector accounts for more than 40% of national income, 85 percent of employment and 90 percent of export earnings. In contrast, other commodity producing sectors (manufacturing, handicrafts and small scale industries; building and construction, mining and of quarrying; electricity and water) generate about 19% of the country's Gross Domestic Product (GDP). The share of the manufacturing sector in the commodity producing sector other than agriculture is less than 9 percent of GDP and employs about 88,000 people. A more contrasting trend is observed in the service sector which accounts for about 40% of GDP with rising share over time.<sup>7</sup>

Furthermore, in the Ethiopian economy no major structural transformation (sectoral changes in employment and GDP contribution) has occurred. In this regard, comparing the periods 1971/72-1972/73, 1973/74-1977/78, 1985/86-1989/90 and 1991/92-1994/95 makes this argument more vivid. As shown in appendix 2.2, for these periods the share of agriculture in GDP accounted for 55.%, 52.95% 44.21% and 53.14% respectively; whereas industry's share in GDP constituted 15.35%, 14.33%, 17.89% and 10.28% percent respectively. In

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<sup>6</sup> Policy Framework Paper, 1992/93-1994/95, p.11

<sup>7</sup> For these statistical figures, see World Bank (1995),p.183.



twenty-four years time considered, the share of agriculture, industry and service sectors accounted for 50.61%, 14.50% and 35.24% respectively. Thus looking at these figures, it is not possible to talk of any structural transformation that has been historically associated with industrialization.

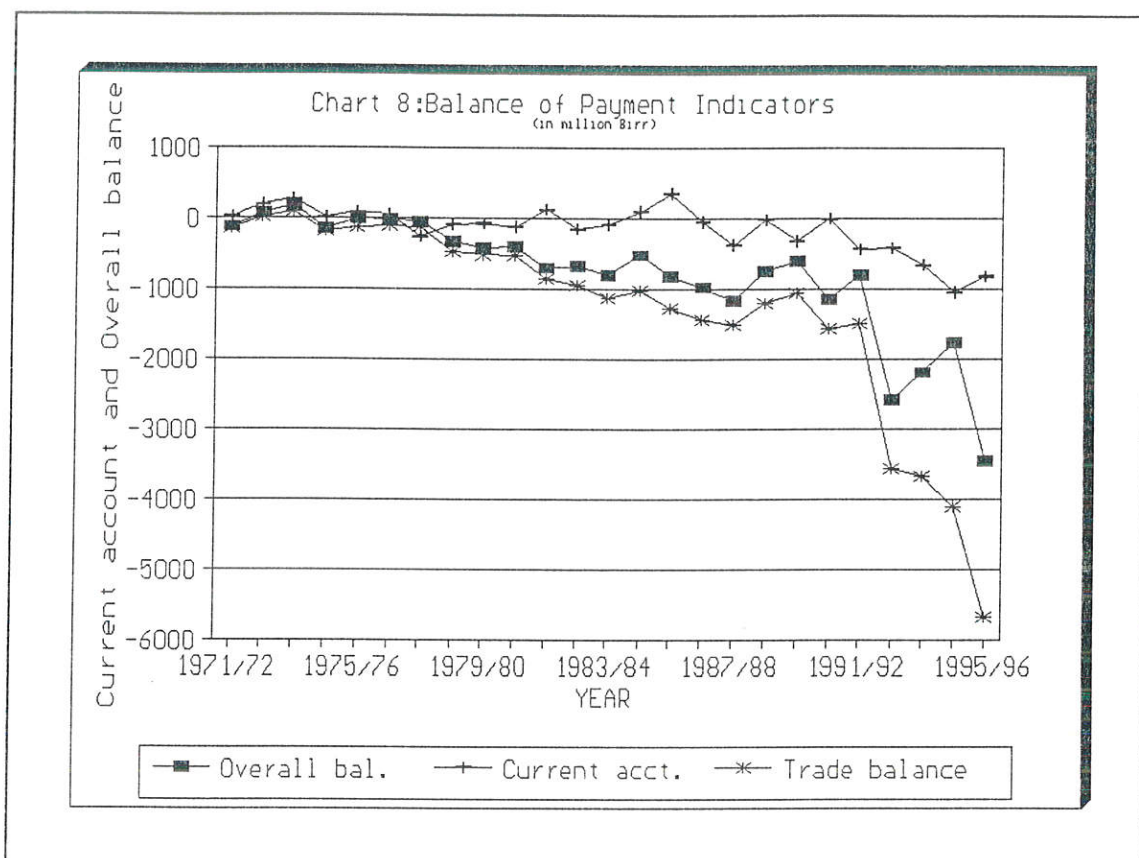
## **2.5 Balance of payments, Monetary and Fiscal Developments**

### **2.5.1 Balance of Payments**

Considering the Balance of payments situation for the period 1971/72-1994/95, in all years except 1972/73 and 1973/74 during which the country had a positive trade balance, the trade balance was negative with a deficit of reaching -4108 million Birr in 1994/95 (see appendix 2.5 and chart 8). This can be attributed to rising of imports over exports and fluctuations in both prices and volume of exports. For instance, in spite of a marked increase in foreign exchange during 1992-95, the increased demand for raw materials and equipment resulted in negative trade balance.

In contrast, the service component of the current account has been showing a positive balance owing to the satisfactory performance of Ethiopian Airlines. Nevertheless, the current account balance has been consistently negative with the exception of 1973 and 1974 that brought about an inflow of resources in the form of grants and thus resulted in a positive balance (see appendix 2.5 and chart 8).

During 1973/74-1989/90 both external loans and drawing down the country's foreign exchange have been used to finance the balance of payments deficit. As a result of this, the country's debt position has been deteriorating and its import coverage has shown a drastic decline. For instance the country's import coverage which had been at 16.8 months in 1973/74 had dwindled to 0.3 months by 1989/90 (Eshetu & Mekonnen (1991), P.21). This shortage in foreign exchange has had severe consequences for all sectors of the economy.



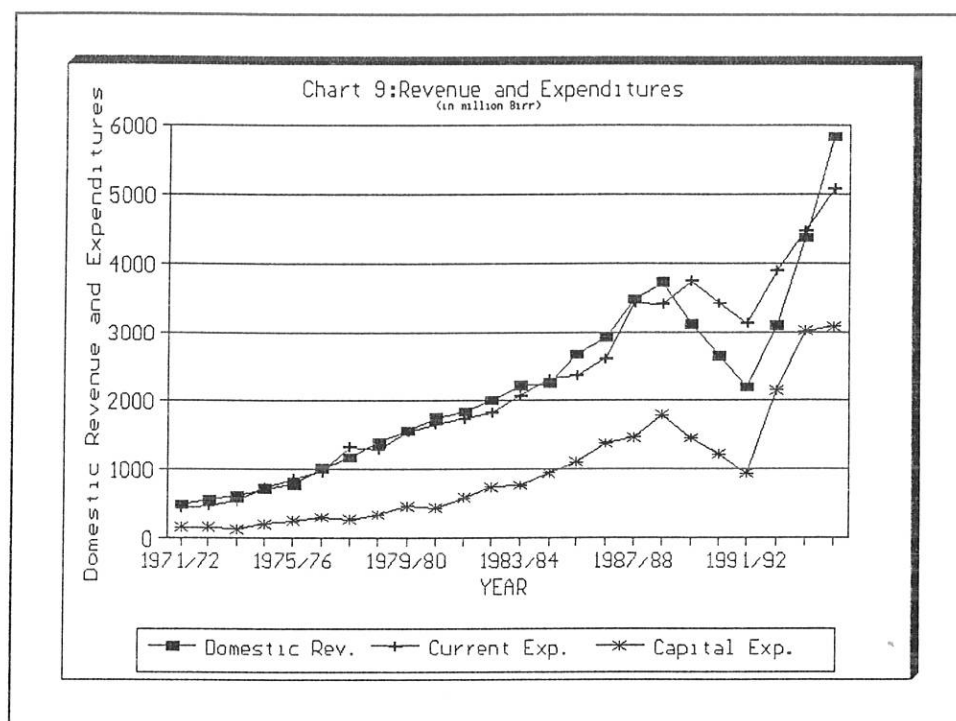
In contrast, the official reserves rose from an import coverage of 16.2 weeks (3.78 months) during the fiscal year 1992/93 to one of 38.4 weeks (8.96 months) in 1994/95, which is a 132 percent increase, due to the rise in imports that were largely financed via capital inflows.<sup>8</sup> In short, the progress with respect to the Balance of Payments has been generally unfavorable, and like the investment-saving gap, the foreign exchange gap is reflected in the widening current account deficit for most of the years in the period 1971/72-1994/95.

### 2.5.2 Fiscal and Monetary Developments

Domestic revenue, in general, has been steadily increasing through out the period ( see chart 9 ).

<sup>8</sup>See Duri Mohammed (1995).





The general increasing trend in government revenue is a result of tax and non-tax revenues. Taxes (of which taxes on foreign trade dominates) have been the most important component of government revenue. However the share of tax revenue which had been 87.30 percent of the total revenue in 1973/74 declined to 74.25 percent, 73.97 percent and 66.62 percent during 1984/85, 1988/89 and 1994/95 respectively<sup>9</sup>. In contrast, the share of non-tax revenue though low showed increasing importance. For instance, from an average share of 22.4 % during the period 1974/75-1990/91 it rose to 27.59% during 1991/92-1994/95. The rise in revenue from about 13 percent of GDP in 1974/75 to a peak of over 31 percent in 1988/89 was mainly because of tax and discretionary revenue measures such as the war levy and mandatory contributions from public enterprise surpluses.

In spite of the country's mobilization effort and a corresponding revenue growth, the growth in government expenditure (current and development expenditures) substantially exceeded the

<sup>9</sup> see appendix 2.2 for these and the following two paragraphs for statistical discussions.

revenue growth throughout the period. Current expenditures increased from 529.5 million Birr in 1973/74 to 3406.4 and 3735.7 million Birr in 1988/89 and 1989/90 respectively. For the same years, capital expenditures rose from 134.3 million Birr to 1799.7 million Birr and declined to 1217.1 million Birr, respectively. Both current and capital expenditures have contributed to increased government expenditures. Capital expenditures increased by 72% in 1994/95 from its 1991/92 level.

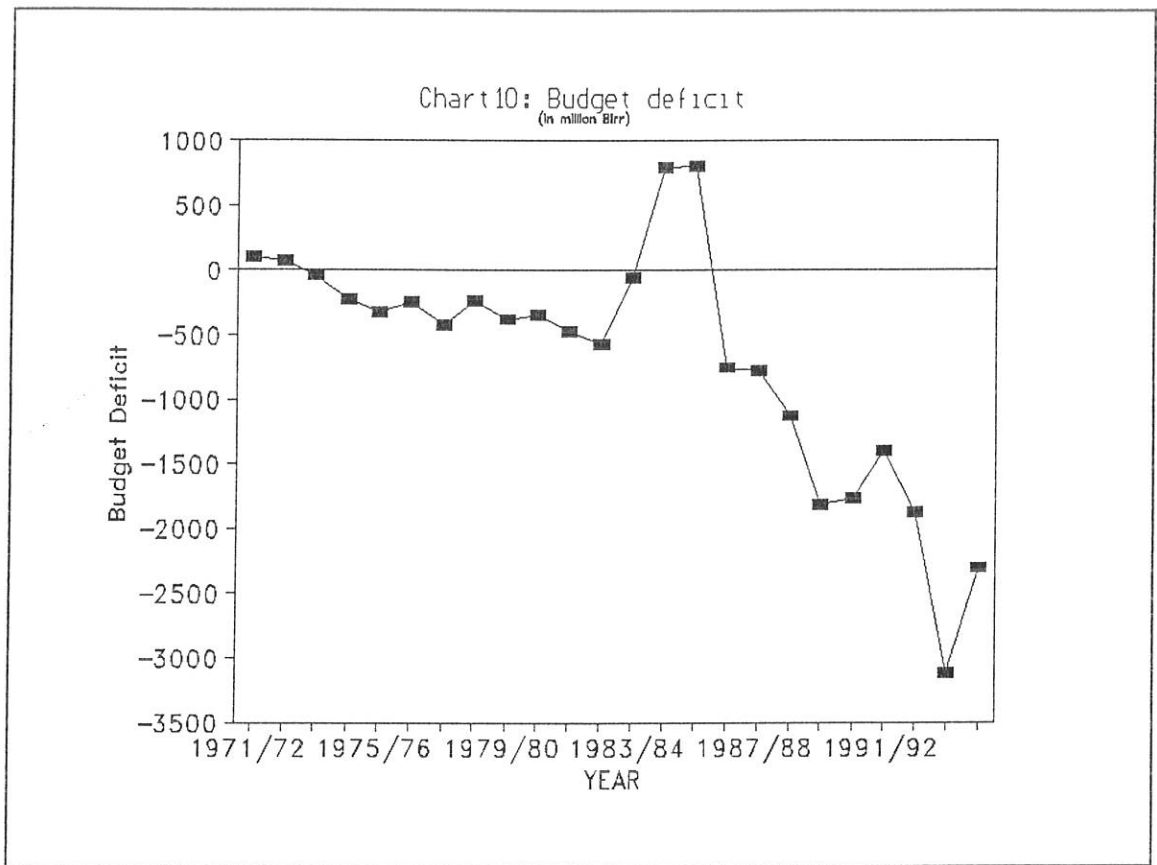
During the Military period the steady rise in expenditures was due to rising in military expenditure which was earlier masked under the 'general service' that accounted for 56.9 percent of current expenditure and rose to 62.7% during 1990-91. Capital expenditures has also grown considerably (chart 9). In the last years of the military rule (1989/90-1991/92) where the country was in deep economic crisis, capital expenditures declined dramatically.

Considering the period 1991/92-1994/95, domestic revenue declined during 1990/91 and 1991/92, which may be due to the overall economic crisis. However, total expenditure increased from 3124.3 million Birr in 1991/92 to 5075 million Birr in 1994/95, a 62.4 percent increase which is attributable to the rising inflow of foreign funds. In contrast, military spending share became as low as 31.8% of GDP in the period 1991/92-1994/95.

Generally speaking, the revenue and expenditure structure of the central government has not shown much change following the economic reform. The expenditure share of public administration remained unchanged throughout the survey period.

The net effect of growing government expenditure over revenue is a steadily widening budget deficit (see appendix 2.5 and chart 9).





Except in the period 1971/72-1972/1973 (pre revolution period) and 1984/85 (due to grants for the drought) on which a positive balance (surplus) can be seen, the remaining period has been characterized by deficits. The deficit oscillated around 8.65 percent of GDP over the period 1971/72-1994/95. The overall budget deficit averaged 7 percent of GDP during 1974/75-1990/91. In contrast the budget deficit fell to 13 percent of GDP in 1990/91. This year marked a fall in revenue due to the slow down in economic activity and defaults in revenue collections. While the larger inflow of funds in the 1984/85 drought year temporarily made a positive balance of Birr 790.2, the deficit reached -1814.7 million Birr in 1989/90 when revenue mobilization flattered. The deficit reached a peak -2312.4 million Birr in 1994/95 mainly due to increased capital expenditures.

During the period 1991/92-1994/95 a number of tax policy reforms and other government revenue enhancement measures were introduced; the rationalization of expenditure was

initiated and included a substantially reduced share of defence.

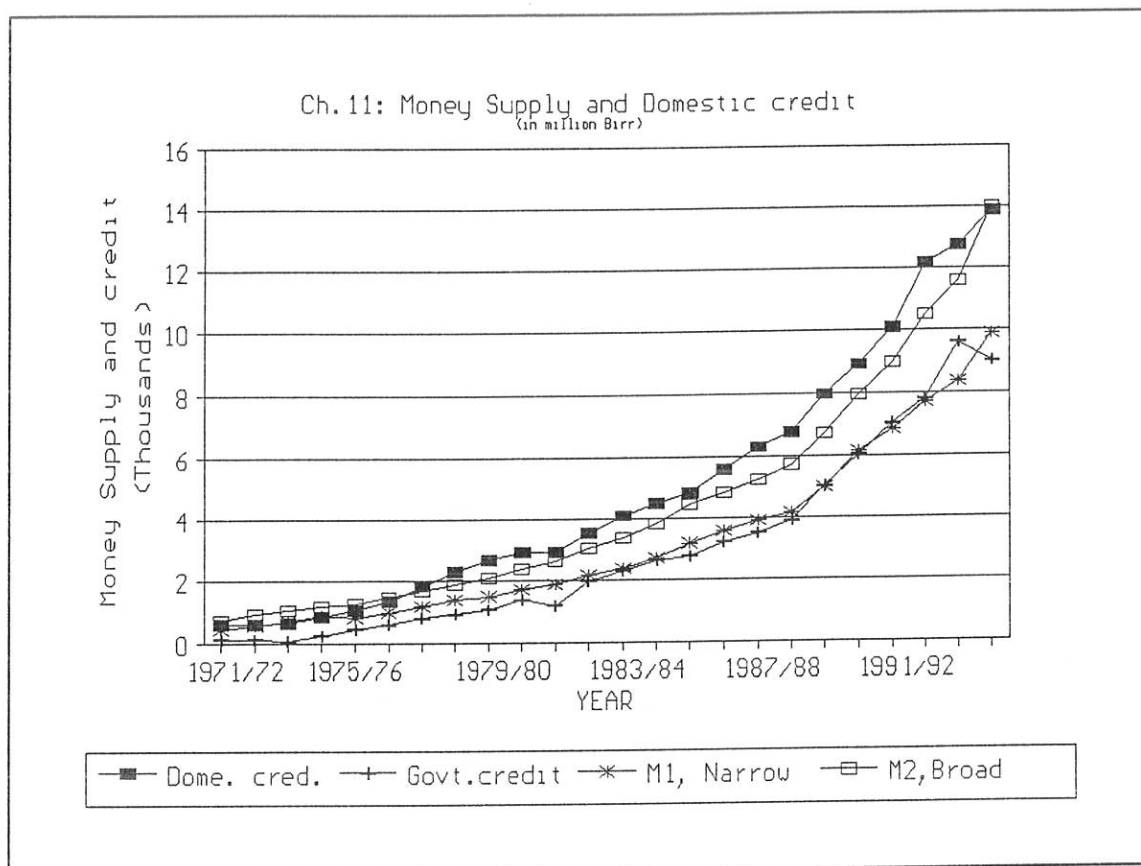
As shown in appendix 2.5 financing the budget deficit has two sources: domestic and external. Considering the years 1975//76, 1984/85, 1989/90 and 1994/95 for illustrative purposes, it can be seen that in 1975/76 and 1984/85 the overall deficit was financed from both foreign (external) and domestic sources taking a share of 34.3% and 65.7% and 45% and 54.8% respectively for each year. While external financing was as low as 25.24 percent in 1989/90, and 19.58 percent in 1990/91, domestic borrowing was as high as 74.7 percent and 80.4 percent respectively.

In contrast, the external financing of the deficit increased to 86.5 percent while domestic borrowing (net) dwindled to 13.5 percent in 1994/95. Domestic financing of the fiscal deficit as a ratio of GDP has declined since 1990/91 from 7 percent of GDP to -1.9 percent in 1995/96. In particular, recourse to domestic bank financing fell from about 6 percent of GDP in the early 1990s to about 3.3 percent in 1993/94 and turned out to be negative in 1994/95 and 1995/96.<sup>10</sup>

In times of increasing reliance on domestic banking system to finance the deficit, an expansion in the money supply is inevitable. As shown in chart 11, there was an increasing trend in domestic money supply over the period. Both narrow money supply ( $M_1$ ) and broad money ( $M_2$ ) expanded by 6 and 5 fold respectively from 1973/74 to 1988/89 and each grew by 2 fold in 1994/95 from their 1988/89 level. These rates of growth were much faster than the GDP. Moreover as can be seen from the figure there has been a close association between the expansion in domestic credit (largely dominated by government) and both broad and narrow money. In spite of these situations, however, quite high inflationary pressures that would have been expected have not occurred in the country.

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<sup>10</sup> These information is taken from: The World Bank, Ethiopia : An Economic Review, November, 1996.



## 2.6 Prices and Inflation

Table 2 shows both the average percentage change in retail price index and the annual rate of inflation for the period 1971/72-1994/95. The average change in retail price index grew from -3.1 percent during the period 1971/72-1973/74 to 83.9 percent during 1991/92-1994/95. In spite of significant fluctuations, the annual average change for the period 1971/72-1994/95 is 12.1 percent. This shows a general price increase in the economy as compared to the pre-revolution period. In parallel with this, the rate of inflation has been generally increasing and it was peaked in the years 1976/77, 1984/85, 1990/91 and 1991/92 with an inflation rate of 21.9%, 18.4%, 20.9% and 21.0% respectively. The average annual inflation rate for the period 1974/75-1990/91 (as measured by the Addis Ababa retail price index on a periodic average basis) was about 9 percent. In the period 1992/93-1994/95 the

average inflation rate was 8.5 percent. The average inflation rate for the period 1979/80-1988/89 was 5.1 percent lower than the 19 percent for Sub-Saharan Africa.

The low inflation could be explained partly by the tradition of tight monetary policy pursued by the National Bank of Ethiopia and the structure of money demand in a situation of financial repression and low level of monetization.

**Table 2**  
**Inflation rates and retail price index (percentage change periodic averages) (1963=100)**  
**1971/72-1994/95**

	Sub periods	A retail price index percentage period average.	Inflation rate periodic average
1	1971/72-1972/73	-3.05	-2.1
2	1973/74-1977/78	27.64	14.96
3	1978/79-1982/83	24.6	7.68
4	1983/84-1984/85	36.2	9.1
5	1985/86-1989/90	10.92	2.42
6	1990/91	110.3	20.9
7	1991/92-1994/95	83.9	11.4
8	1971/72-1994/95	12.10	2.68

**Source;** National Bank of Ethiopia Economic Planning & Research Department, 1996.



## CHAPTER 3

### LITERATURE REVIEW

#### 3.1 GROWTH THEORIES

On the subject of the analysis of economic growth, there have been many views beginning with Harrod-Domar model which occupied center stage in the late 1940s and early 1950s until the present 'new' growth theories. To date there are two interpretations of the relationships between accumulation and output growth (represented by aggregate production function): the neoclassical and the endogenous growth theories. To this may be added the structural view. Therefore the three major interpretations of economic growth which are worth mentioning are the following:

- (1) The neoclassical view;
- (2) Endogenous Growth Theory (including the new growth theory);
- (3) The Structural View (Models for Developing Countries).

##### 3.1.1 The Neoclassical view

In the neoclassical tradition, economic growth is the result of capital accumulation, increase in labor quantity and quality, increase in intermediate inputs and the overall growth of total productivity within sectors of an economy. Their models generate long-term growth relying on exogenous changes in technology or population. Underlying their specification are several systematic assumptions. The overall economy is assumed to be characterized by perfect competition and economic growth will reach the optimum if all the chief factors of production are engaged in full, which is only possible under conditions of free competition (Chenery (1986), p.15). In production, factor returns are assumed to equal their marginal productivity in all uses implying that at any given point in time, it is not possible to increase aggregate

output by shifting labor and capital from one sector to another. As a result, there is limited scope for sectoral dis-aggregation aimed at improving efficiency. Furthermore, technology is assumed to be characterized by constant returns to scale.

This approach is based on the assumption that as physical and human capital are accumulated, their incremental contribution to output diminishes. The implication this provides is that poor economies with smaller endowments of physical and human capital per worker, will grow faster than rich economies for the same level of investment in physical and human factors. As a result of this per capita income will converge to roughly equal levels.

Further development in this view is about total factor productivity (the rate of technological progress, (TFP)), which refers to that substantial amount of growth that remained unexplained after factor earnings (wage rates, returns per unit of capital, etc.), is used as measures of the contributions of productive factors to the process of economic growth. The neoclassical view assumes this "residual" (TFP) to be exogenous to the system of aggregate production function. This takes us to the analysis by Solow (1956) who developed a growth accounting framework.

Solow found that technological progress accounts for most of the growth of output per person, while accumulation of capital and changes in participation rate play only a minor role. Moreover, since labor participation rate can only increase for a while, and higher growth in capital than in labor will lead to diminishing returns to capital, technological progress is implied to be the only possible way for an economy to achieve a sustained rate of growth of output per person in the long run.

### 3.1.1.1 The Neoclassical Growth Models (Equilibrium growth)<sup>6</sup>

Considerations of the different neoclassical models give evidence on the common assumptions in the total factor productivity.

(a) **Solow (1956) and Swan (1956):** specified the first neoclassical model of long-run growth. Under the neoclassical general assumptions mentioned in the previous section, their starting point is a standard production function with constant returns to scale specified as:

$$Y_t = A_t F(K_t, L_t) \dots \dots \dots (3.1)$$

Where  $A_t$  is the exogenous technology parameter,  $Y_t$  is output, and  $F(\cdot)$  is the constant returns technology with labor  $L$  and capital  $K$  as factor inputs. Here, technology is 'Hicks neutral' (or output augmenting). This implies that technological progress does not affect the marginal rate of substitution between the factor inputs.

(b) **Harrod neutral (or labor augmenting) production function:-** is a widely used specification of the production function when analyzing the growth process of labor-augmenting or Harrod-neutral technology. Harrod defines an innovation as neutral (Harrod neutral) if the relative input shares,  $K.K_K/L.F_L$  remain unchanged for a given capital/output ratio. The production function is in the form:

$$Y = F[K, L \cdot A(t)] \dots \dots \dots (3.2)$$

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<sup>6</sup> This discussion is from Barro and, Xavier (1995), pp.14-36.

where  $A(t)$  is an index of the technology, and  $A'(t) \geq 0$ . This function is called labor augmenting technological progress because it raises output in the same way as an increase in the stock of labor.

**(c) The Solow-Swan model with Labor-Augmenting technological Progress:-**

Assuming now that the production function includes labor-augmenting technological progress as shown in Equation (3.2), and the technological term,  $A(t)$ , grows at the constant rate  $x$ , (engines of growth here are technical shocks and growth of labor force), the condition for the change in capital stock using the Solow model can be written as:

$$K' = s \cdot f(K) - (n+x+\delta)k \dots \dots \dots (3.3)$$

where  $K'$  is change in capital-labor ratio over time (i.e, the time derivative of  $K$ ),  $s$  the saving rate assumed to be constant,  $k$  capital labor ratio,  $n$  is the growth rate of labor,  $x$  the rate of technological progress,  $\delta$  is the rate of depreciation, and  $f(.)$  is the modified production function. The term  $s \cdot f(K)$  denotes the savings per efficiency laborer,  $(n+x+\delta)k$  represents the effective depreciation rate for  $k$ . If the saving rate,  $s$ , were zero, then  $K'$  would decline partly due to depreciation of  $k$  at the rate  $\delta$  and partly due to growth of labor force at the rate  $x+n$ .

Therefore, according to the neoclassical model, the economy always attains its steady state growth path. Since at the steady-state growth rate  $K'$  is zero, equilibrium prevails.

When  $K'=0$ , it implies that:

$$sf(K) = (n+x+\delta)k \dots\dots\dots (3.4)$$

Since in steady state  $K$  which is  $K/EL$  ( $EL$  efficiency labor) is constant the capital stock ( $K$ ), consumption ( $C$ ) and output  $Y$  must grow at the rate  $n+x$ , that is, the sum of population growth and technological change.

That is:

$$\frac{dY_t}{Y_t} = (n+x) \dots\dots\dots (3.5)$$

$$\frac{dK_t}{K_t} = (n+x) \dots\dots\dots (3.6)$$

The Solow model thus predicts that:

- (1) Economic growth is solely a result of population growth rate ( $n$ ) and the rate of technological progress  $x$ . This result is clear from equation (3.5) above.
- (2) Changes in the savings rate of an economy only have a temporary effect on growth. The central argument presented by the classical economics is that once the economy adjusts to the new lower level of capital it resumes its former steady-state rate of growth and changes in the savings rate only have temporary growth spurt. Thus growth would not be sustained indefinitely due to diminishing returns to capital.
- (3) A rise in population growth rate  $n$  lowers per-capita income because given an economy's fixed savings rate, higher population growth is likely to dilute capital resources. Thus from this prediction it follows that economies with high population

growth rates and lower savings rates will be poorer than countries with low population growth rates and high savings rates.

### **3.1.2 Endogenous growth theory**

The special feature of these models is that they do not rely on exogenous changes in technology or population since these factors are endogenous to the models. Their general feature is the presence of constant or increasing (non decreasing) returns in the factors (Lucas 1988; Romer 1989; Rebelo 1991). This model has gone beyond Solow's argument of growth. Moreover, in the newer endogenous growth theories, the total factor productivity (TFP) growth ratio is generally attributed to the interaction between "ideas" and accumulation, which results in increasing returns to scale to physical and human capital (Romer 1986). Scale economies, and Research and Development are also stressed in the new growth theories. Under this school, total productivity is related to economic factors like Research and Development, investment and trade. This results in an endogenous total factor productivity.

The implication of this theory to developing countries is that it urges to place more emphasis on human capital, and emphasizes the benefit from the exchange of ideas that comes with an open economy integrated into the world economy.<sup>7</sup>

### **3.1.3 Structural View ( Growth Models of Developing Countries)<sup>8</sup>**

This view emanates from the assertion that while total factor productivity (TFP) growth in the industrial economies is largely a result of technology change, in low-and middle-income

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<sup>7</sup> see Romer (1986)

<sup>8</sup> The discussion here is from Chenery, Hollis (1986) Meier, Gerald M. (1995), pp.13-27 and pp.95-99 respectively.

economies most TFP change is a result of changes in technical efficiency ( World Bank (1993) , P.51). In looking at what changes technical efficiency , factor reallocation is considered as one factor. The structural approach assumes no perfect competition rather imperfect foresight, factor immobilities, and other structural bottlenecks that are often characteristic features of developing countries as causing conditions of disequilibrium in these countries. Therefore, growth can be achieved by reallocating labor and capital from less productive to more productive sectors of the economy.

"In the neoclassical tradition GNP rises as the result of the long-term effects of capital formation, labor force expansion, and technological change which are assumed to take place under condition of competitive equilibrium. Shifts in demand and the movement of resources from one sector to another are considered relatively unimportant because labor and capital produce equal marginal returns in all uses" (Chenery, 1986: 13).

As related to the sources of growth, the main objective in the neoclassical model has been to estimate the relative contributions of the growth of capital and labor inputs (corrected for quality changes) on the one hand and of total factor productivity on the other. Contrary, developing countries show more pronounced symptoms of disequilibrium in factor markets. As a result, "a shift of labor and capital from less productive to more productive sectors," that can accelerate growth, is likely to occur. Thus, in the structural model, disequilibrium aspects of growth are considered and econometric works tested their significance in explaining growth among countries. In this regard, many findings have suggested the importance of moving resources from lower-productive to higher productive uses. For example, expanding exports or turning from agriculture to industry can be important sources of growth in developing than in developed countries.

Economic growth is thus perceived as "an aspect of the transformation of the structure of production that is required to meet changing demands and to make more productive use of technology" (Chenery, 1986:31). It should be noted that this perception, apart from implicitly recognizing all neoclassical sources of growth, it makes an extension to take into account the

case when markets do not clear. Such extensions include the need to take into account internal and external bottlenecks, resource reallocation and the utilization of scale economies and the "learning by doing" aspects in production.

From the above discussion, the neoclassical production function has low explanatory power in explaining growth process in developing countries. This suggests a need for future extensions and further modifications of the neoclassical theory to incorporate such issues as process of transformation<sup>9</sup>, excess capacity, etc., which characterize most developing countries, where perfect competition is not the norm characterizing their economies and hence often resources are not allocated fully and optimally.

In the next section an attempt is made to review the empirical findings based on the above theories in order to identify the sources of growth. This would help as a starting point to the growth model to be developed for Ethiopia.

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<sup>9</sup> structural transformation of the developing economy refers to changes in the composition of demand, trade, production, and factor use that takes place as per capita income increases.

## 3.2 EMPIRICAL FINDINGS

### 3.2.1 Endogenous Growth Theories

Romer, Mankiw and Weil (1992), using a Cobb-Douglas production function that includes human capital, and which displays constant returns to scale estimated the following equation:

$$\ln\left(\frac{GDP}{L}\right) = \theta_0 + \theta_1 \ln(n+x+\delta) + \theta_2 \ln\left(\frac{I}{GDP}\right) + \theta_3 \ln(school) \dots \dots \dots 2.8)$$

where  $GDP/L$  = GDP per capita ,  $I/GDP$ = the share of investment in GDP,  $school$  = secondary school enrollment rate,  $n$ = population growth ,  $x$ = rate of technological progress  $\delta$ = rate of depreciation, and "ln" is logarithm, using ordinary least squares (OLS) on pooled cross section data for a number of developed and developing countries. The estimation results strongly supporting the augmented Solow model, have shown a very important role for capital. Thus a country is richer the higher its savings rate and the lower its population growth rate.

Mankiew, Romer and Weil (1992) also examined whether the Solow growth model is consistent with the international variations in the standard of living. In their model, output is produced from physical capital, human capital and labor, and is used for investment in physical capital, investment in human capital and consumption. The results strongly support the augmented Solow model and implies that the elasticity of income with respect to the stock of physical capital is not substantially different from capital's share in income; second, despite the absence of externalities, the accumulation of physical capital has a larger impact on income per capita than the Solow model predicts, third a higher saving rate leads to a higher income in steady state, and this in turn leads to a higher level of human capital, fourth

, population growth has a larger impact on income per capita than Solow model indicates.

Kormendi and Meguire (1985) presented an explanatory empirical evidence bearing on a set of macroeconomic factors that may affect economic growth based on certain macroeconomic hypotheses across a sample of forty-seven countries. The basic results obtained indicated that economic growth is positively related to the rate of growth of population and negatively related to real income per capita for the first year of each country's sample period (a factor of initial condition). Likewise in Barro's (1976,1980) work, an important negative effect of monetary variance on economic growth is found. Moreover, a weak evidence is observed on the assertion that countries that become increasingly open experience greater economic growth. While Tobin-Mundel's hypothesis on a positive effect of inflation is rejected due to lack of evidence, a negative relation as predicted by Stockman (1981) is found

Barro (1991) using the recent theories of economic growth as a guide, revealed some empirical findings about growth, fertility, and investment for 98 countries, during the period 1960-1985. His findings suggest that for a given starting value of per capita GDP, a country's subsequent growth rate is positively related to measures of initial human capital (proxied by school enrollment rates). Moreover, given the human-capital variables, subsequent growth is substantially negatively related to the initial level of per capita GDP. Thus, poor countries tend to catch up with rich countries if the poor countries have high human capital per person (in relation to their level of per capita GDP), but not otherwise. In relation to per capita growth and fertility, countries with high human capital have low fertility rates and high ratios of physical investment to GDP. Growth is also found to be inversely related to the share of government consumption in GDP since government consumption may introduce distortions, through high tax rates, without an off setting stimulus to investment and growth. On the other hand, growth is related insignificantly to the share of public investment. Despite inverse relation between growth and market distortions, growth is found to be related positively to measures of political stability.



### 3.2.2 Structural View (models for developing countries)

Chenery (1986) in analyzing the sources of growth for a sample of economies has developed a model that shows the contribution of the total factor productivity<sup>10</sup> growth to output growth. He found out that low and middle income-economies have a relatively small contribution of TFP growth to total output contrary to high economies that derived about 30-50 percent of their total output growth from TFP growth.

Landau, D. (1986) disaggregated government expenditure while holding other determinants of economic growth constant. He found out that general government consumption has a negative and significant influence on economic growth. Moreover, he showed that government investment has a weak positive impact on growth, and an almost zero impact in cases where taxation and borrowing to finance such investment, and the crowding out of private investment, are considered.

Otani and Villanueva (1990) examined the growth performance of developing countries using a sample of 55 developing countries with 13 from Africa, 12 from Asia, 6 from the Middle East, and 18 from the Western Hemisphere using the long run growth rate specification of the form:

$$g' - n = f(s, hc, r, x', n)$$

where  $(g' - n)$  denotes the growth rate of per capita real output,  $s$  is the domestic saving ratio,  $hc$  = the budgetary share of expenditures on human capital,  $r$  = the cost of external borrowing in real terms,  $x'$  = the growth rate of exports in real terms, and  $n$  = the growth rate of population.

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<sup>10</sup>these refers to increases in productivity that can not be accounted for by measured increases in inputs.

The main findings of the authors are: first, the significance of human capital in influencing the economic growth of developing countries particularly those saddled with a big external debt burden; second, a sustained increase in the aggregate domestic saving rate is found to be crucial to growth oriented adjustment efforts pointing to the need for mobilization of domestic savings which would greatly facilitate the growth potential of developing countries; third, the effect of population growth rate on per capita income growth was highly significant and negative; fourth, the real interest rate on external debt had the right sign (negative) indicating that a general reduction in the world market interest rate and risk premium will contribute to realization of growth potentials. The model contributes to the understanding of the growth process in developing countries with an implication for the design of structural policies at macro level and highlights the need to extend the model by including inflation and intermediate inputs.

Ghura and Michael (1995) have investigated empirically the determinants of economic growth for a large sample of sub-Saharan African countries during the period 1981-92. The results have shown:

"evidence of conditional convergence of per capita income, positive and significant impact of private investment on growth, positive effect of increases in government investment ratio on growth and significant adverse effects of drought and deteriorations in the terms of trade. Moreover, the study reveals that growth is stimulated by public policies that lower the budget deficit in relation to GDP (with out reducing government investment), reduce the rate of inflation, maintain external competitiveness, promote structural reforms, encourage human capital development, and slow population growth" (p.20)

Thus, it has been recommended that notwithstanding the significant effects of exogenous factor, growth in the region can be enhanced by policies that encourage macro economic stability, remove tax and other price distortions, and alleviate the impediments to private sector development through structural reforms.

Quarcoo (1990) related trade performance to overall economic activity on the presumption that export performance affects economic growth directly and indirectly through improvement in the balance of payments that would increase the foreign assets of the banking system. To test this effects in Ghana for a sample period 1967-83 he used a consolidated balance sheet of the monetary system that links trade performance to overall economic activity.<sup>11</sup> The result shows that exports acted as an engine of growth to the country during the liberal regime (1950-57).

In a similar way, Fosu (1990) examined whether export growth favorably affects the rate of economic growth in Africa like in other Less Developed Countries (LDCs). His findings suggested a positive and significant impact of export growth on economic growth. The implication is that African countries would benefit similarly from the impacts of exports on economic growth as do other LDCs notwithstanding the former's relative reliance on agricultural exports.

Nalo (1993) examined the role of savings and investment in the economic growth of developing economies and suggested that the ability of an economy to transform domestic savings (personal, private and government) into additional income through capital accumulation is crucial to growth. He also noted the importance of foreign capital not only when domestic savings are not forthcoming but also for investible capital which cannot be produced locally.

Ohhawa (1993) has attempted to present an overview of the growth mechanism of contemporary developing economies focusing on the aspects of investment , productivity and

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<sup>11</sup>MQ= MQ(GDP,PGDP,PDGP(-1),DC,DC(-1),MQ(-1))

NFAD= NFAD(BOP, MQ, MQ(-))

\*NFA+DC=M<sub>2</sub>+OIN

Where MQ= Real Balance, GDP= Real Gross Domestic Product,NFA=Net Foreign Asset of the Banking System, BOP Balance of Payment, OIN= Other items, DC Domestic Credit, PGDP implicit price deflator index (1980=1)

employment, and using a sectoral approach to analyze the relationship between productivity growth and employment performance in major sectors namely agriculture, industry, and services based on the following assumptions:

(1) the more labour-absorbing an industry is the more its contribution to enhancing productivity growth in agriculture since it may weaken underemployment pressure there.

(2) productivity growth in agriculture can not be achieved without a sustained decrease in the labour force engaged in the sector.

Based on these, a sectoral comparison was undertaken on a sample of grouped countries. The findings showed: first, differences in productivity growth between agriculture and non-agricultural sectors. In this regard, the growth rate in agriculture was higher than in non-agriculture due to technological progress in agriculture and the productivity performance of services. Second, comparing agriculture and industry, for all the groups considered but one, productivity growth in industry was found to be sustained at a slightly higher rate than agriculture; and the same pattern is perceived for developing countries.

The implications derived from the analysis indicate that industrialization is a driving force in economic development. This emanates from its function in aggregate growth by contributing to productivity growth and labour employment reallocation (changes in production structure). Moreover, since without a shift from one phase to another<sup>12</sup> no development is possible in the long term, an accelerated growth in productivity first in agriculture and second in industry is required. For this to occur upgrading the level of the developing country's capability (in

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<sup>12</sup>There are two development phases which are characteristics of developing countries. These are the primary phase which is characterized by the sustained negative performance of agricultural productivity growth in terms of its contribution to aggregate productivity growth and the secondary phase featured by an accelerated path of industrialization that is accompanied by a sustained positive contribution of agriculture to aggregate growth (here the contribution of industry continues to increase relative to services during this phase).

order to realize the advantage of borrowed technology appropriate to each phase) is very important.

Block (1996), based on the conceptual support that agriculture plays a central role in African economic growth, has developed a two-sector numerical simulation model that captures both the direct and indirect contributions of agriculture to economic growth in Kenya. While the direct effects arise from agriculture's share in GDP its indirect contributions arise via sectoral linkages in supplying inputs to domestic industry, source of demand for domestic industrial output, foreign exchange generation and agricultural income growth and a source of capital investment. The model demonstrates that the agricultural growth multiplier in Kenya is approximately two and half of the magnitude of non-agricultural growth multiplier.

Robinson, S. (1971), has examined the sources of growth using an extended aggregate production function that includes the role of structural change and foreign exchange inflows. The empirical results suggested that compared to the United States and North-West Europe, capital investment is a more important source of growth in the sample of less developed countries. The contribution of factor transfers to the non agricultural sector is found to be more important in the less developed countries, which probably reflects a widespread of productivity between sectors and also greater structural disequilibrium in the factor markets in these countries. Furthermore, the results support the view that foreign exchange is a scarce factor limiting growth.

Similarly, Feder (1982) analyzed the sources of growth in the period 1964-1973 for a group of semi-industrialized less developed countries. It was shown that good export sector performance, apart from its direct contribution to volume of exports, contributes to GDP growth through capacity utilization, economies of scale, incentives for technological improvements and efficient management. The implication of the latter effect is that marginal factor productivities are not equal in the export and non export sectors of the economy such

that the former has higher factor productivity. It follows that countries which have adapted policies less biased against exports benefit from closer-to-optimal resource allocation and higher growth.

Furthermore, Tyler's (1980) analysis of the empirical relationship between economic growth and export expansion in developing countries revealed a significant positive association between growth and various other economic variables including the growth of manufacturing output, investment, and total exports. The production function model also indicated export performance along with capital formation as important in explaining the inter country variance in GDP growth rates.

In order to assess the impact of macroeconomic policies on the long term performance of developing countries, Otani and Villanueva (1989), had developed a model that emphasizes expenditures on the improvement of human capital and the dynamics of external debt. The contributing factors of long-term economic performance are found to include : domestic savings, export performance, the rate of expenditures on human capital, the cost of capital and the rate of the population growth.

### **3.3 Studies in Ethiopia**

There have not been studies that deal with the determinants of growth in Ethiopia. However, Asmerom (1991) carried out a study on economic-demographic interactions using an economic-demographic model that includes traditional and modern sectors, with each sector having economic and demographic sub-models. The study revealed improvement in productivity and reduction of the fertility rate as important factors for higher per capita GDP.

### 3.4. Some Lessons to be learnt

Most of the work used cross sectional data and the following can be learned from the above reviews:

- (1) Export growth significantly contributes to growth in developing countries.
- (2) Integration in the world economy to exploit scale economies helps to achieve higher levels of growth but issues like diversification needs further considerations.
- (3) Domestic saving, growth of capital stock, and investment are important factors for economic growth.
- (4) Human capital (e.g labor force quality through education) contributes positively to growth.
- (5) Foreign Capital plays an important role to economic growth.
- (6) Though agriculture has hardly contributed fully its potential to economic growth in Less Developed Countries (LDC), economic performance in these countries is primarily related to the performance of this sector.

Finally, though the work on both the theoretical and empirical fronts to date give useful insights on the growth-macro economic policies nexus, it has not yet produced a general framework for definite policy prescriptions. Hence, relying on partial results becomes imperative for limited and directed research on the effects of specific policies on growth.

## CHAPTER 4

### DATA AND METHODOLOGY

#### 4.1 Data

Most of the data are from recently revised national accounts made available by the Ministry of Economic Development and Cooperation (MEDaC). Other sources include the publications of the Ministry of Finance, National Bank of Ethiopia, and Central Statistical Authority. The data set includes: gross fixed capital formation (investment), primary and secondary school enrollment rates as a measure of human capital, population, working age population, and other conventional and policy related variables. The data cover the period 1967/68-1994/95. A brief description of the variables and techniques of arriving at real values are summarized in appendix 5.1.

Though studies of this nature are mostly using cross sectional data (due to quite a number of diversified data required for country specific studies), country specific time series data would help to identify country specific problems, study the effects of policies, and provide a foundation for inter country comparisons. In addition, since most of the macroeconomic variables vary over time they may have an impact up on changes in per capita GDP. Hence looking at these effects through time series analysis becomes helpful.

Because of data constraints it has been attempted to proxy the variables relevant to the growth model by those which are observable. For instance, instead of share of physical capital stocks in GDP gross investment growth rates are used as a proxy<sup>13</sup>. In addition, human capital has been proxied by primary and secondary school enrollment rates. Data on labor force are not usually available and hence population is used as a proxy.

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<sup>13</sup> The country's data for investment is not the appropriate one due to measurement errors.

Periods of unfavorable weather conditions, political instability, favorable government policies and structural reform measures are taken care of using different dummies.

The data for the growth rates of the variables used in this study have been generated using the following:

$$GRX = \frac{X_t - X_{t-1}}{X_{t-1}}$$

where

GRX = the growth rate of the variable X

$X_t$  = current data point, and  $X_{t-1}$  lagged data point.

#### 4.2 Statistical Methods and Time series Issues

$R^2$  and t- statistics are of help to test the equation and the significance of the coefficients. Moreover, the residuals of the regression equations are tested for any systematic influence of omitted variables. Since examining the equation from the point of view of serial correlation is required, Lagrange Multiplier test (LM-test) is utilized. In order to test significant "bias" in the estimates due to " omitted variables", the specification Reset test is used.

Apart from the usual statistics that are employed to test the model and the significance of the coefficients, time series analysis is carried out.

Many of the variables that one encounters in economics are non-stationary in the sense that the mean and variance depend on time. Working with such variables in their levels will give

a high likelihood for spurious regression results and invalid inferences.<sup>14</sup>

Although it may be difficult to model non stationary processes, it can be transformed into stationary or approximately stationary processes. To undertake this, a brief review of some concepts becomes important.

### Stationary Series and Integrated Processes

A time series  $y_t$  is said to be stationary if its mean, variance and autocovariances are independent of time and

$$E(y_t) = \mu$$

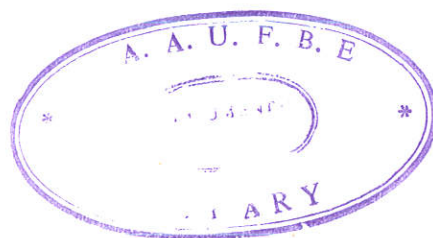
$$\text{Var}(y_t) = \sigma^2$$

$$\text{Cov}(y_t, y_{t-j}) = \sigma_j$$

If one or more of the above conditions fail, the process  $y_t$  is said to be non stationary.<sup>15</sup> A time series  $y_t$  which is itself non stationary but becomes stationary after differencing: i.e.,

$$\Delta y_t = y_t - y_{t-1} = e_t$$

and that  $e_t$  defines a stationary process is said to be integrated of order one, denoted as I(1). A series that is stationary, so that differencing is not required is integrated of order zero, denoted I(0). Similarly, a non stationary series which can be transformed to stationarity by differencing it 'n' times is said to be integrated of order 'n', (Rao, 1994:p.54).



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<sup>14</sup> See Pindyck and Daniel, pp. 443-444

<sup>15</sup> See Rao, Bhashara (1994), p.49.

## Testing for the Order of Integration

Dickey and Fuller (1981) present a simple method for testing the order of integration based on the unit root test. This method proceeds as follows:

$H_0$ : (null hypothesis): the variable is a random walk (non-stationary with drift or without drift)

$H_A$  : the variable is stationary

Based on OLS estimation the reported t-statistics are compared with the critical values obtained by computer simulation.

## Cointegration

Cointegration, developed in Granger (1981) and elaborated in Engle and Granger (1987), addresses the issue of integrating short run dynamics with long run equilibrium. It refers to a situation of a long-run equilibrium relationship between variables that do not drift too far apart over time. In two variables  $X$  and  $Y$  this occurs if:

- (a) both  $X_t$  and  $Y_t$  are integrated of order  $d$ ; and
- (b) there exists a linear combination of  $X_t$  and  $Y_t$  which is integrated of order  $d-b$ .

In multivariate case, cointegration is possible when (respectively):

- (a) the two variables are integrated of the same order.
- (b) the order of integration of the dependent variable is not greater than the order of integration of any of the explanatory variables. In addition, there should exist "either none or at least two explanatory variables integrated to an identical order higher than that of the

dependent variable<sup>16</sup>.

### Test for Cointegration

In order to verify long-run relationships between the dependent variable and regressors unit root tests (both DF and ADF) on the residual ( $e_t$ ) are carried out in a similar hypothesis outlined earlier. Both the dependent variable and regressors are not cointegrated if  $e_t$  has a unit root vis-a-vis the alternative that refers to cointegration.

### The Error Correction Mechanism (ECM)

Since economic theory is usually concerned with the relationship between variables, differencing a series has to be dealt with in the context of regression model rather than separately. An Error Correction Mechanism provides a room for considering both short run and long run factors while modelling differenced series. This takes the form:

$$\Delta Y_t = r\Delta X_t + \alpha (Y - \beta X)_{t-1} + U_t$$

for short run relationship. It relates the change in Y to changes in X and  $e_{t-1} (= Y - \beta X)_{t-1}$ . The coefficient  $\alpha$  shows the degree of adjustment of the dependent variable to its long run solution. While  $\alpha$  is expected to be negative and less than unity, it functions to influence the short run movements in the dependent variable.

Besides these, other methods include test for structural break problem, multicollinearity and autocorrelation. In the former case, the Cumulative Sums (CUSUM) and Cumulative Sums

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<sup>16</sup> See Deadman, (1992)

Square (CUSUM SQ) tests are used. The Cochrane-Orcutt iterative procedure and a correlation matrix which are readily available in computer statistical packages (MFIT 286) are used to correct for autocorrelation and multicollinearity problems.

### 4.3 Methodology

Following those several studies of economic growth outlined earlier we can use the basic growth accounting (neoclassical ) model that is derived from an aggregate production function of the form:

$$Y = A(K, L) \dots \dots \dots (4.0)$$

with all the neoclassical assumptions.

#### 4.3.1 Model Specification<sup>17</sup>

Following Solow (1957) the objective of growth accounting is to dis-aggregate output to its contributors (factor inputs) and technology.

The standard neoclassical production function is:

$$Y = A F(K, L) \dots \dots \dots (4.1.1)$$

where A is an index of technology (called total factor productivity or TFP), K is capital, and L is Labor. Multiplying and dividing terms in brackets by K and L respectively, and Taking logarithms of both sides and time derivatives gives:

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<sup>17</sup> This specification follows the approach by Barro (1995,p 346); Chenery (1986); and the World Bank (1993, p.63-69).

$$\frac{Y'}{Y} = \frac{A'}{A} + \left(\frac{AF_K}{Y}\right) K' + \left(\frac{AF_L}{Y}\right) L'$$

$$\frac{Y'}{Y} = \frac{A'}{A} + \left(\frac{AF_k k}{Y}\right) \frac{K'}{K} + \left(\frac{AF_L L}{Y}\right) \left(\frac{L'}{L}\right) \dots \dots \dots (4.1.2)$$

If factor markets are competitive

$AF_k$  = rental payment of capital = R

$AF_L$  = wage rate = w

So,  $\frac{AF_k k}{Y}$  &  $\frac{AF_L L}{Y}$  are, rental

share of capital and wage payment share in total income, respectively.

Hence,

$$\frac{Y'}{Y} = \frac{A'}{A} + R \frac{K'}{K} + W \frac{L'}{L} \dots \dots \dots (4.1.3)$$

$$\frac{Y'}{Y} = Y_g, \frac{A'}{A} = A_g, R = \alpha_k, W = \alpha_L, \frac{K'}{K} = K_g, \frac{L'}{L} = L_g$$

Thus:

$$Y_g = A_g + \alpha_k K_g + \alpha_L L_g \dots \dots \dots (4.1.4)$$

This is used as a growth equation.

where:  $Y_g$  = growth rate of aggregate output;



$A_g$  = the growth rate of total factor productivity (TFP);

$K_g$  = the growth rate of capital ; and

$L_g$  = the growth rate of labor.

Regressing log per capita GDP growth on the factors of production; the growth in TFP(log) is given as :

$$A_g = Y_g - (\alpha_k K_g + \alpha_l L_g) \dots \dots (4.2)$$

Here,  $\alpha_k$  and  $\alpha_l$  measure the effect on output growth of a one percent increase in growth of inputs K and L respectively. Under constant returns assumption  $\alpha_k + \alpha_l = 1$ ; and  $A_g$  is the residual of growth of GDP after deducting the contributions of labor and physical capital.

Furthermore, equation 4.1.4 can be expressed as :

$$Y_g = A_g + \alpha K_g + (1 - \alpha) L_g \dots (4.3)$$

Where  $\alpha$  is the share of capital output and other variables as explained earlier.

#### 4.3.2 Extending the Model<sup>18</sup>

While the neoclassical growth model specified in 4.1.4 contributes as a foundation, the alternative model to be used is the one extended by Mankiew, Romer and Weil (MRW) to encompass investment in human capital. This assumes an aggregate production function of the form:

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<sup>18</sup>the discussion in Cohen and Hammour (1994), p.2 is utilized here.

$$Y_t = A_t K_t^\alpha (H_t)^\beta (L_t)^{1-\alpha-\beta} \dots (4.4)$$

where  $Y_t$  is output,  $K_t$  and  $H_t$  are physical and human capital respectively,  $L_t$  is raw labor input, and  $A_t$  is the exogenously determined level of aggregate productivity (all at time  $t$ ).

Taking log differences the relationship for long term growth can be specified as:

$$(\log Y_t - \log Y_{t-1}) = (\log A_t - \log A_{t-1}) + \alpha (\log K_t - \log K_{t-1}) + \dots$$

$$(1-\alpha-\beta) (\log L_t - \log L_{t-1}) + \beta (\log H_t - \log H_{t-1}) + \log U_t - \log U_{t-1} \dots (4.4.1)$$

Endogenous growth models allow a linkage between public policies and growth in the long run by assuming aggregate production functions that exhibit non-decreasing returns to scale. Replacing the log difference in human capital alternatively by an average school enrollment rates, and public expenditures in education, we extend the growth model in (4.4.1) where  $Y$  is expressed as real per capita GDP growth (log difference) to include policy and structural variables as regressors.

Thus the model for the empirical analysis is represented as follows:

$$\begin{aligned} GRYPC = & \alpha_0 + \alpha_1 \ln GRPOP + \alpha_2 \ln GIY + \alpha_3 H_c + \alpha_4 INFR + \alpha_5 \ln GRM2 + \alpha_6 XG + \alpha_7 PCREE + \\ & + \alpha_8 PCWANAL + \alpha_9 \ln RAGY + \alpha_{10} SRTB + \alpha_{11} \ln RGCS + PCRFL + DWP2 + TI + U \dots (4.5) \end{aligned}$$

where GRYPC is per capita real GDP growth rate; GRPOP is growth rate of population; GIY is the growth in capital formation (a proxy for capital stock);  $H_c$  is an indicator of human capital development, measured alternatively by primary and secondary enrollment rates and public expenditures on education share in GDP (GEDE); INFR is the rate of inflation; XG is the real export growth (in volume terms); PCREE is percentage change in real effective exchange rate; PCWANAL is the percentage change in working age non-agricultural labor

force; PCRFLI percentage change in rainfall using adjacent years; SRTB share of real trade balance in real GDP (this is calculated by computing real imports and real export, and real import less export is expressed as the share of real GDP) ; RAGY is the ratio of real agricultural GDP to real GDP; "ln", represents logarithm; DWP2 is dummy for political instability, BOP difficulties, change of government and war situations; TI is a time trend,  $\alpha_0$  and U are constant and an error term respectively<sup>19</sup>.

Moreover, the intersectoral linkages between export sector and non agricultural sector and their overall contribution to economic growth is identified using the following equations<sup>20</sup>.

$$\frac{Y'}{Y} = \alpha_0 + \alpha_1 I' + \beta \left( \frac{P'}{P} \right) + \gamma \left( \left( \frac{X'}{X} \right) \left( \frac{X}{Y} \right) \right) + PCRFLI + U. . (4.6)$$

where Y/Y' is per capita GDP growth; I' is growth of capital formation; P'/P is growth of population (a proxy for growth of labor force); X'/X is growth of real exports; X/Y is the share of real exports in GDP; and PCRFLI is the percentage change in rainfall index.

The hypothesis that marginal productivity in the export sector (agricultural sector) is higher and exports generate beneficial externalities suggests that the parameter  $\gamma$  should be positive and significantly different from zero.

It is expected that  $\alpha$  the marginal productivity of capital in the non-export sector, would be positive. The parameter  $\beta$  related to labor growth in the absence of surplus labor should be significantly different from zero.

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<sup>19</sup> More description of the variables and ways of calculating real values is found in appendix 5.1.

<sup>20</sup> see Appendix 4.2 for the derivations and Feder (1982).

If  $\gamma$  is significantly positive an attempt will be made to identify the specific inter-sectoral externality effect by adopting a plausible specification taking the form :

$$\frac{Y'}{Y} = \alpha_0 + \alpha_1 I' + \beta \frac{P'}{P} + \left( \frac{\delta}{1+\delta} - \theta \right) \frac{X'}{X} \frac{X}{Y} + \theta \frac{X'}{X} + PCRFL + U. \quad (4.7)$$

where  $\delta/(1+\delta)$  is the extent of marginal productivity difference across the sectors and  $\theta$  is related to intra-sector externalities. From the parameter  $\theta$  and the parameter associated with  $(X'/X)(X/Y)$  the component of productivity differential  $\delta$  would be calculated.<sup>21</sup>

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<sup>21</sup> The same procedure will be used to test the alternative hypotheses that other sector of the economy such as the government sector contribute to the overall economic growth. In this case,  $\gamma$  becomes the coefficient of  $G \cdot RGCS$  where  $G$  is the growth rate of government consumption, and  $RGCS$  is the share of real government consumption in real GDP.

## CHAPTER 5

### GROWTH DETERMINANTS

#### 5.2 Economic Growth Determinants of Ethiopia

##### 5.2.1 Stationary Tests

In table 5.1 the stationary tests of the variables are reported. While variables such as GIY, PCWANAL, RGCS, X/Y, INFR, GEDE, RAGY, SRTB, PRMJEN, and SECEN are non stationary; GRYPC, GRPOP, XG, XX, GG, PCRFL, and GRM2 are stationary.

**TABLE 5.1**  
**STATIONARY TESTS OF THE VARIABLES**

Variables	DF-Test		ADF-Test	
	With out trend	With trend	Without Trend	With trend
GRYPC	-5.0565 (-2.9798)	-4.9802 (-3.5943)	-3.7866 (-2.9880)	-3.7557 (-3.6027)
GIY	-5.8386 (-2.9798)	-5.7733 (-3.5943)	-2.9665 (-2.9850)	-2.9216 (-3.6027)
RAGY(-1)	-3.0370 (-2.9798)	-2.9924 (-3.5943)	-2.2008 (-2.9850)	-2.1430 (-3.6027)
GRPOP	-5.0255 (-2.9798)	-5.0253 (-3.5943)	-3.8187 (-2.9850)	-3.7800 (-3.6027)
PCWANAL	-5.2533 (-2.9750)	-5.1477 (-3.5867)	-3.3888 (-2.9798)	-3.3143 (-3.5943)
RGCS	-1.8094 (-2.9750)	-1.9164 (-3.5867)	-1.9267 (-2.9798)	-2.0605 (-3.5943)
XG	-6.6275 (-2.9798)	-6.4780 (-3.5943)	-4.1520 (-2.9850)	-4.0448 (-3.6027)
X/Y	-1.6302 (-2.9750)	-3.3177 (-3.58.67)	-1.5967 (-2.9798)	-2.4125 (-3.5943)
XX	-6.7347 (-2.9798)	-6.7461 (-3.5943)	-4.0565 (-2.9850)	-4.1506 (-3.6027)
GG	-4.3514 (-2.9798)	-4.3895 (-3.5943)	-3.8494 (-2.9850)	-3.9170 (-3.6027)
INFR	-3.4931 (-2.9750)	-3.4699 (-3.5867)	-3.3509 (-2.9798)	-3.3053 (-3.5943)
GEDE	0.73426 (-2.9750)	-0.096685 (-3.5867)	-0.23856 (-2.9798)	-1.3037 (-3.5943)
RAGY	-3.0222 (-2.9750)	-2.9577 (-3.5867)	-2.1758 (-2.9798)	-2.1013 (-3.5943)
SRTB	-0.52785 (-2.9750)	-1.7859 (-3.5867)	-0.66297 (-2.9798)	-2.0171 (-3.5943)
PCRFL	-6.9083 (-2.9798)	-6.7654 (-3.5943)	-5.1486 (-2.9850)	-5.0311 (-3.6027)
ROER	-1.3963 (-2.9750)	-1.3062 (-3.5867)	0.12949 (-2.9798)	0.87104 (-3.5943)
PCREE	-8.4785 (-2.9750)	-10.0364 (-3.5867)	-3.2746 (-2.9798)	-4.7097 (-3.5943)
GRYACF	-8.0778 (-2.9798)	-8.0140 (-3.5943)	-4.9300 (-2.9850)	-4.9425 (-3.6027)
PRMJEN	-1.9122 (-2.9750)	-1.1104 (-3.5867)	-2.0586 (-2.9798)	-1.6208 (-3.5943)
SECEN	-1.5280 (-2.9750)	-0.26694 (-3.5867)	-1.7500 (-2.9798)	-1.2843 (-3.5943)
GRM2	-4.8796 (-2.9798)	-4.7683 (-3.5943)	-5.6428 (-2.9850)	-5.5722 (-3.6027)
RYPC	-0.95890 (-2.9750)	-2.3016 (-3.5867)	-1.0068 (-2.9798)	-2.1990 (-3.5943)

NOTE: Number in parenthesis are critical values and the rest are calculated values.



### Order of Integration

From table 5.1 above, the order of integration of the variables ( shown in the parenthesis) are as follows: GRYPC=I(0),GIY= I(0) or I(1), RAGY(-1)= I(1), GRPOP= I(0), PCWANAL= I(1) or I(0), RGCS= I(1), XG= I(0), XX= I(0), GG= I(0), INFR= I(0) or I(1), GEDE= I(1), RAGY= I(1), SRTB= I(2), PRMJEN= I(2), SECEN= I(2).

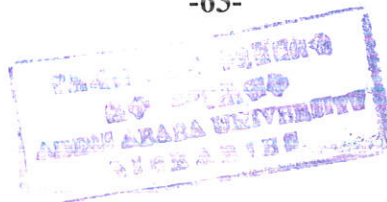
Since in considerations of this nature the focus is often on the parameter sign and not on the estimated magnitude it might be useful to review the expected signs of the variables used.

### 5.2.2 Some Theoretical Considerations

In this section we discuss how some of the variables that can influence the growth of the economy both directly and indirectly.

### Population Growth, and Investment

Developing countries like Ethiopia are characterized by high population growth rates. This situation is hardly supported with higher labour productivity. Moreover higher population growth can have an adverse effect on growth since it depletes resources for growth due to higher consumption. While the theoretical justification of investment is explained in the earlier chapter, improvement of human capital through higher education level of the associated work force which is through expenditure in education is of considerable importance in economic growth. Recent endogeneous growth models have shown human capital accumulation as an important source of long term growth either because of its direct input into research or its positive externalities ( Romer,1990:71).



## Degree of openness and Trade balance

Degree of openness in an economy has been shown to have a robust and positive relationship to investment (see chapter, 2). One explanation is that a more open economy can count on a greater variety of intermediate products, that raise the return on investment. Openness can also be a measure of economic liberalization or international mobility of capital.

Trade balance (trade gap) in foreign currency terms can be specified as

$$TB_t \text{ (trade balance, )} = Z_t - X_t$$

where  $X_t$  and  $Z_t$  are value of exports and imports respectively. This equation can be related to the balance of payments as,  $TB_t = B_0 - a(e_t/P_{Dt} - 1) + b\Delta Y_t$  where  $a$  and  $b$  are positive constants,  $B_0$  = constant whose sign is undetermined,  $e_t/P_{Dt}$  = real exchange rate ( $e_t$  = nominal exchange rate = number of domestic currency unit per unit of foreign currency,  $P_{Dt}$  = price of domestic output),  $\Delta Y_t$  change in real output. Thus the above equation implies that the trade balance improves in foreign currency terms when the real exchange rate depreciates ( $e/P_D > 1$ ) or when real output falls since in the latter case import declines (Khan, M.S. and et.al, 1991:p.14).

Total imports can be decomposed into capital imports and other imports. In Ethiopia case since imports are greater than exports. These are possible through grants and loans. Grants and loans, however, tend to be tied to high cost of supplies of manufactured goods or to specialized personnel. The trade gap ( $Z-X$ ) which is referring to net imports under this case can also be related to saving gap using the identity equation  $Z-X = (I-S) + GD$  where  $GD$  is the gap difference that can possibly be filled by capital inflow (Asmerom and Kocklaeuner, 1985:p.4)

## **Export Growth and Agricultural Share in GDP**

Exports encourage economic growth and development when discussed from production and demand sides.<sup>22</sup> On the production side, an increase in the output of export goods often leads to the development of infrastructure, transport and communication systems, etc., which in turn facilitates the production of other goods and services.

Economic growth from exports is also linked to demand since an increase in income results directly in a rise in demand for a wide range of products, including non-tradeables. These demand-pressures are reflected in an expansion in domestic supply and, therefore, involve investment in facilities providing such products. Increased demand for importable goods also contributes to the expansion of domestic production. In short, overall output increases in response to the export induced rise in demand. This linkage to demand represents the "cyclical" effect of export growth on real output.

The above are just direct effects of export expansion. There are also other indirect effects which include-a rise in aggregate savings due to a general increase in incomes, direct foreign investments and foreign loans, foreign exchange availability for importation of capital goods and raw materials for which there are no convenient domestic substitutes.

### **Real Effective Exchange Rate**

The real exchange rate represents foreign prices in local currency units relative to the domestic price measures. It measures the country's competitiveness. A decrease in the real exchange rate means that domestic goods become more expensive and less competitive compared with foreign goods. As the prices of domestic commodities increase, imports become more attractive and exports more difficult. This situation impedes the development of tradeable good sectors. The impact of real exchange rate on an economy depends on the

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<sup>22</sup> this discussion is from Khan Moshins, and Villanueua Delano (pp.16-17).

occurrence of depreciation or appreciation in the real exchange rate. Depreciation of the real exchange rate improves competitiveness and induces a shift in the composition of output toward tradables ( an impressive growth of exports), which is essential for successful overall growth of the economy.

On the other hand, a decline in the real effective exchange rate which implies real appreciation requires narrowing of the gap between actual and equilibrium real exchange rate. Thus getting real effective exchange rate right through realistic and effective exchange rate policy and avoidance of overvalued real exchange rates is important for promoting long-run growth since it leads to expansion and diversification of export and increased competitiveness. Thus reforms that result in faster convergence of the actual real effective exchange rates toward the respective equilibrium levels becomes important.

However, the effect of devaluation on real per capita growth can possibly go in opposing direction. Devaluations may have a short run negative effect on real per capita growth due to contractionary demand effect and higher costs of imported inputs to be used for production purposes (Chhibber and Dailami, 1990, p.15). The effect of devaluation on real GDP growth should be interpreted with caution since it also depends on other policy and conventional factors. For instance, a study to assess the effects of devaluation on real growth in Uganda, Kenya, and Tanzania showed that devaluation was expansionary in the case of Uganda but contractionary in Kenya and Tanzania (Murinde,1996: p.316).

In Ethiopia case,

"between February 1973 and September 30,1992 the Ethiopian Birr remained pegged to the US dollar at the rate of Birr 2.07 per US dollar reflecting movements in the dollar as well as in the relative prices between Ethiopia and its trading partners. Thus the real effective exchange rate of the Birr appreciated and the scope of the illegal parallel markets widened."<sup>23</sup>

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<sup>23</sup> See Policy Framework Paper, 1992/93-1994/95, p.3



On the other hand, due to devaluation measures taken after 1992 the real effective exchange rate has been increasing.

### Government Consumption

As is often the case, the call for more limited role of government in the economy is due to the argument that a large government hampers growth. In endogenous growth models, government spending generally has two effects, namely (a) a higher tax rate that may reduce growth, and (b) larger government spending that may increase productivity. Usually the second force dominates when the government is small, and the first force dominates when the government is large (Barro, 1990).

From the above discussions, the following table shows the expected signs of the variables used in the specified model.

**Table 5.2**  
**Expected signs of variables .**

Regressors	Expected signs	Regressors	Expected signs
GRPOP	< 0	RAGY	> 0
PCWANAL	< or > 0	INFR	< 0
GIY	> 0	GRM2	< 0
GEDE(-1)	> 0	PCREE	> 0 or < 0
SECEN	> 0	PCRFL	> 0
PRMJEN	> 0	DWP2	< 0
RGCS	> 0 or < 0	-	-
XG	> 0	-	-
SRTB	< 0	-	-

The results of the estimated sub models using Ordinary Least Squares are reported in table 5.3. In each model, growth in real GDP per capita (GRYPC) is regressed on various explanatory variables in order to arrive at an appropriate model that explain the growth

process in Ethiopia. The residuals obtained after each regression are tested for stationarity, and diagnostic tests are reported in appendix 5.3 and 5.4 respectively. Stationary tests are also reported in table 5.1.

In equation 1 the dependent variable was regressed on conventional variables of labor and capital and in equation 2, a time trend and Dummies were included along with these variables. This helps for an understanding of whether the standard neoclassical production function explains growth in this country.

Table 5.3 Estimates of the growth equation 1/ Dependent variable GRYPC

Explanatory Variables	Regression Number								
	1	2	3	4	5	6	7	8	9
Conventional Variables									
CON	0.0049 (0.704)	0.0586* (2.6320)	0.010005 (0.693)	-1.3906*** (1.9124)	-0.37641* (2.9316)	-1.0305* (3.4081)	-0.69075* (3.5120)	-0.54642* (2.7721)	0.024540 (1.0708)
GRPOP	-0.81495** (2.10)	-1.3226* (3.5957)	-1.2067* (2.5786)	-0.635** (1.9333)	-0.80958*** (1.95)	-0.62568** (2.0435)	-0.59006** (2.0347)	-0.64896** (2.1432)	-1.1941* (3.2383)
GIY	0.1288** (1.65)	0.0351 (0.4235)	0.26600*** (1.8673)	0.019636 (0.24925)	-	0.051910 (0.64064)	-	0.035782 (0.535227)	0.051230 (0.9446)
PCWANAL					-0.022366 (1.1143)		-		
GEDE(-1)			0.0005920 (1.071)	-		-	-		
SECEN			0.0013961 (0.147)	-0.0099036 (0.78675)	0.018638 (1.2788)	0.012953 (0.84117)	-		
PRMJEN			-0.0089395 (0.960)	-0.0055094 (0.34978)	- 0.0037839 (0.45507)	0.0087241 (0.97377)	-		
Policy-related Variables									
RGCS				-0.32088* (2.4741)	-0.52439* (4.4192)	-0.54971* (4.0551)	-0.43704* (4.3624)	-0.36544* (3.5523)	-0.28875* (-2.3801)
XG				0.085062 (1.5606)	0.0754	0.10912** (2.0148)	0.10031** (2.1721)	0.065571 (1.4586)	0.070087 (1.2311)
RAGY(-1)				0.47051*** (3.0617)	0.66804* (3.7873)	0.89614* (4.5940)	0.70193* (5.1810)	0.63121* (4.5318)	0.16054 (0.93538)
SRTB					0.96460** (2.3469)	0.92345** (2.1408)	0.76756* (2.3932)	0.73363** (2.0125)	-0.42203 (1.1416)
E9(-1)									-0.68537* (2.4361)
INFR				-0.0024345 (1.0598)					
GRM2					-0.58961*** (1.8761)				
PCREE				-0.0019361 (2.0792)**	-0.0017179 (1.7093)	-0.0013810 (1.7645)	-0.0010383 (1.5262)		
Dummies and Other Variables									
TI	-0.0011 (0.499)	-0.00174 (1.148)	-	-	-0.01559* (2.5636)	-0.018523* (2.8562)	-0.010863* (3.1964)	-0.010939* (2.9092)	
PCRFL		0.0140 (0.448)	0.037686 (1.093)	1.0112 (1.5524)	1.2134*** (1.7290)				
DWP2		-0.23807 (2.5493)	-0.11044 (1.3409)	-	-0.013840 (0.25930)	-0.031261 (0.56482)	-0.071462** (2.0167)	-0.065008** (1.7478)	-0.008266 2 (0.24394)
R <sup>2</sup>	0.25963	0.46615	0.40905	0.71930	0.82325	0.75120	0.71425	0.68233	0.61183
R <sup>2</sup> 3/	0.16306	0.25854	0.076640	0.47820	0.61704	0.56878	0.58725	0.54115	0.42916
F Statistic 4/	2.6885***	2.2453***	1.2306	2.9856*	3.9922*	4.1173*	5.624*	4.8328*	3.3494*
DW-Statistic	2.3071	1.9688	2.1763	2.0060	1.9271	2.04	2.1757	2.3256	1.8935

## NOTES:

- 1) The number in parentheses below the estimated coefficients are the absolute values of the t-ratios. The symbols \*, \*\*, and \*\*\* beside the estimated coefficients denote statistical significance at 1%, 5% and 10% respectively.
- 2) See Appendix 5.1 for Definitions of the variables used.
- 3) R<sup>2</sup> is an adjusted goodness of fit for the models.
- 4) is the F statistic for test of the null hypothesis that the joint effect of all the variables included on the right hand side of the estimated equations is zero.  
The rest of the values are coefficients.  
The same description applies to other regression equations.

In the first equation, growth in population affects per capita growth negatively which is significant at 10% and growth in capital formation (a proxy for capital stock) affects growth positively, significant at 10%. While this representation of capital formation is assumed to be appropriate, most commonly used measure of capital stock such as real investment share in GDP has showed a negative insignificant coefficient (not reported here). This latter result which contrasts with the argument that capital stock affects economic growth positively may be attributed to the problem with the data and measurement problems. For instance, depreciation of capital stock is not accounted in computing capital formation.

The significance of growth in capital formation is weakened in equation 2. Moreover, all the variables except population growth (which is significant at 1%) become insignificant but with their expected signs. This reveals the very low level of gross capital formation existed in the country. Moreover, the fact that substantial portion of capital formation is accounted for by public investment implies less pressure and incentive by public sector to allocate funds to the most profitable and efficient ones. Thus there is little relation of growth to the quantity of public investment. On the other hand, the highly significant negative impact of population growth on per capita GDP growth and the fact that the size of the coefficient is greater than unity as shown in equation 2 and 3 suggests that population has a much larger impact on per capita growth of Ethiopia.

Apart from possible 'omitted variable bias' both the above estimations have very low explanatory power and goodness of fit as measured by Adj-R<sup>2</sup>, R<sup>2</sup>, and F-statistic. Thus, this low explanatory power of the neoclassical production function suggests that future extensions of this frame work should attempt to incorporate other variables characterizing this country.

A further inclusion of measures of human capital to equation 2 and regression with out a time

trend<sup>24</sup> as shown in equation 3 shows no improvement in the goodness of fit. The Adj-R<sup>2</sup> is very low and its significance measured by F-statistic revealed it to be invalid. A part from this, the primary school enrollment rate (PRMJEN) though insignificant had a wrong sign. Secondary school enrollment rate (SECEN) is in significant but positive. An alternative measure of human capital using 1-year lagged government education expenditure share in GDP {GEDE (-1)} though positively related to economic growth is insignificant. The attempt to include 1-2 year lagged enrollment rates (not reported here) has not generated a significant positive coefficients. Human capital has been much emphasized in recent theoretical and empirical work on economic growth. In spite of this and its importance in reconciling aggregate evidence with the Solow model, however, it has not explained at least Ethiopia's poor economic growth. While this might partly be attributed to problems with identifying good proxies of human capital is also due to poor human capital endowment resulted from deteriorating quality of education and the existing narrow room for technical and science oriented subjects in the Ethiopian educational system.

Favorable weather accounted by the percentage change in rain fall index (PCRFLI) though not significant affects economic growth positively. To arrive at this variable a proxy of 'national rainfall index'<sup>25</sup> is used. However, the dummy variable introduced for political instability, change of government, and unfavorable economic policies that inhibit the economy (DWP2) has a negative coefficient but is insignificant .

Policy related and other variables have been included and estimated in regression 4. Since

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<sup>24</sup> Since it is assumed that possible technological factors that may exogenously affect the economy which are captured through the time trend are endogenous.

<sup>25</sup> Ways of calculating a proxy that serves as " a national rainfall index" for this work are explained in appendix 5.1.

policy environment matters for growth both measures of goodness of fit and the F-statistic for measuring the joint significance of the coefficients have improved. The DW-test which is 2.0 indicate absence of any serial correlation. Other diagnostic tests show no major problems. While conventional variables are as reported above, the share of real government consumption in GDP negatively affects the economy which is highly significant at 1%. This generally implies correlation between increased government consumption and the slow down in growth of per capita GDP. Though there has been substantial government expenditure in Ethiopia that is capital in nature, this might have tended to reduce capital formation and private consumption. Another interpretation is that government consumption introduces distortions through its intervention, such as high tax rates, with out an offsetting stimulus to investment and growth.

The percentage change in the real official exchange rate is negative and significant at 5%. This implies large deterioration in the terms of trade and absence of devaluation that characterized most of the period under investigation (prior to 1992) that widened the gap between actual and equilibrium real exchange rates. Alternatively said, this real appreciation of the real exchange rate lowering external competitiveness affected the country's exports adversely. These effects together with limited export diversification has contributed to severe decline in per capita GDP growth.

Inflation has a significant independent direct impact on per capita growth though with the other policy related variables its effect is negative and insignificant.

Growth in real exports is positive in its coefficient but was not significant for this estimation. In contrast, agriculture on which the country's economy heavily depends as represented by its lagged share in GDP {RAGY (-1)} is highly significant (at 10%) and contributes to the growth of GDP per capita positively. If the share of GDP accounted for by agriculture is not lagged the significance of other variables in explaining growth is reduced. This is due to the

sector's major influence on exports and the fact that any of its beneficial externalities come lately. Moreover, both natural factors and macroeconomic policies effect on agricultural sector may take a considerable amount of time.

In regression 5, excluding the investment variable the following variables: a proxy for shift of labor from agriculture to non-agricultural sector (PCWANAL), share of real trade balance in real GDP (SRTB), time trend (TI), growth in broad money supply (GRM2) in place of inflation rate are included. The regression results indicate that the variable, PCWANAL is negative and insignificant, GRPOP is significant at 10% and growth in money supply has a negative effect on growth of economy which is significant at 5%. Thus, with the existing high budget deficits in the country an excessive growth rate of monetary expansion may inhibit economic growth by accelerating the rate of inflation and macroeconomic instability which reduces investment.

The share of real trade balance ( or trade gap ) in real GDP (defined as the ratio of real import less real export to real GDP) was expected to have a negative impact on the growth. However, the result revealed as having a positive significant effect on the growth at 5%. The significance of this variable may suggest foreign capital receipts (grants and loans) that substitute for domestic savings and account for a substantial proportion in the import component of the trade balance contributing significantly to real output growth. Specifically this could signify the importance of such items as capital goods, fuel, semifinished goods, and intermediate goods which are part of the net imports as a contributing factor to economic growth of the country. Nevertheless, since these net imports in the country depend on external sources taking a form of loans and grants due to low foreign exchange earnings in the country, debt servicing problems are inevitable.

The fact that the time variable is highly significant (at 1%) and negative in this and the following regressions after controlling for the effects of most of the variables though

surprising might reveal that it serves as instrumental variable for capturing the declining pattern or stagnation of the country's growth trend overtime. This variable may also partly capture the adverse effect of exogenous shocks on the non stationary variables. Non-inclusion of this variable affects both the goodness of fit and the significance of other coefficients.

The above sub-models made on trial and error has given sight as to how the variables are behaving and has paved the way for our basic model.

Therefore, regression 6 is estimated including the investment variable and excluding the variable GRM2. While other variables are as explained earlier, the growth of real export has now become positive and significant at 5%. This suggests positive growth effects of external policies directed towards export promotion. The rationale for this is that exports often leads to the development of infrastructure, transport and communication systems etc., that in turn facilitate the production of other goods and services. Economic growth from exports is also linked to demand since an increase in income results in a rise in demand for a wide range of products which are reflected in increased investment for domestic supply expansion. A part from these, export expansion indirectly contributes to the importation of capital goods and raw materials through increased foreign exchange availability. These export effects are reflected in both significant positive effects of lagged agricultural share in real GDP and of real trade balance share to some extent.

Equation 6 is believed to be an appropriate growth model for Ethiopia and a bench mark used for analysis of policy implications. This is because possible 'omitted variable bias' is not a problem. Moreover, the results of equation 6 is quite satisfactory in terms of goodness of fit, Durbin Watson statistic for measuring presence of first-order serial correlation and various diagnostic tests.

Regressions 7-8 are in a bid to improve the significance of each of the variables and their joint significance and thus estimate an error correction model that captures both short and long run factors.

Regression 9 represents the estimated error correction model using equation 8. In this model, both growth of population and share of government consumption in GDP have a significant (both at 10%) negative impact on GDP per capita growth.

The lagged residual,  $\{E9(-1)\}$  which reflects the equilibrium error term is significant at 1% and correctly negatively signed. This implies that there is a long run equilibrium relationship between the regressor and the included variables.

### **Diagnostic Tests**

The residuals of the regressions were each examined plotting them against GRYPC and found no systematic influence of omitted variables. Moreover, as shown in appendix 5.3 and 5.5, no evidence of statistical significance is found to accept the probability for presence of serial correlation. Thus it can be argued that this is not a problem to the equations.

The above argument follows for any possible functional form error in the basic regressions and also the other sub models.

As evidenced by the diagnostic tests, the problem of heteroscedasticity is least suspected since it is usually associated with cross sectional data.

### **Cointegration Tests**

In order to see whether a long run relationship between the dependent variable and regressors exists or not in the estimated model, unit root tests of the residuals of each regression are examined and reported in appendix 5.3. Both the DF and ADF tests reveal that the null

hypothesis that the residuals have unit root is rejected except for equation 2 (E2) in favor of the alternative that all are stationary. Therefore, the variables in the regressions are cointegrated and they do not drift a part over time.

### Tests for Possible Endogeneity

To examine whether some of the variables are endogenous to the system or not, two procedures have been used.

First, Granger causality test has been carried out between the dependent variable (GRRYPC) and selected differenced (stationary) variables: GIY, XG, PCREE, DRAGY, and DDSRTB. The test is based on the null hypothesis that given x and y, x doesn't granger cause y. Furthermore, y doesn't granger cause x is also tested. Two way relationship between these variables is tested because if x helps to predict y, and y helps to predict x, it is likely that one or more other variables are causing both x and y.

Running two regressions of the form:

$$y_t = \sum_{i=1}^m a_i y_{t-i} + \sum_{i=1}^m b_i x_{t-i} + \epsilon_t$$

(Unrestricted equation)

$$y_t = \sum_{i=1}^m a_i y_{t-i} + \epsilon_t$$

(Restricted equation)

and using the F-statistic obtained by

$$F = (N-k) (ESS_R - ESS_{UR}) / q (ESS_{UR})$$

where  $y_t$  is explained by lagged value of  $x_t$  and  $y_t$ ,  $ESS_R$  and  $ESS_{UR}$  are the sums of squared residuals in the restricted and unrestricted regressions, respectively,  $N$  is the number of observations,  $k$  is the number of estimated parameters in the unrestricted regression, and

q is the number of parameter restrictions.

The F- statistic obtained is compared with the table values and the results are shown in the table below.

**Matrix for Testing bi-directional (both ways) causality**

Variables	Variables					
	GRRYPC	DGIY	XG	PCREE	DRAGY	DDSRTB
GRRYPC	-	0.30 (0.74)	0.43 (0.65)	0.20 (0.80)	0.31 (0.74)	0.52 (0.60)
DGIY	2.44* (0.10)	-	4.59** (0.02)	-	-	0.05 (0.95)
XG	0.473 (0.63)	1.53 (0.24)	-	-	0.43 (0.65)	1.01 (0.41)
PCREE	0.57 (0.57)	-	0.03 (0.97)	-	0.04 (0.96)	-
DRAGY	5.74* (0.01)	-	2.74** (0.09)	-	-	0.99 (0.39)
DDSRTB	0.11 (0.90)	-	-	-	-	-

NOTES: Values in the brackets are probabilities.

\*, \*\*, \*\*\* represent significance at 1 percent, 5 percent, and 10 percent respectively

From the above table, a positive significant effect of capital stock, agricultural share in GDP on economic growth is observed. Moreover, export is significantly used to predict growth in capital formation and agricultural share in GDP. Apart from this, no two way relationship is observed looking at each variables separately. because of these reasons, the explanatory variables considered are exogenous to the system and hence OLS can readily be applied for the regression.

Secondly, using saved residual of regression 6 (to capture more of the variables) each of the variables in the equation were regressed on the error term for any possible correlation of the variables with the error term could bias the parameter estimates . Since no correlation is observed between the regressors and the dependent variable (the error term) we can argue that these variables are exogenous to the model under consideration.

### **5.1.1 Comparison with Earlier Growth Findings.**

Previous cross country studies by Otani and Villanueva (1990), Mankiew, Romer and Weil (1992), and Ghura and Ichael, (1996) found a significant negative impact of population growth on per capita growth of developing countries. The results of this study also reveals the existence of a negative relationship.

The studies by Barro (1991) and Barro and Sala-I-Martin (1995) (though cross sectional study ) indicate that growth rate of real per capita GDP is insignificantly related to the share of public investment in GDP. On the other hand, Landau (1985) found the growth of government expenditure contributing to the slow down in economic growth. Though this research differs by using growth in capital formation (since the computation of investment data is in appropriate), little contribution of investment to economic growth was also obtained

Agriculture share in GDP constitutes about 50% in the Ethiopian Economy. Thus the significant direct contribution to growth of the share of real agriculture sector output to real GDP, though not surprising, supports the existing conceptual framework that agriculture plays a central role in African economic growth (Block, 1996).

In this study, the influence of external sector on the domestic output growth is captured via the real export growth rates and the real trade balance share in GDP which were both found

to have a significant positive effect on economic growth. Similar studies by Quarcoo (1990), Otain and Villanueva (1990), Feder (1982), Tyler (1980), Chenery and et.al (1970), and Block (1996) have also shown the positive impact of export performances and foreign exchange inflows.

Development Economists (especially advocates of endogenous growth theories) have long stressed the importance of human capital to the process of growth. The studies by Barro (1989,1991), Romer and Weil (1992), Otani and Villanueva (1990) revealed the significance of human capital in influencing the economic growth of developing countries. The results in this study, however, are in sharp contrast since the measures of human capital used are found to have insignificant effect on economic growth.

The significant negative impact of the share of real, government consumption in GDP supports similar findings in Barro (1991), and Landau (1986).

Finally, the negative coefficient of inflation as shown in this study lends support to the result of the study by Kormendi and Meguire (1985).



## 5.2 Test for Export-Economic Growth Nexus Hypotheses and Externality Effect of Exports Sector on the Rest of the Economy.

The results for testing the hypotheses that export acts as engine of growth for Ethiopia based on the specification in chapter 4 takes the form:

$$Y' = \alpha_0 + \alpha_1 P' + \alpha_2 I' + \alpha_3 X' + \alpha_4 PCRFL + \alpha_5 DWP2$$

$$(\alpha_1 > \text{or} < 0; \alpha_2 > 0; \alpha_3 > 0; \alpha_4 > 0; \alpha_5 < 0)$$

where  $Y'$  is growth rate of real GDP per capita,  $I'$  is growth of capital stock (proxied by growth capital formation),  $P'$  is population growth ( a proxy for growth of labor force),  $X'$  is growth of real exports, PCRFL is rainfall index and DWP2 is a dummy for Unfavorable political and economic conditions. The export variable  $X'$  is replaced by variables: XX (real export growth weighted by the share of real exports in real GDP) to examine the external effect of the export sector on the rest of the economy; X/Y ,the share of real export in real GDP; GG the size of the government ( specified by share of real government consumption weighted by growth rate in real GDP). In addition, growth rates are proxied by log difference of each variable.

The summary results derived from OLS estimates are reported in table 5.4.

TABLE 5.4  
RESULTS FOR EXPORT ECONOMIC GROWTH NEXUS  
Dependent variable GDP per capita growth rates(Y)

Reg. No	Constant	P	I	X	X/Y	XX	GG	PCRFL	DWP2	R <sup>2</sup>	R <sup>2</sup>	F-STATISTIC	DW-STATISTIC
1	-0.364430 (0.54)	-0.85356** (2.16)	0.097203*** (1.79)	0.0096456 (0.17)				0.37865 (0.56)	-0.01298 (0.31)	0.327	0.159	1.950	2.382
2	-0.47295 (0.718)	-0.79133** (2.05)	0.091235*** (1.70)		-0.05157 (0.97)			0.47756 (0.72)	-0.0045564 (0.11)	0.357	0.196	2.2242***	2.21
3	-0.45617 (0.666)	-0.81262** (2.07)	0.092684*** (1.70)			0.0062151 (0.336)		0.48038 (0.69)	-0.020741 (0.47)	0.33264	0.16580	1.9938	2.285
4	0.018033 (0.51)	-1.2270* (3.13)	2.1004** (1.74)				1.5610 (1.28)	0.017636 (0.57)	-0.00645 (0.02)	0.440	0.254	2.3590**	2.0691

NOTES= Symbols \*,\*\* and \*\*\* imply significant at 1%, 5% and 10% respectively

The figure in parentheses are t-values.

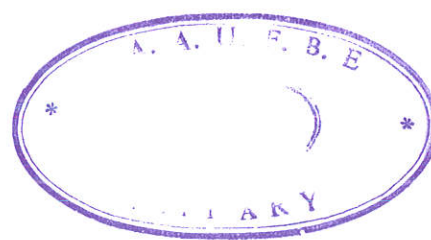
Using the growth of real exports as the measure of export orientation on the growth of the economy, the fit of the regression as measured by  $R^2$  and  $R^{-2}$  which are 0.327 and 0.159 respectively is very low. The F-statistic that shows the joint significance of all regression coefficients, is 1.950, significant at 10%. In this connection, it is of some interest to note the the fit of the model as estimated by Ram (1987) for Ethiopia. Though relatively better, the reported fit of the model as shown by  $R^2$  and F-statistic was 0.40 and 2.70 respectively. Nevertheless, the predominant export-growth connection while positive, is insignificant. In contrast, the coefficient of growth in gross capital formation is positive and significant at 10%, and the coefficient of population growth is negative and significant at 5%. Though this doesn't violate the significant positive impact of real export growth in economic growth obtained earlier, the empirical link between growth of capital formation and GDP per capita growth should be interpreted with caution since growth is not specific to this category alone but also other variables like exports. In the study by Ram (1987) all the variables were insignificant but had similar signs on the coefficients.

Estimation of equation 2 using the share of real exports in GDP, though it improved the fit, resulted in a wrong sign and was insignificant. Similar result is also found in a similar study by Sheekey (1994), for less developing countries.

Regression using equation 3 to identify the two possible mechanisms through which favorable exports may influence the rate of economic growth (namely: higher input productivity in the export sector and positive externality effect of export output on the rest of the economy) resulted in low goodness of fit. Besides, the insignificant positive coefficient of XX shows no evidence about the roles of export in economic growth. Though estimation of the same equation made by Ram for Ethiopia is relatively better ( $R^2 = 0.40$ , F-Statistic = 2.83) it had positive and insignificant Coefficients.

A similar specification used to test government size on economic growth (see Ram, 1986) is reported in equation 4. In addition to improving the goodness of fit of the regression, the coefficient for government size is insignificant and positive in specification 4.

Thus, on the whole, the direct effect of exports on economic growth and the positive externality effect of the level of the export sector output on the rest of the economy using this specification can not be determined. Thus there is a need for further research in the area.



## CHAPTER 6

### CONCLUSIONS AND POLICY IMPLICATIONS

Factors behind the growth experience of the country is not by any means exhaustive and requires further attention and research. The fact that the economy of Ethiopia has been declining or stagnating over time implies that the model lacks sufficient 'up ward' variations to adequately estimate the magnitudes of the impacts of the various factors.

Nevertheless the following are the major conclusions that can be drawn from the study. Aggregate economic performance in Ethiopia during the period 1971/72-1994/95 has been unsatisfactory. Both domestic and external factors have contributed to this disappointing performance. The poor overall economic growth record especially in the period 1974-1991 was due to the poor growth of agriculture. Average GDP growth fell considerably short of the average population growth implying a decline in per capita income. Thus rapid population growth has become one obstacle rather than an aid to the economic growth.

This study investigated the macroeconomic and other determinants of growth in Ethiopia during 1967/68-1994/95. The main findings can be summarized as follows: (1) there is little evidence regarding the contribution of gross capital formation to growth; (2) the effect of the population growth rate on per capita GDP growth was highly significant and negative; (3) though the role of human capital has been much emphasized in recent theoretical and empirical works this doesn't, at first sight at least, explain Ethiopia's poor economic growth; which can be attributed to measurement problems; (4) per capita GDP growth and the ratio of government consumption to GDP are negatively related; (5) the relationship between the ratio of agricultural output to real GDP (lagged) and economic growth has been positive and highly significant. Moreover, a positive export growth effect that is highly significant has been obtained.

In spite of its importance, agriculture in Ethiopia is characterized by a slow growth. Moreover, the test for any beneficial externalities such as strong linkages of exports with the other sectors of the economy indicated little evidence.

(6) While the growth of money supply has a significant negative effect on per capita growth, the adverse impact of inflation has been insignificant; (7) a decline in real effective exchange rate resulted in reducing competitiveness, increasing of smuggling of major exports and non traditional exports to neighboring countries and adversely affected real GDP growth; (8) the share of real trade balance (defined as imports less exports ) in the real GDP has shown a positive effect on per capita growth.

The results obtained relate to the study by Asmerom (1991), Mankiew and et.al(1992), Ghura and Ichael (1996) and Otani and Villanueva (1990) in the negative impact of population growth and government consumption on the real GDP growth. The insignificant impact of investment (dominated by public investment) resembles the results obtained by Barro (1991, 1995) and Landau (1985). A similar result of the positive export growth impact is found in (Quarcoo,1990), Otani and Villanueva (1990), Feder (1982), Tyler(1980). The study by Block (1996) and Chenery and et.al(1970) also showed the importance of agriculture.

## **6.1 Policy Implications**

The empirical analysis presented in this thesis shows that policy related and other structural variables have closer relation with GDP per capita growth. In this regard, while structural reforms are important for it affects the supply side significantly, macroeconomic policies designed for economic growth should also include such conventional policy variables that may include budgetary and financial policies. Thus some of the general policy implications of the study are as follows.

The positive and significant link of the share of agricultural GDP with economic growth implies that the key to economic growth in the country lies in the agricultural sector. This also implies that a negative shock such as drought in the sector is most likely to decelerate the economic growth of the country. Hence, apart from policies directed towards improving productivity and positive linkages of agriculture with other sectors of the economy, policies should aim at strengthening other sectors of the economy.

Raising the productivity of agriculture should envisage better utilization of the existing capacity, use of increased quantities of inputs and new techniques. Moreover, appropriate pricing and exchange rate policies are required. However, this can not be sufficient since the problems of the country's agriculture are deep seated. Fundamental changes involving major investments in the sector, infrastructure and water resources, wide spread applications of new technologies will be required to count on agriculture as a means to a more rapid economic growth. This becomes possible through participation of government, domestic and foreign entrepreneurs and international financial institutions. Moreover, success in both rural and agricultural development depends on establishing effective linkages to activities beyond the agricultural sector.

Export promotion with diversification is important for the growth process in Ethiopia. In this regard, policies such as structural reform measures (such as real exchange rate improvement) that maintain competitiveness of tradeables are important.

Interest rate and financial sector policies that result in competitive returns and major institutional changes in the financial sectors are important in order to stimulate private savings and investment.

Public investment that has accounted for substantial portion in gross capital formation has shown little contribution to growth. There is a need for the government to formulate and

implement appropriate policies to encourage private sector investment that stimulate growth. In particular policies that encourage foreign capital inflow should not be overlooked.

Real exchange rate policies which can be influenced by a package of budgetary, financial and structural policies are important to foster economic growth. In this regard a market determined exchange rate, improved incentives and investment in the export sector would help foster the tradeable goods sector and real GDP growth.

Population planning to reduce population growth should be given due attention. In this regard, increased government expenditure on education and health would help to raise human capital and contribute to growth both indirectly and directly by slowing population growth.

A significant positive relationship between economic growth and the share of real trade balance (as defined by import less export) in real GDP is found . Nevertheless, an indirect look at the trade balance shows that loans that constitute a higher percentage of capital inflow and grants create dependence on external sources. In this regard, associated with loans a higher cost of debt servicing is inevitable. Thus great effort to fully utilize the country's resource potential should be given a top priority.



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## APPENDICES

## Appendix 2.1

Total GDP, Per capita GDP and value added by sectors (at constant factor cost, in millions), and percentage growth rate (for period 1971/72-1994/95)

Year	Gross Domestic product (GDP)	Growth rate	Agriculture value added	Growth rate	Industry value added	Growth rate	Value added in service	Growth rate	Pop. (in'000)	Pop. growth rate	Per capita GDP	Growth rate
1971/72	6666.1	4.5	3704.9		1020.2		1941		30526.4	2.32	218.4	2.15
1972/73	6833.9	2.52	3730.1	0.68	1052.3	3.15	2051.5	5.69	31237.3	2.33	218.8	0.18
1973/74	6828.6	1.39	3706.6	-0.63	1044.8	-0.71	2177.2	6.13	31964.9	2.33	213.8	-2.37
1974/75	6927.7	-0.01	3640.1	-1.79	1029.2	-1.49	2258.4	3.73	32731.4	2.40	211.7	-0.89
1975/76	7048.3	1.74	3750.3	3.03	973.8	-5.38	2424.2	2.91	33544.2	2.48	210.1	-0.72
1976/77	7123.2	1.06	3753.2	0.08	1001.9	2.89	2468.1	1.89	34406.1	2.57	207.0	-1.47
1977/78	7003.3	-1.68	3698.5	-1.46	968.8	-3.30	2336	-1.36	35313.5	2.64	198.3	-4.21
1978/79	7467.6	6.63	3789.1	2.45	1110.6	14.64	2567.9	9.93	36244.7	2.64	206.0	3.89
1979/80	7848.3	5.10	3969.8	4.77	1217.2	9.60	2661.3	3.64	37200.6	2.64	211.0	2.40
1980/81	7912.7	0.82	3904.8	-1.64	1259.5	3.48	2748.4	3.27	38223.7	2.75	207.0	-1.88
1981/82	7971.5	0.74	3807.7	-2.49	1312.5	4.21	2851.3	3.74	39317	2.86	202.7	-2.08
1982/83	8614.1	8.06	4204.2	10.41	1376.1	4.85	3033.8	6.40	40441.7	2.86	213.0	5.06
1983/84	8188.9	-4.94	3685.7	-12.31	1460.1	6.10	3043.1	0.31	41598.5	2.86	196.9	-7.58
1984/85	7710.7	-5.84	3125.3	-15.20	1473.5	0.92	3111.9	2.26	42767.5	2.81	180.3	-8.41
1985/86	8245.9	6.94	3480.6	11.37	1516	2.88	3249.3	4.42	44002.4	2.89	187.4	3.94
1986/87	9031.7	9.53	4008.6	15.17	1588.6	4.79	3434.4	5.70	45306.8	2.96	199.3	6.38
1987/88	9199.1	1.85	3923.7	-2.12	1604.9	1.03	3670.5	6.87	46631.8	2.92	197.3	-1.04
1988/89	9347.7	1.62	4011.4	2.24	1611.6	0.42	3724.7	1.48	48000.7	2.94	194.7	-1.28
1989/90	9206	-1.52	4020.5	0.23	1536.8	-4.64	3648.7	-2.04	49414.4	2.95	186.3	-4.33
1990/91	10937		6199.9		1031.4		3705.7		50874.6	2.96	215.0	15.39
1991/92	10575.9	-3.30	6051.5	-2.39	943.8	-8.49	3580.6	-3.38	55117.3	8.34	20202.92	-5.62
1992/93	11842.9	11.98	6424.2	6.16	1215.4	28.78	4203.3	17.39	53236.4	-3.41	222.5	9.64
1993/94	12042.8	1.69	6122	-4.70	1301.8	7.11	4619	-8.9	54939	3.20	219.2	-1.48
1994/95	12627.2	4.85	6344	6.64	1406	8.00	4876.3	5.57	54677.1	-0.48	230.9	5.34

1) New revised series that excludes Eritrea is used after 1990/91  
 Source: 1) MEDaC 2) NBE, Quarterly Bulletin, 1995/96 3) Central Statistical Abstract

## Appendix 2.2

Average percentage (periodic) share of each sector's value added in total GDP (at constant factor cost)

N°	GDP and value added by economic activity	Sub-Periods <sup>1</sup>							
		1971/72-1972/73	1973/74-1977/78	1978/79-1982/83	1983/84-1984/85	1985/86-1989/90	1990/91	1991/92-1994/95	1971/72-1994/95
1	total GDP (at constant factor cost)	100	100	100	100	100	100	100	100
2	Agriculture	55.08	52.95	49.45	42.77	44.206	56.69	53.14	50.61
3	Industry <sup>2</sup>	15.35	14.332	15.746	18.47	17.894	9.43	10.28	14.50
	Manufacturing	5.65	5.53	7.036	8.455	8.456	3.04	3.86	6.00
	Construction	4.705	3.966	3.992	4.705	4.164	2.62	2.502	3.80
	Handicrafts & Small S.Industry	4.185	4.048	3.86	4.165	4.022	1.75	1.895	3.417
4	Service Sector	29.57	32.72	34.804	38.76	40.338	33.88	36.58	35.236
	Trade, transport	15.175	15.372	15.38	17.145	17.742	11.21	12.585	14.944
	Other services Sectors	14.39	17.348	19.426	21.61	22.594	22.67	23.993	20.290

Note 1) New revised series excluding Eritrea after 1990/91

2) here other industrial activities are excluded

Source: 1) MEDaC 2) NBE, quarterly Bulletin, 1995/96

## Appendix 2.3

### Average Growth Rates of GDP (at constant factor cost) and by type of activity (in percentages) for period 1971/72-1994/95

N°	GDP by type of activity	Sub-Periods <sup>1</sup>							
		1971/72-1972/73	1973/74-1977/78	1978/79-1982/83	1983/84-1984/85	1985/86-1989/90	(2) 1990/91	(3) 1991/92-1994/95	(4) 1971/72-1994/95
1	Commodity producing Sector	2.46	0.52	2.7	-9.21	3.99	-	1.88	1.31
1.1	Agriculture	2.09	-0.15	2.7	-13.77	5.4	-	0.68	0.66
1.2	Industry	3.79	-1.59	7.35	3.51	0.896	-	8.85	3.62
	Manufacturing	5.21	-0.68	10.92	3.80	1.71	-	2.67	3.84
	Construction	1.84	-3.82	6.47	3.59	0.52	-	4.98	2.02
	Handicrafts & Small Industry	4.0	-0.44	2.80	1.25	1.57	-	6.87	2.50
2	Service Sector	6.14	2.66	5.39	1.28	3.28	-	7.36	4.39
	Trade, transport	4.81	0.98	6.42	0.39	2.99	-	8.93	3.84
	(5) Other services Sectors	7.57	6.01	4.62	2.02	3.54	-	6.63	4.73
3	Average annual growth of GDP	3.51	0.5	4.27	-5.39	3.68	-	3.80	2.14
4	Average Population growth	1.165	2.484	2.75	2.835	2.932	-	1.912	2.455
5	Average per capita GDP growth	1.16	-1.93	1.48	-7.99	0.73	-	r.27	-0.137

- Note
- 1) Own computations
  - 2) This year is considered a reference year
  - 3) New revised series that excludes Eritrea is used after 1990/91
  - 4) Excludes 1990/91
  - 5) Includes public admn., defence and social services: education, health etc.
- Source: 1) MEDaC 2) NBE, quarterly Bulletin, 1995/96

## Appendix 2.4

### Domestic expenditures as percent of GDP (Periodic averages)

N°	Total Resource and domestic Expenditures	Sub-Periods <sup>1</sup>							
		1971/72-1972/73	1973/74-1977/78	1978/79-1982/83	1983/84-1984/85	1985/86-1989/90	1990/91	1991/92-1994/95	1971/72-1994/95
1	GDP at market price	100	100	100	100	100	100	100	100
2	Total consumption	87.92	93.014	96.062	95.125	94.97	100.02	95.36	94.638
	Public	10.67	13.96	17.486	19.405	22.786	15.38	10.8925	15.797
	Private	77.25	79.058	78.578	75.71	72.188	84.64	84.46	78.840
3	Domestic saving	12.08	6.986	3.938	4.89	5.03	-0.02	4.64	5.363
4	Gross Investment	11.985	8.896	10.79	15.74	14.324	7.12	13.195	11.721
	Private								
	Public								
5	Exports of goods and non factor services	11.64	12.802	12.53	12.165	11.696	5.67	9.995	10.928
6	Imports of goods and non-factor services	11.545	14.716	19.386	23.03	20.994	12.81	18.55	17.290
7	Resource gap	0.095	-1.916	-6.854	-10.865	-9.296	-7.14	-8.555	-6.361

Note 1) New revised series excluding Eritrea after 1990/91

Source: 1) MEDaC 2) NBE, quarterly Bulletin, 1995/96

## Appendix 2.5

### Summary of Balance of Payments (in million Birr, for selected years at current prices)

	1971/72	1973/74	1975/76	1977/78	1979/80	1982/83	1984/85	1986/87	1988/89	1990/91	1994/95
Trade Balance	-144.3	76	-140.3	-127.1	-517.6	-943.4	-1026.8	-144.2	-1205	-1558.3	-4108.2
Exports (fob)	323.9	598.8	539.1	670.7	950.6	809.6	743.6	794.8	903.2	572.15	2857.68
Coffee	164.7	166.1	297.7	514.5	631.8	495.9	466.3	524.3	626.7	268.48	1813.14
Percentage of exports	50.85	27.74	55.22	76.71	66.46	61.25	62.71	65.97	69.39	46.92	63.45
Other exports	159.2	432.7	241.4	156.2	318.8	313.7	277.3	270.5	276.5	303.67	1044.54
percentage of exports	49.15	72.26	44.73	23.29	33.54	38.75	37.29	34.03	30.61	53.08	36.55
Imports (c.i.f.)	-468.2	-522.8	-679.4	-797.8	-1468.2	-1753	-1770.4	-2236.8	-2108.2	2130.44	6965.28
Fuel	47.9	67.7	106.6	158.3	339.4	436	317.9	225.9223.8	-	-	-
percentage of imports	-10.23	-12.95	-15.69	-19.84	-23.12	-24.87	-17.96	-10.10	-10.62	-	-
Other imports	-420.3	-455.1	-572.9	-639.5	-1123.8	-1317	-1452.5	-2010.9	-1884.4	-	-
percentage of imports	89.77	87.05	84.31	80.16	76.54	75.13	82.04	89.90	89.38	-	-
Net services	26.2	65.9	89.6	41	55.1	85.9	103.1	121.3	66.9	-7.45	383.04
Net goods & services	-118.1	141.9-50.7	-86.1	-462.5	-857.5	-923.7	-1320.7	-1138.1	-	-	-
private transfers (net)	3.2	34.3	43.9	30.7	41.3	175.8	403.7	336.4	389.1	-	-
Current account balance	-114.9	176.2	-6.8	-55.4	-421.2	-681.7	-520	-984.3	-749	-1145.8	-1764.6
percent of GDP	-1.72	2.54	-0.10	-0.79	-5.37	-7.91	-6.74	-10.90	-8.01	-10.48	-13.97
Public official transfers	29.7	48.5	60.8	110.1	124	191.4	617.6	438.6	433	604.44	2693.25
Capital account	76.3	65.7	71.2	48.1	169.5	401.7	423.7	395.4	425.2	448.36	5.67
Errors & Omissions	26.3	-27.3	-45	-363.5	44.1	-59.4	-421.5	106.7	-132.2	90.05	-1982.6
Overall Balance	17.4	263.1	80.2	-260.5	-83.6	-148	95.8	-43.6	-23	-2.9	-1049
Change in External reserves (- = increase)*											

Source: National Bank of Ethiopia Annual Report (various issues)  
\*full information is not available

## Appendix 2.6

## Central Government Finance for Selected years (in million Birr)

	1971/72	1973/74	1975/76	1977/78	1979/80	1982/83	1984/85	1986/87	1988/89	1990/91	1994/95	1989/90
Domestic Revenue of which	489.7	618.9	781.1	1174.2	1559.7	1996.6	2262.3	2925.9	3732.6	2647.1	5839.2	3115.2
Taxes	432	540.3	615.5	933.6	1302.9	1493.5	1679.3	2203.1	2761	2065.7	3890.3	2278.2
percent of Rev	88.22	87.30	78.80	79.51	83.54	74.80	74.25	75.30	73.97	78.04	66.62	73.13
non-taxes	57.7	78.6	165.6	240.6	256.8	503.1	582.5	722.8	971.6	581.4	1948.9	837
percent of Rev	11.78	12.70	21.20	20.49	16.46	25.20	25.75	24.70	26.03	21.96	33.38	26.87
Current expenditure of which:	434.3	529.5	858.2	1330.7	1548	1836.4	2321.4	2619.8	3406.4	3419.2	5075	3735.7
General services	230.2	263	496.4	859.1	906	1079.1	1229.4	1358.1	2077.2	2078.3	1560.5	2414.3
percent of Exp	53.0	49.67	57.84	67.27	58.53	58.76	52.96	51.84	60.98	60.78	30.75	64.64
current surplus (deficit) (1-2)	55.4	89.4	-77.1	-156.5	11.7	160.2	-59.1	306.1	326.2	-772.1	764.2	-620.5
Capital expenditures	150	134.3	247.7	267.3	453.2	737.4	944.5	1383.1	1799.7	1217.1	3076.6	1217.1
Overall deficit (3-4)	94.6	-44.9	-324.8	-423.3	-337.6	-577.2	790.2	-755	-1128.3	-1769.9	2312.4	-1814.7
Deficit financing: foreign loans (net)	44.1	47	111.4	71.6	142.5	236.4	356.5	392.7	615.4	346.6	2000	458
percentage share	46.62	-104.68	-34.30	-16.91	-37.74	-41.48	45.12	-52.01	-54.54	-19.58	-86.49	-25.24
Domestic Borrowing (net)	26.4	-2.1	213.6	334.2	235.1	337.8	433.7	362.3	512.9	1423.3	312.4	1356.7
percentage share	27.91	4.68	-65.76	-78.95	-62.26	-58.52	54.88	-47.99	-45.46	-80.42	-13.51	-74.76
Banking system (net)												
percentage share												
Other	24.1	0.00	0.00	18	0.00	0.00	-19	0.00	0.00	0.00	0.00	17.2
percentage share	25.48			-4.25			-2.40					-0.95

Source: Ministry of Finance (in Annual Report and Quarterly Bulletin of NBE (various issues))

## APPENDIX 4.1

The intersectoral linkages between agriculture and non agricultural sector and their contribution to economic growth is identified using the following methodology<sup>26</sup>.

First, a two-sector production function (export sector, that dominantly refers to agricultural sector, and non-agricultural sector) that provides a foundation for the inclusion of export variable among the sources of growth is utilized.<sup>27</sup>

Next, instead of an aggregate production, each of the two sector's output is a function of the factors allocated to the sector. Moreover, the output of the non-agricultural sector is considered to be dependent on the volume of exports produced since this helps to identify the beneficial effects of exports on other sectors.

Thus:

$$N = F(L_n, K_n, X) \dots \dots \dots (1)$$

$$X = G(L_x, K_x, R) \dots \dots \dots (2)$$

where:

N = non-agricultural sector

X = export sector

$K_n, K_x$  = capital stocks of non-agriculture and export sector's respectively.

$L_n, L_x$  = labor forces of non-agriculture and export sector's respectively.

R = rainfall index

To estimate the sectoral marginal productivity between the sectors each sector's marginal productivity with respect to the primary factors is represented as:

---

<sup>26</sup>see Feder (1982).

<sup>27</sup>This is an abstraction as both agriculture and non-agricultural sectors produce for both domestic and external sectors. But the agricultural sector dominates in its exports the other sector. Moreover, the latter are assumed to be characterized by the same factor productivity that characterize exports.

$$\frac{\partial N}{\partial L} \text{ and } \frac{\partial N}{\partial K} = F_L \text{ and } F_K$$

$$\frac{\partial X}{\partial L} \text{ and } \frac{\partial X}{\partial K} = G_L \text{ and } G_K$$

Hence assuming difference in marginal productivity between the sectors ( and the ratio to diverge from unity by  $\delta$ ) we have:

$$\frac{G_K}{F_K} = \frac{G_L}{F_L} = 1 + \delta \dots \dots (3)$$

Where K, L as a subscript refer to partial derivatives.

In the absence of externality<sup>28</sup>, and for a given set of prices a situation where  $\delta=0$  would reflect an allocation of resources which maximizes national output. However, due to reasons such as more competitive environment in the export sector, various impeding regulations and constraints like credit and foreign exchange (rationing)  $\delta > 0$  holds and the marginal factor productivity are likely to be lower in non-agricultural sector. However, productivity differentials due to externalities are not included in  $\delta$ .

Differentiating (1) and (2) yields:

---

<sup>28</sup> This refers to the beneficial effects of exports on other sectors via the development of efficient and internationally competitive management, the introduction of improved production techniques, etc.

$$X' = G_K I_x + G_L L_x' + G_R R_x' \dots (5)$$

Where:  $I_n$  and  $I_x$  are respective sectoral gross investments,  $L'_n$  and  $L'_x$  sectoral changes in labor force,  $F_x$  describes the marginal externality effect of exports on the output of the non agricultural sector.

Denoting Gross Domestic Product by Y, it becomes:

$$Y = N + X$$

Therefore,  $Y' = N' + X'$  .....(6)

Using equations (3)-(5) in equation (6) yields:

$$Y' = (F_K I_n + F_L L_n' + F_x X') + G_K I_x + G_L L_x' + G_R R_x' \dots (7)$$

$$\text{Since } G_K = F_K(1 + \delta)$$

$$G_L = F_L(1 + \delta)$$

We obtain:

$$Y' = F_K (I_n + I_x) + F_L (L_x' + L_n) + \delta (F_K I_x + F_L L_x') + F_x X' + G_R R_x' \dots (7)$$

Using equation 3 equation 5 can be formulated as

$$X' = (1 + \delta) (F_K I_x + F_L L_x') + G_R R_x'$$

Thus,

$$F_K I_x + F_L L'_x = \frac{X'}{1+\delta} - G_R R'_x \dots \dots \dots (8)$$

Substituting (8) in (7)

$$Y' = F_K I + F_L L' + \delta \frac{X'}{1+\delta} + F_x X' + G_R R'_x = F_K I + F_L L' + \left( \frac{\delta}{1+\delta} + F_x \right) + G_R R'_x \dots \dots \dots (9)$$

Assuming  $F_L = B(Y/L) \dots \dots \dots (10)$

and using this in (9), denoting  $F_K = \alpha$  and dividing (9) by Y yields:

$$Y'/Y = \alpha (I/Y) + \beta (L'/L) + \left( \frac{\delta}{1+\delta} + F_x \right) \frac{X'}{X} (X/Y) \dots \dots \dots (11)$$

This equation is the basis for empirical work in which  $(\delta/1+\delta)$  is referring the extent of marginal productivity difference across the sectors.

$F_x$  is related to inter-sector externalities.

$$\frac{\delta}{1+\delta} + F_x = \gamma$$

Hence,

$$Y'/Y = \alpha (I/Y) + \beta (L'/L) + \gamma \frac{X'}{X} (X/Y) \dots \dots (11')$$

Here, in testing whether or not the marginal productivity in the export sector are higher and that exports generate beneficial externalities, the parameter  $\gamma$  should be positive and significantly different from zero.

## APPENDIX 5.1

### DESCRIPTION OF VARIABLES

**Growth rate of real GDP per capita (GRYPC):** is used to represent economic growth. It is log difference between per capita GDP in adjacent years.

**Growth of Investment (GIY):** this variable is used to represent growth of capital formation (private plus public).

**Human capital:** the proxy variable for this is school enrollment rates. **SECEN, PRMJSEN** are used to represent secondary and primary, enrollment rates respectively. These are constructed by considering the ratio between the number of pupils or students enrolled at a given age group and the size of the population in that relevant age group. To make use of the existing demographic structure in our case PRMJSEN refers to the ratio of the number of students enrolled in primary and junior secondary school with age 7-14 to the total number of population in that age and SECEN refers to the ratio of those in age 15-19 to total number of population in that age.

**Population (POP):** is mid year population in millions, and (GRPOP) is growth rate of Population.

**PCWANAL** is annual percentage change in index of non-agricultural labor force.

**SXVA** is the ratio of total exports of goods and services (fob) to GDP. It is denoting relative availability of foreign exchange from export.

**XG** is export volume growth measured as total exports (fob) deflated by export unit value both measured in Birr. The export unit value index proxy is constructed by dividing total value of exports to total volume and expressing it in 1975 base year.

**REER ( Real Effective Exchange Rate)** takes account of the distortions of the existing trade and exchange system. It refers to the total number of units of domestic currency required for

an import or received for an export in exchange for a unit worth of foreign currency. The real effective Exchange rate can be calculated as follows:

$$REER = \sum_{i=1}^n \theta_i e_{ij} \frac{P_i}{P_j}$$

where

REER = multilateral effective exchange rate

$e_{ij}$  = Nominal exchange rate between home country (j) and trading partner (i),

n = total number of trading partners

$\theta_i$  = trade weight corresponding to country i.

$P_j$  = price index of home country and,

$P_i$  = price index of trading partner.

**PCCRE** : is percentage change in real effective exchange rate

**RGCS**: is the ratio of real government consumption to real GDP.

**SRTB** :is ratio of trade balance (in real terms) to GDP.

**INFR** :is inflation rate measured by the consumer price index.

**XX** :is growth of volume exports in real terms multiplied by this share in real GDP. It is used to represent the overall effect of exports in economic growth.

**G** :is growth rate in government consumption represented as log difference between adjacent years.

**GG (G\*RGCS)**: represents size of government. It is used for looking at the effect of the government size on overall economic growth.

**SRAYY** is the share of real GDP accounted for agriculture.

**RAGY** is ratio of real agricultural GDP to real GDP.

**RFLI** is "rainfall index." Though there is a wide variation in the annual rainfall data the rainfall index is constructed as follows (see Kidane and Gerhard, p.4). First the country is divided into five zones on the basis of the agricultural potential: West and South West, Central, East, North East and North. A major town is selected for each of the regions; thus Jimma, Addis Ababa, Dire Dawa, Debremarkos and Mekele has been chosen. The total annual rainfall being a representative of each region, it is also weighted by 0.4, 0.3, 0.15, 0.2 and 0.1 respectively depending on the agriculture potential of each area. Thus the weighted average of the four towns was taken as the "annual rainfall index" for the country.

**DWP2**: is A dummy for political instability, BOP difficulties, change of the government and war situations. For these cases it takes a value of 1 (and 0 otherwise).

### **5.1.1 CALCULATION OF REAL VALUES USED IN REGRESSION**

Since GDP or aggregate expenditure items measured at current prices are likely to give a misleading results of changes in activity levels, various indices has been used to generate real values.

(1) GDP deflator at 1975 base year is used to construct real GDP and dividing this by the population yields real GDP per capita.

(2) Real Gross Investment ( capital formation ) is obtained as follows. First, the major components of investment: imports and construction were identified. Dividing gross investment to the average of construction and import unit price indices (assuming both constituting 50 percent share) yields real gross investment. The import and construction indices are obtained from UNCTAD, commodity year book.

(3) Export volume growth (in real terms) is measured as total exports deflated by export unit value index.

(4) Consumer Price Index (CPI) is used as a deflator to express other variables in real terms.

Appendix 5.3

Equation No	Diagnostic Tests			
	Serial Correlation	Functional Form	Normality	Heteroscedasticity
1	0.86512(0.362)	0.76522(0.391)	4.9610(0.084)	0.48877(0.491)
2	2.6793(0.164)	0.6994(0.413)	5.0812(0.328)	0.35673(0.556)
3	1.2702(0.275)	1.5113(0.236)	1.4543(0.483)	0.18133(0.674)
4	0.0021443(0.964)	0.28584(0.602)	0.80011(0.670)	0.0033181(0.955)
5	0.017692(0.897)	1.0380(0.330)	1.5096(0.470)	0.0048348(0.945)
6	0.093347(0.764)	0.29458(0.596)	0.058917(0.971)	2.7102(0.112)
7	0.22816(0.639)	1.2740(0.275)	0.52765(0.768)	1.0411(0.317)
8	1.0806(0.313)	0.73870(0.402)	0.51347(0.774)	1.2594(0.272)
9	0.14347(0.710)	0.38596(0.543)	0.12643(0.939)	0.27229(0.607)

Appendix 5.4

Tests of Cointegration of the Estimated growth equations using saved residuals

Unit root tests for equations	DF-TEST		ADF-TEST	
	With out trend	with trend	with out trend	With trend
E1	-5.8248(-2.9798)	-5.6916(-3.5943)	-3.8281(-2.9850)	-3.7402(-3.6027)
E2	-6.3940(-2.9798)	-6.2520(-3.5943)	-3.3786(-2.9850)	-3.3213(-3.6027)
E3	-6.2879(-2.9798)	-6.1517(-3.5943)	-4.3745(-2.9850)	-4.2700(-3.6027)
E4	-4.9610(-2.9798)	-4.9549(-3.5943)	-3.7077(-2.9850)	-3.8458(-3.6027)
E5	-4.7659(-2.9798)	-4.6710(-3.5943)	-3.7941(-2.9850)	-3.7950(-3.6027)
E6	-5.7618(-2.9798)	-5.6738(-3.5943)	-4.6867(-2.9850)	-4.7127(-3.6027)
E7	-5.4721(-2.9798)	-5.3655(-3.5943)	-4.3424(-2.9850)	-4.2690(-3.6027)
E8	-6.1189(-2.9798)	-5.9949(-3.5943)	-3.8591(-2.9850)	-3.7870(-3.6027)

Notes: Critical values in brackets

Appendix 5.5

Equation No	Diagnostic Tests			
	Serial Correlation	Functional Form	Normality	Heteroscedasticity
1	1.1309(0.301)	2.499(0.130)	0.11047(.946)	0.0006074(0.981)
2	0.94338(0.344)	0.17680(0.915)	0.043295(0.837)	
4	1.4362(0.245)	0.60914(0.445)	2.5735(0.276)	0.073928(0.788)

Note: Numbers in parentheses are probabilities and those with no parentheses are coefficients.

## DECLARATION

I, the undersigned, declare that this thesis is my own original work and has not been presented in any University. All sources of materials for this thesis have been fully acknowledged.

Name : Seyoum Chane Mengistu

Signature : 

Date : 26th May, 1997.

Place : Addis Ababa.