



# SAINT MARY'S UNIVERSITY

## THE IMPACT OF HUMAN CAPITAL AND AGRICULTURE PUBLIC SPENDING ON ECONOMIC GROWTH IN ETHIOPIA

BY

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ADDIS ABABA

# **SAINT MARY'S UNIVERSITY**

## **THE IMPACT OF HUMAN CAPITAL AND AGRICULTURE PUBLIC SPENDING ON ECONOMIC GROWTH IN ETHIOPIA**

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THE IMPACT OF HUMAN CAPITAL AND  
AGRICULTURE PUBLIC SPENDING ON ECONOMIC  
GROWTH IN ETHIOPIA

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## Declaration

This is to certify that the thesis entitled: The Impact of Human Capital and Agriculture Public Spending on Economic Growth in Ethiopia is submitted in partial fulfillment of the requirements for the Degree of Master of Arts (Agriculture Economics) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Date\_\_\_\_\_

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## List of Acronyms and Definition

### Acronyms

1. **bln**– billion
2. **CPI** – Consumer Price Index
3. **CSA** – Central Statistics Agency
4. **ETB** – Ethiopian Birr
5. **EU** – European Union
6. **GDP** – Gross Domestic Product
7. **GTP** – Growth and Transformation Plan
8. **IMF** – International Monetary Fund
9. **MoFED** – Ministry of Finance and Economic Development
10. **MDGs** – Millennium Development Goals
11. **OLS** – Ordinary Least Squares
12. **PASDEP** – A Plan for Accelerated and Sustained Development to End Poverty
13. **SDPRP** – Sustainable Development and Poverty Reduction Program
14. **SSA** – Sub-Sahara Africa
15. **VAR** – Vector Autoregressive

## Abstract

### The Impact of Human Capital and Agriculture Public Spending on Economic Growth in Ethiopia

*St. Mary's University, 2014*

*The Ethiopian government aims to increase overall expenditure by more than 100% from 690.9 billion in GTP periods (2010/11-2014/15) as compared to previous plan period (PASDEP, 2004/05-2009/10) expenditure. According to some scholars- Keynesian view, the increase in public spending on socio-economic and physical structures is important and encourages economic growth. However some scholars – Classical economists on the other hand argue that the increase in public expenditure may shift resources from the productive private sector to public sector which they believe unproductive and hence, crowd out overall performance of the economy. These views indicate that policymakers are under debate whether increase in public spending helps or hinders economic growth.*

*The paper investigates the relationship between government expenditure and domestic output (GDP) in Ethiopia. The study attempts to measure the impacts of sectoral public spending – human capital and agriculture, on economic growth; using annual data set on GDP and government expenditure for the period 1960/61-2010/11. Elasticities of GDP with respect to human capital and agriculture are estimated using OLS regression analysis. The study employ co-integration and error-correction model to examine the short and long run relationships between GDP and government sectoral spending (human capital and agriculture).*

*It is found that education sector expenditure has both short-run and long-run statistically positive-significant effect on growth while health sector spending has negative-insignificant relation. With regard to agriculture, the result shows that it has negative relationship with growth. The result also found the existence of long run relationship between the components of government spending and economic growth. These results have policy implication that education if properly funded could bring about sustainable economic growth.*

# Chapter One

## 1.0 Introduction

### 1.1 Background

As Keynesian economics argue and numerous empirical findings have proven, an increase in government expenditure on socio economic and physical structure encourage economic growth. Advocates of this view, Mulhearn and Vane (1999) argue that government spending helps to undertake a massive effort to restore and upgrade a deteriorating infrastructure of public capital as highways, bridges, air traffic control facilities, rail transit, school buildings and textbooks. However, according to the classical economists view, increased government spending can exacerbates an economic contraction by shifting resources from the private sector. Hence, this relatively higher resource allocation by government may have negative effect on the private sector and consequently on economic growth.

A study using information, from a survey of IMF country desk officers, on government budgets, fiscal outcomes and projections, and social spending of 41 Sub Saharan African countries, covering the period 2000-2010 found that planned and implemented fiscal policies in most sub Saharan countries have indeed been countercyclical, and that social spending has been protected. According to the study the trend of rising health and education expenditures established before the economic crisis in all sub Saharan Africa country groups doesn't seem to have been interrupted, with real growth rates in outlays remaining robust. Capital expenditures generally seem to have held up, although there were significant disparities between countries. A growing number of countries have put in place cash transfers, which have good targeting mechanism and typically offer high impact at low cost. An increasing number of countries are taking a more developmental approach to social protection, focusing on public works, and food security, especially through agricultural input subsidies. (Regional economic outlook, 2010)

According to the development plans and strategies documents (such as SDPRP, PASDEP and GTP) of Ethiopia, government spending has continued to increase and is planned to rise in the coming years. And, recently, in order to achieve the objectives of growth and transformation plan (2010/11 – 2014/15), a larger amount of resource requirement (a base case scenario of ETB 690.90 billion) has been projected compared to the previous year's plan period ETB 332.57 billion (GTP, 2010).

Meanwhile, this paper presupposes that the increased government expenditure without due consideration for impacts of these changes in the future has certainly helped increase the interest. So that identifying the long run relationship between governments sectoral spending and economic growth can be a great help in utilizing the country's scarce resource efficiently.

Cognizant of the importance of examining the short and long-run impacts of government spending on economic growth, this paper empirically investigates whether government spending has positive or negative relationship with economic growth and their short and long term effects. This thesis uses multivariate analysis to examine the relationship between government spending and economic growth in Ethiopia. It focuses on sectoral expenditures of education, health and agriculture sectors. It is therefore, supposed to provide a standard explanation in line with one of the views raised above, and to make concluding remarks with policy implication.

## **1.2 Statement of the problem and justification**

In the endogenous growth models (extended Solow growth model), the level of output per worker depends on both the amount of physical capital input per worker and human capital per worker input. Poor nations with little human capital cannot hope to catch up industrial nations simply by accumulating physical capital. So, different levels of investment in human capital- through training and education help to explain the lack of convergence of per capital income levels and growth rates overtime ( Mulheam and Vane, 1999: p. 197).

There is a need for increasing public expenditure along with the need for public goods (utilities) so as to achieve certain goals and objectives like economic growth and development. It should be born in mind that recently the scale and composition of government spending have changed dramatically. Over the last decade, Ethiopia has made economic progress and since 2003 recording more than 11% average growth. By spending more than 60 percent of its total expenditure on poverty oriented sectors, such as agriculture, education, health, water and road development during the last seven years, the government has maximized its efforts and shown the highest level of dedication to bring about pro-poor economic growth (Ethiopia:2010 MDGs Report).

The total expenditure during the country's Growth and Transformation Plan (GTP) period prioritizes the financing of ongoing projects and investments on pro-poor sectors (such as

agriculture and rural development, education, health, roads, rural electrification etc) that will help realize development policies and strategies set by the government and described in the GTP. According to the plan, by the end of the plan period, it is expected that total public spending will reach ETB 201.1 bln, up from its ETB 71.3 bln in 2009/10 and ETB 29.3 billion in 2005/06 (GTP, 2010). This increasing trend indicates that the government is escalating its expenditure. Nevertheless, critics of using the surpluses, using government spending say that tax cuts, increased spending will be inflationary. Moreover such increases would tilt the allocation of resources away from the high- tech, high- productivity private sector and toward the less productive public sector, blunting the very economic growth that generated the surpluses in the first place. And because high spending levels tend to get “institutionalized” into federal budgets, the enlarged public spending would continue even if tax revenue later declined as the economy slowed or receded (Mulhearn and Vane, 1999: p.197).

Though there has been considerable number of researches in attempt to gauge the impact of government spending on economic growth. The studies on impacts of government expenditure on economic growth have continued to generate series of debate among scholars. Some scholars argue that increase in government expenditure on Socio economic and physical infrastructures encourages economic growth. However some scholars did not support the claim that increasing government expenditure promotes economic growth, instead they assert that higher government expenditure may slow down overall performance of the economy.

The study by Ditimi (2011) indicates that expenditure on agriculture had a significant influence on economic growth while expenditure on education, Health and Transport and Communication had insignificant influence on economic growth. This paper utilized the multivariate co-integration methodology to examine the effects of each sector on economic growth. On the other hand, a study by Saad and Kalakech (2009) where impacts of public spending on education, defense, health and agriculture with respect to sustainable economic growth is evaluated. These Authors also use method of analysis to examine these different effects on economic growth but have got opposite result with the study by Ditimi (2011).

A study by Alfonso and Alessandro (2008) analyses both the long and short-run relationship between government expenditure and potential output in European Union (EU) countries by means of pooled mean group estimation (Pesaran, Shin, and Smith (1999), results show that, over a sample of comprising EU-15 countries over the 1970 -2003 period, it indicated that there exist a common long-run elasticity between cyclically- adjusted primary expenditure and potential output close to unity.

Two studies on the Ethiopian context, the first one by Endale (2007); assessed the effect of defense expenditure on economic growth based on the Hausman (1978) test; random effect estimator is selected and employed in the analysis. The empirical result showed that defense burden is destructive to real GDP. The other study by Ketema (2006), tried to see the impact of various components of government spending (investment, consumption and human capital expenditure) on the growth of real GDP using Johnson Maximum Likelihood Estimation procedure. The study found that only the human capital has long run significant positive impact on growth of real GDP.

Some of the studies are very comprehensive (considers each sector of government expenditure such as the study by Alfonso and Alessandro (2008) and Ketema (2006). And some focuses specific expenditures such as the study which focus on the effect of defense expenditure on economic growth by Endale (2007). However, these studies come up with widely different conclusions. This paper attempts to examine the impacts of recently growing government sectoral spending on economic growth and their long run relationship; and use data set that shows the recent expanding government spending. The research focuses on human capital and agriculture which play a crucial role in fighting hunger, poverty and deprivation.

### **1.3 Objective and research question of the study**

The main objective of the study is to investigate the effects of human capital and agricultural spending on economic growth in Ethiopia.

The specific objective of the study is to evaluate and assess the impact education and agriculture has in the overall economic growth of the country both in the short-run and long run.

On the basis of the premises that findings of this research complement and/or supplement outputs of previous researches, particularly on the relationship between government spending - on human capital and agriculture, and economic growth, the thesis is meant to respond to the following research questions as derivatives of the above objective/s:

- Is there a positive and strong correlation between level of spending on human capital and agriculture sector, and economic growth?
- What will be the short and long term impact it has on the overall economic growth?

## **1.4 Significance of the study**

As mentioned in the GTP, in the plan period (2010/11- 2014/15) allocation of development finance will aim to support the overriding objectives of poverty eradication.

Based on these objectives a larger share of total government spending planned to be allocated for development of pro-poor and development enhancing sectors – education, health, agriculture, infrastructure...etc. Given the shortage of financial resources on one hand and numerous competing spending needs on the other hand; investigating the growth effects of spending on these sectors and to identify the short and long run effect of higher total government expenditure on growth is vital.

By utilizing some economic theory and empirical analysis the study will evaluate and analyzes the relationship between government spending and economic growth in Ethiopia. The study provides guidance for policy makers and development partners. The study will also serve to back up policy decisions on allocating government investment and



spending, enhancing the efficiency of the resource use.

## **1.5 Research hypothesis**

In the Ethiopian case; according to the GTP and previous policy documents, resource allocations have been guided by the government's pro-poor growth policy where by the lion's share of available resources are allocated to priority infrastructure and services that enhance pro-poor economic growth and social development. It is widely thought that the policy encourages and support investment, and hence promotes rapid and broad based economic growth. Thus based on a priori economic theory the following tentative hypothesis is developed:

Expenditure on education, health and agriculture will have a positive effect on economic growth at least in the long run.

## **1.6 Scope and limitations of the study**

This study will look at the growth effects of only human capital and agriculture sector spending of the government of Ethiopia. It should be known that this study has its own shortcoming such as inadequate availability of reference materials, time constraints and the dearth of data itself is a limiting factor.

## **1.7 Organization of the paper**

The paper is organized in six chapters, the s e c o n d chapter deals with the review of growth and expenditure theories; and empirical literature reviewed. The third chapter discusses the trend and status of government spending and economic growth. The fourth chapter comprises issues related to the methodological part of the research and economic modeling; and econometric analysis presented in the fifth chapter. The six chapter summarizes, conclusion and policy recommendations presented. Finally references and Indices are presented.

## **Chapter Two**

### **2. Review of related literature**

#### ***2.1 Overview***

This section has three sub-sections, including review of growth and expenditure theories, which introduces major growth models, the public expenditure growth theories of the Wagner law of increasing law of public expenditure and the Peacock-Wiseman hypothesis. And the third section is the main body or component of literature review presented to give the general picture about the literature. In this section discussion will be made focusing on the reasoning, logical arguments behind as well as to back-up the research topic by the relevant literatures through discussing, summarizing and developing synthesis on the research paper. Some research papers and journals are selected according to their relevance to the topic and the major theme under study. The conclusion part will focus on presenting the summary obtained from reviewing different literatures. The key terms and focus of this research are: government spending, human capital, agriculture and economic growth. Before looking at the studies that have been examined the theoretical and empirical literatures on the effects of government spending on economic growth, it would be useful to give a brief description of economic growth and public expenditure growth theories in studying the relationship between government spending and economic growth and their short and long run effects of growing government spending.

#### ***2.2 Theories of economic growth***

Ever since the inception of systematic economic analysis at the time of the classical economists from William Petty to David Ricardo the problem of economic growth – its sources, forms and effects – was high on the agenda of economists. Interest in the study of economic growth was central in classical political economy from Adam Smith to David Ricardo, and in its critics by Karl Marx, but moved to the periphery during the so called ‘marginal revolution’. John Von Neumann’s growth models and Roy Harod’s attempts to generalize Keynes’s principle of effective demand to the long run re-ignited interest in growth

theory. Following the publications of papers by Robert Solow and Nicolas Kaldor in the Mid-1950s, growth theory became one of the central topics of the economics profession until the early 1970s. After a dormancy of a decade, since the mid- 1980s, economic growth has once again become a central topic in economic theorizing.

The recent famous theory is called ‘endogenous growth theory’, according to it the growth rate is determined with-in the model and is not given as an exogenous variable (Salvadori, 2003).

### **2.2.1 Classical growth theory**

The classical economists recognized three factors of production: land, labor and Capital. They laid the foundation for a number of growth theories. The foundation for classical growth model was laid by Adam Smith. He pioneered a supply side driven model of growth and his production function was as follows:-

$$Y = f(L, K, T)$$

Where Y is output

L is labor

K is capital

T is land

Consequently output growth (gY) was driven by population growth (gL), investment (gK) and land growth (gT) and increases in overall productivity (gP). Symbolically:

$$gY = f(gP, gK, gL, gT)$$

Smith argued that growth was self-re-enforcing as it exhibited increase returns to scale. Besides he considered savings as a creator of investment and hence, growth. Adam Smith explained economic growth thoroughly as an endogenous phenomenon. According to him, the growth rate depends on the decisions and actions of agents, especially their savings and investment behavior, and the creativity and innovations. They come up with in given social and historical conditions and institutional settings (Salvadori, 2003). More specifically, special emphasis is placed on the endogenous creation of new knowledge that can be used economically. New technical knowledge is treated as a good, which is or in the long-run tends to become a public good. The additional work force required in the process of accumulation is generalized by that process itself: labor power is a commodity, the quantity of which is regulated

by the effectual demand for it. Diminishing returns due to scarce natural resources are set aside or taken to be compensated by the increase in productivity due to the division of labor.

### **2.2.2 Keynesian growth theory**

Harrod and Domar are the first to develop the first macroeconomic model to formally analyze one problem of growth. The model argued that saving, investment technical progress and population growth as the major causes of growth. In their model production is obtained only by means of physical capital and labour. Since Harrod and Domar, following Keynes, believe that the market mechanism is not able to attain full employment of labor, they focus only on the equilibrium of the goods market which holds when savings are equal to the desired investment- rather than the general equilibrium on the goods and labor markets.

On the other hand, Kaldor (1954, 1980a, 1961) holds that it is not saving, investment, technical progress and population growth that are the causes of growth, - but the attitude of investing by society and in particular of entrepreneurs. In this he follows the Keynesian approach in conceiving the expansion of the economy as driven by psychological and social factors like human attitude to risk-taking and money-making (Kaldor, 1954, p. 67).

### **2.2.3 Neo-classical growth models**

Before I proceed with my analysis I briefly summarize how this paper is related to the literature on economic growth from the perspective of the Neo-Classical growth model and the endogenous growth model in the subsequent section. The Neo-Classical growth model was an extension of the Harrod-Domar model that included new term, productivity growth. According to the neo-classical theories growth comes about in three ways if holding land fixed; increase in the labor supply, capital stock and productivity. Since real output rises as more people take part in a country's production, increasing labor supply generate a larger output. Capital increase can have two forms; physical and human capital. Physical capital increase output because it enhances the productivity of labor and provides valuable services directly. Human capital promotes economic growth because people with skills are more productive than those without skill and this can be done through University studies, on-job

training etc.

The most important contribution was probably the work done by Robert Solow; in 1956 Solow and T.W.Swan developed relatively simple growth model. Solow (1956) extended the Harrod-Domar model by adding labor as a factor of production, requiring diminishing returns to labor and capital separately and constant returns to scale for both factors combined. Solow assumes that there is only capital and labor as a factor of production. The technology is represented by means of a neo-classical production function with constant returns to scale, decreasing productivity with respect to physical capital and possibly labor augmenting technical progress. He also assumes flexible prices so as to construct a model that conciliates full employment of resource with growth. In particular, equilibrium on the capital market yields that investments are equal to savings while the equilibrium on the labor market yields that there is always full employment of labor.

Inspired by the article by Ramsey (1928), several growth models have been constructed in order to improve Solow's model by making the rate of saving of households endogenous. The accumulation process in the Ramsay's model is similar to that of Solow's which is described as higher level of capital per capita, production will generate a new supply of capital and a demand of capital for a full employment steady state with constant per capita capital will arise. According to Solow, if the supply of capital is equal to demand of capital, steady state is attained. However, in Ramsay's model along the optimal path, the rate of saving changes over time and converges towards the long-run level associated with the steady state.

#### **2.2.4 Endogenous growth theory**

As stated in the book of Salvadori (2003), the endogenous growth theory has had remarkable success in giving new energy to the neo-classical research program going back to the fundamental question of the factors which determine economic growth and abandoning the static vision of competitive economic equilibrium. The aim of the theory is twofold; first to overcome the shortcomings of the Solow and Ramsey models which are unable to explain sustainable growth, and second, to provide a rigorous model in which all variables which

are crucial for growth, in particular saving, investment, and technical knowledge are the outcome of rational decision. The augmented Neo- Classical model simply extends the basic production function framework to allow an extra input to enter the production function; Human capital. The endogenous growth model or approach argues that there should be an additional effect of human capital over and above the static effect on the level of output. This indicates that the endogenous models explain growth further with human capital, which is the growth rate also depends on the rate of return to human capital as well as physical capital.

McConnel (2002) wrote about the fundamental ways how society can increase its output and income as; first by increasing inputs of resources and second by increasing the productivity of these inputs. Other things equal, increase in land, labor, capital and entrepreneurial resources yields additional output. But economic growth also occurs through increase in productivity measured broadly as real output per unit of input.

Productivity rises when the health, training, education and motivation of workers are improved.

### ***2.3 Public Expenditure Growth Theories***

There are theories in explaining the factors determining the growth in public expenditure. Among them Adolf Wagner's law of increasing government activities and the Peacock Wiseman hypothesis are more important. The factors are mainly environmental, technological, economic, administrative and political in nature.

#### ***Adolf Wagner's Law of increasing State activity***

Wagner (1883) the German economist made an in depth study relating to rise in government expenditure in the late 19<sup>th</sup> century. Based on his study, he propounded a law called 'The law of increasing government activity'. The law states that "as the economy develops over time, the activities and functions of the government increases". He pronounced two purposes of explanation on the growth of public expenditures. The first of Wagner's

explanation identified the social transformation between a society based on primary activities (as agriculture or fishery) and a society with the rising of the industrial sector. The second law of Wagner suggested that public goods were characterized by higher income elasticities (as in micro economics context the luxury goods); so with rising national product, and national income, public expenditures tends to grow. Thus the common exogenous variable to explain the growth of public expenditures is national product.

### ***The Peacock-Wiseman Hypothesis***

Peacock and Wiseman conducted a study based on Wagner's law. They studied the public expenditure from 1891 to 1955 in UK. They found that the Wagner's law is still valid. They identified 'displacement effects' as a reason for the shift of the demand of public goods and services. Facing obligations assumed during special periods, like wars or social convulsions, governments have difficulties when they try to re-establish the structure of public expenditures which were verified before these unusual moments.

Therefore after these moments, there is a tendency to increase the amount of public outlays.

As articulated by Reis (2007) other authors, like Downs (1957), Romer and Rosenthal (1978) or Maltzer and Richard (1981) appealed to the redistribution processes as a possible causes of public growth expenditures. According to the theorem of the Median voter of Downs (1957), the politicians will search to satisfy the preferences of the median (observing an ordinary scale of some measurable variable, like personal income).

Therefore, democratic elected governments will try to please this representative voter, enlarging her endowments, especially through current transfers. Consequently, a very suggestive explicative variable of the growth of public outlays should be identified with the movement of real current transfers per capita.

Moreover, Pyne (1991) illustrates the applicability of Socialization Hypothesis which assumes that the government spending grows because the decisions about spending are made by government officials who have been socialized into pro- spending beliefs by their membership in government organizations. He argued that, especially in times seen as crisis, government keeps adding new programs as experiments, as response to changing conditions and as temporary measures. Once a program is in place, it creates, in turn, an array of administrators and program-linked beneficiary groups that mount a one- sided campaign of persuasion in its favor. Hence, policy makers are persuaded that all the old programs are valuable and must not be terminated, with new programs constantly being added and few old programs being dropped, the overall result tends to be continuously spending growth.

James and Paul (1981) argued that the impetus for the growth of government has come largely from the supply side. That is, changes in technologies have led to forms of organization and behavior which make taxation easier and have thus enabled government to increase tax revenues: these changes have made self-employment, with opportunities for barter, more expensive and have also made home production more expensive relative to market production, and both of these changes increase the opportunities for taxation. If there exist chances always for politically profitable income re-distribution measures, then it must be from the supply side that growth in government can occur, and their results were consistent with this argument. They also noted and explained in their model that one way of granting favors to a special interest group is to reduce the taxes which they must pay however; a reduction in taxes is a benefit only if taxes are initially high.

## ***2.4 Impacts of government Sectoral spending on economic growth***

A number of researchers have studied study the effects of government spending on economic growth. However these studies have continued to generate a series of debate among researchers which have generated a wealth of literature which despite using different methodology often come to contradictory conclusions. Each case is valuable as examples of empirical as well as theoretical literatures into the impacts of government sectoral spending on economic growth. The studies demonstrate the absence of empirical consensus and also revealed



a series of differences in methodology during analyzing the results.

### **2.4.2 Empirical literature**

The empirical literature on the relationship between government spending and economic growth remains controversial. Most studies on the relationship between public spending as productive and others conclude that big government reduces growth of per capita income. Government spending can take different forms as:-

- Public investment to enhance education and health services that increase the stock of human capital;
- Investment on public infrastructure assets (transport and communication system as well as energy, water supply and sanitation) to support market production and the creation of human capital;
- Transfer and public consumption representing expenditure with public goods' characteristics which may enter into households' preferences (public parks, civic facilities and consumption transfers) and public administration necessary for the functioning of the government (including justice, security and tax collection).

Hence, the definition of nation's wealth has extended to contain not only the physical capital but also human capital as an independent factor of production essential to achieve high and sustainable economic growth rates. This study tries to explore the impact of Human Capital and agriculture sector spending on economic growth.

As articulated by the work of Le Gibson and Oxley (2003); Schultz (1961) and Machlup (1962) calculated human capital based on the idea that investment in human capital is equal to the stock of human capital. In his study human capital can be measured (estimated) in cost based approach which takes all forms of costs of forming human capital into account

retrospectively which means that almost every aspect of human capital has to be calculated separately (education finance, health, etc). Accordingly, in this study human capital is estimated by the government total spending on education and health sectors.

The relationship between government spending/different components of expenditures and economic growth has received a lot of attention of researchers. For instance, Musibau and Rasak (2005) using Johansen Co-integration technique and Vector Error Correction Methodology in Nigeria for the period of 1970 – 2003, find long run relationship between enrollments in primary and tertiary level as well as the average years of schooling with output per worker. Further the study examines two different channels through which human capital can affect long run economic growth. The authors put when human capital is a direct input in the production function as the first channel and the second channel is when human capital affects the technology parameter. Bakare and Olubokun (2011) investigate the relationship between health care expenditure and economic growth in Nigeria using OLS multiple regression analytical method. The study finds a positive relation between health care expenditure and economic growth in the period under study (1970 – 2008). Based on their finding they conclude that public expenditure has vital relationship to growth and development of any nation and they also noted that expenditure on health care improves health, the life expectancy, efficiency and productivity of labor.

Evidence from time series data which investigate the relationship between government education expenditure per worker and economic growth during the period 1965 – 1999 in Uganda also found that education expenditure per worker has a positive and significant impact on economic growth both in the long-run and short-run (Jacob and Walid, 2004).

Based on the estimates of error-correction model, the authors suggest that a 1 per cent increase in average education expenditure per worker will lead to about 0.04 per cent increase in output in the short run; and the co-integration estimates shows that a 1 % increase in average education expenditure per worker will increase output by about 0.6 % in the

long run.

As the authors suggest an increase in education expenditures help to improve the economy's growth performance is economically sound. And as a caution, however, for education expenditures to have the intended results to the fullest, they suggest that there has to be competent administration at lower level of government to formulate and execute the budget and to allocate resources efficiently within the education sector, otherwise, without this background, resources allocated to the education sector may not have appreciable positive impact on economic growth.

Saad and Kalakach (2009) also find that government spending on education has positive effect on growth in the long-run and negative impact in the short run while spending on health and defense has a negative effect on economic growth in the long run and insignificant in the short run. And spending on agriculture is found to be insignificant in both short and long run cases. They studied the growth effect of this government sectorial expenditure using econometric analysis.

Halil et al (2006) examines the long run relationship among the per capita private, public and total health care expenditure and per capita GDP and population growth for Turkey. Their study employs a multivariate co-integration technique proposed by Johansen. The Johansen method provides some evidence of multivariate co-integrating vector among the health care expenditure and GDP and population growth. They found statistically significant bi-variate co-integrating relationship between private health expenditure and GDP. They also indicate that the income elasticity of health care expenditure (HCE) is also estimated to be greater than one, indicating that HCE is a luxury good in Turkey.

Moreover, they found that there exists one way causality running from income to various definitions of health care expenses. And notify that they do not observe any reverse causality.

Amasoma et al (2011) also investigated the relationship between the components of government expenditure (that is education, agriculture, health and transport and communication) on economic growth in Nigeria for the period spanning 1970 to 2010 using an Error Correction Model. The authors find out that expenditure on agriculture was the most significant component of government expenditure which impacted on economic growth. While the other components education, health, transport and communication was observed to be insignificant in both the short run and long run. Based on the study the author suggested that government educational spending has been relatively low which is expected to affect the nation's level of human capital in the long run. Musibau and Rasak (2005), as discussed above, find that education has long run relationship with growth.

In Ethiopia, a study by Ketema (2006) also investigates the impacts of various components of government spending on the growth of real GDP and found a significant positive impact of human capital on economic growth. The author uses Johanson Maximum likelihood estimation procedure for the period 1960/61 to 2003/04. It is found that only expenditure on human capital have long run significant positive impact. Investment (productive) government spending displays a negative but insignificant impact on growth of real GDP.

Abu and Nuredin (2010) studied the effects of government spending on economic growth by employing a disaggregated analysis. The paper uses the co integration and error correction methods to analyze the relationship. The result was that total government expenditure and expenditure on education have negative effect on economic growth and on the contrary, rising expenditure on transport and communication and health results to an increase in economic growth.

Wubet (2006) found that human capital variable in the form of schooling has an insignificant impact on the level of output. The author investigated the impacts of human capital on economic growth in Ethiopia between the period 1971 and 2005 using an Error Correction Methodology. And the researcher noted that the deteriorating quality of education in the wake of significant expansion in the sector is an important element that puts into question the basic framework that education provides students with growth enhancing skills. She poised

that schooling might not actually be creating the required skills or raising worker's productivity.

Loto (2011) investigated the impact of government expenditure on economic growth over the period of 1980 to 2008 using OLS regression analysis. It was found that in the short run, expenditure on agriculture was found to be negatively related to economic growth. Though expenditures on national security, transport and communication were positively related to economic growth, the impacts were not statistically significant.

In an attempt to assess the impact of the composition of government spending on economic growth in developing countries using a dynamic GMM model and a panel data set for 44 developing countries from 1980 to 2004, Bingxin et al (2009) found that the various types of government spending have different impact on economic growth. The result shows, in Africa, human capital spending contributes to economic growth whereas in Asia capital formation, Agriculture and education promotes economic growth. In Latin America, none of government spending items has significant impact on economic growth.

Shioji (2001) studies the role of public capital in economic growth. The study employs an open economy growth model and estimates the dynamic effect of public capital on output per capita for United States of America (1963 – 1993) and Japan (1955 – 1995). According to his study, in both countries the infrastructure component of public capital – streets & highways, Utilities, sewerages ...etc, have significantly positive effects. The implied elasticity of output with respect to infrastructure is somewhere around 0.1 to 0.15. The result suggests a modest contribution of infrastructure to growth of the two countries for the period under study. With respect to education the estimated long run effects in these two countries is different. In the United States “education” has a significantly negative effect while in Japan the estimated effect of education differs between methods. It is insignificantly non-zero when using OLS with regional fixed effects (add regional dummies) is used but significantly positive in the case of GMM (DIF) which eliminates regional specific constant through differencing. The author also found that the effect is insignificant for conservation of National Land and is significantly positive for agriculture and fishery. As the exact economic relationship between components of government spending and economic growth is debatable,

the effect of total government spending on economic growth is also inconclusive. Ghali (2003) studied the economy of Tunisia. He developed and used a vector error-correction (VEC) model and identified that the government spending has not only direct effect on growth but also has indirect induced effect resulting from its interaction with other macro-variables such as investment, trade and labor. And his study has led to three channels through which government spending may have an accelerating effect on economic growth. And one channel through which government spending may have depressing effect on economic growth. According to the study, he pointed out that government spending that aimed at shaping the general efficiency of the economy and promoting the productivity of labor and imports have accelerating effects on economic growth and whereas government involvement in the productive sectors of the economy has a crowding out effect on private investment and, hence, depressed economic growth.

Angelopoulos and Philippopoulos (2007) use annual data for Greece 1960-2000 to study the link between fiscal policy and economic growth. Their result showed that although a smaller public sector can be good for growth, the importance of giving serious consideration beyond size; the composition and quality/efficiency of the public sector are equally important. They indicate that smaller government share in GDP, a reallocation of funds away from the wage bill to public investment; and an improvement in government quality/efficiency can become engines of economic growth.

Ambachew (2010) explore the existing health condition of countries of Sub-Saharan Africa using dynamic panel data model. The model estimated by using the system and difference Generalized Method of Moment (System GMM and difference GMM) that takes into account the endogeneity of health and other repressors like education, population growth....etc. The result reveals that health human capital which was proxied by life expectancy at birth and infant mortality rate; positively and significantly affect economic growth of Sub-Saharan Africa while the effect of education was found to be positive but insignificant.

A study by Shaista et al (2010) examine the long run relationship between social expenditures and economic growth in case of ten Asian countries for the period 1970 –2005; employing the J.J.Cointegration approach and used a specific rank test (panel co-integration

test) for panel of these countries. The study analyses and concludes that expenditures in the social sector can increase economic growth. The studies also discuss and pronounce that such social expenditures enhance productivity by providing infrastructure, education, health and harmonizing private and social interests. Alfonso and Alessandro (2008) also studied the short and long run relation between government expenditure and potential output across EU countries during 1970 to 2003 by means of pooled mean group estimation (Pesaran, Shin and Smith; 1999). And found that the average of individual country level estimates would have yielded a long run elasticity of government expenditure well above unity.

Barro (1996) analyzed growth and democracy for a panel of about 100 countries from 1960 to 1990. According to the study, the favorable effects on growth include maintenance of the rule of law, free markets, small government consumption, and high human capital. He pointed out that, once these kinds of variables and the initial level of GDP are held constant, the overall effect of democracy on growth is weakly negative.

With respect to economic development his analysis indicates that improvements in the standard of living – measured by the country's real per capita GDP, infant mortality rate, and male and female primary school attainment substantially raise the probability that political institutions will become more democratic overtime.

To sum up, in this section endogenous and other growth models have been introduced and it can be concluded that there is continuity from classical to endogenous growth theory, partly through Keynesian theory, concerning the fact that the steady state is conceived as endogenously determined by the model. The model incorporates, in addition to the physical capital, human capital as an independent factor of production essential to achieve high and sustainable economic growth.

The cause and nature of the increase in public spending explained using two popular theories; the Wagner's law of increasing state activities which assumes that the spending pressures stemming from the continued expansion of social programs and with the rising national product/income and the other theory, the Peacock-Wiseman theory which

pointed out special periods, like wars or social convulsions, as a factor that tend to increase the amount of public spending.

Economic theories suggest that government contributes to total economic growth in two ways; positively through the provision of public goods and services; and negatively through the inefficient provision of such goods and services and the distortionary effects attendant with their provision. From the literature presented above, empirical evidence is not conclusive on whether government spending on human capital and agriculture has positive or negative effect on economic growth in both short run and long run. The literature examined both the positive and negative effects of public spending on overall growth in the economy for a time series data and a cross section of countries. In general, the literatures indicate that public spending has both significant positive and significant negative effect on growth. Some of the empirical studies give mixed results.

In sum, the expected effect of public spending on growth differs in the context of countries, methodology used and it is also considered different types of expenditures have divergent effects. Along with these review of literature, some facts that should be taken into consideration can be identified, like investigating the relationship between components of public spending with growth is important. A careful cost benefit analysis is particularly important for developing countries like Ethiopia because of the ambitious plan and its aims to join the group of middle income countries in the next decade. Hence identifying the sub-sector that contributes to growth and make decision to transfer resources from the unproductive sector to productive ones is essential to overcome the financing challenge and for efficient utilization of resources. The theory of Co-integration and error correction model is appropriate so as to examine the short run and long run relationship between the variables under consideration and make decision on the allocation of the scarce resource.



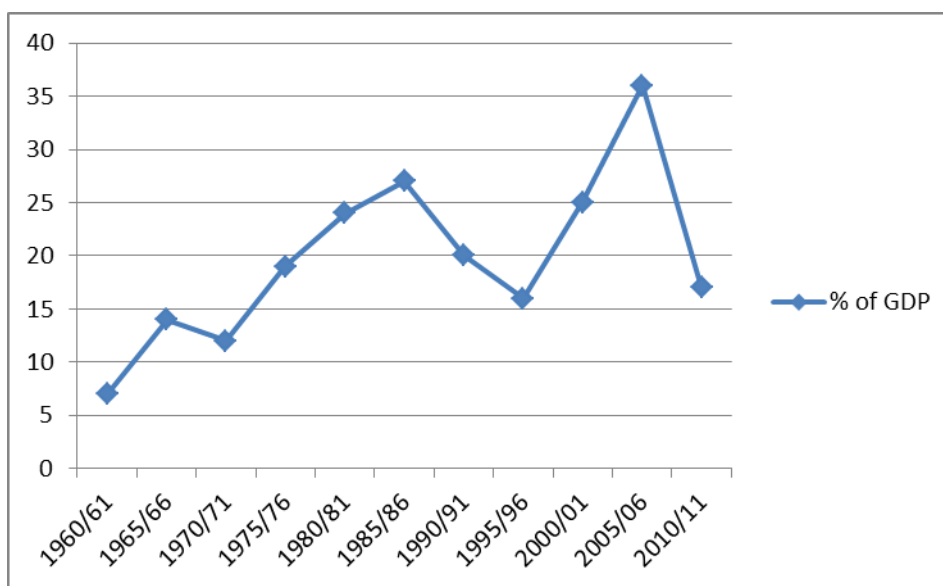
### **2.4.3 Trends of Government Spending and Economic Growth in Ethiopia**

Government spending trend in Ethiopia has changed dramatically within the last ten years. Thus, it is important to monitor trends in the levels and composition of government expenditures, and to assess the causes of the change over time. It is even more important to analyze the relative contribution of sectors expenditures to GDP and poverty reduction, as this will provide important information for more efficient targeting of these limited financial resources.

#### ***2.4.3.1 Growth and Composition of government spending***

At the most aggregated levels, the composition of government expenditures has an impact on the output of the public sector in particular and in the economy wide in general. The classification of functions or socio-economic objectives; that general government units aim to achieve through various kinds of outlays, such as economic, social, general and other services. The composition of expenditures reveals the priority setting of an economy, for instance, when a large share of spending is devoted to future oriented areas such as education and R &D. Considering the ratio of total government spending to GDP which measures the amount of government spending relative to the size of the economy is more important.

**Figure 2.1 Level of government spending as percentage of GDP**



Source: MoFED, Annual report, 2011

During the Imperial period the ratio of government spending to GDP ratio was 11% and grows by more than 100% in the Derg regime. In the Derg regime government spending show a tremendous fluctuation ranging from a high of 33.51% in 1988/89 and a low of 18.01% of GDP in 1974/75. On average, government spending was 25.22% of GDP over the seventeen years of the regime. The share of government spending on average reached 28.21% of GDP between the year's 2000/01-2004/05 and the share decreased by about 22% for the last six years average (19.21%).

In broader terms, government expenditure has two components, recurrent and capital expenditure. There is no definite line dividing the two. However, capital expenditure may loosely to be taken to mean government expenditure for economic and social development expressed in financial terms. On the other hand, recurrent expenditure (RE) is related to financial out lays by the government to run state administration of government defense and security and provision of social and economic services. Unlike capital expenditures (CE), recurrent expenditures are mainly for government consumption.

During the three regimes, spending pattern as shown on the table below, the percentage share

of recurrent expenditure to GDP was higher than that of capital expenditure. The share of recurrent expenditure to Total Government Expenditure (TGE) is decreasing sharply from the Imperial period (86.5%) to Military regime (73.5%) and then EPRDF (60.7%) but the percentage share of capital expenditure to TGE is increasing at an increasing rate. On average, the share of capital expenditure increased from 13.5% (Imperial regime) of TGE to 26.4% and 39.3% in Derg and EPRDF regimes, respectively.

**Table 2.1 Average percentage share of recurrent and capital expenditure from GDP and TGE and average GDP and TGE**

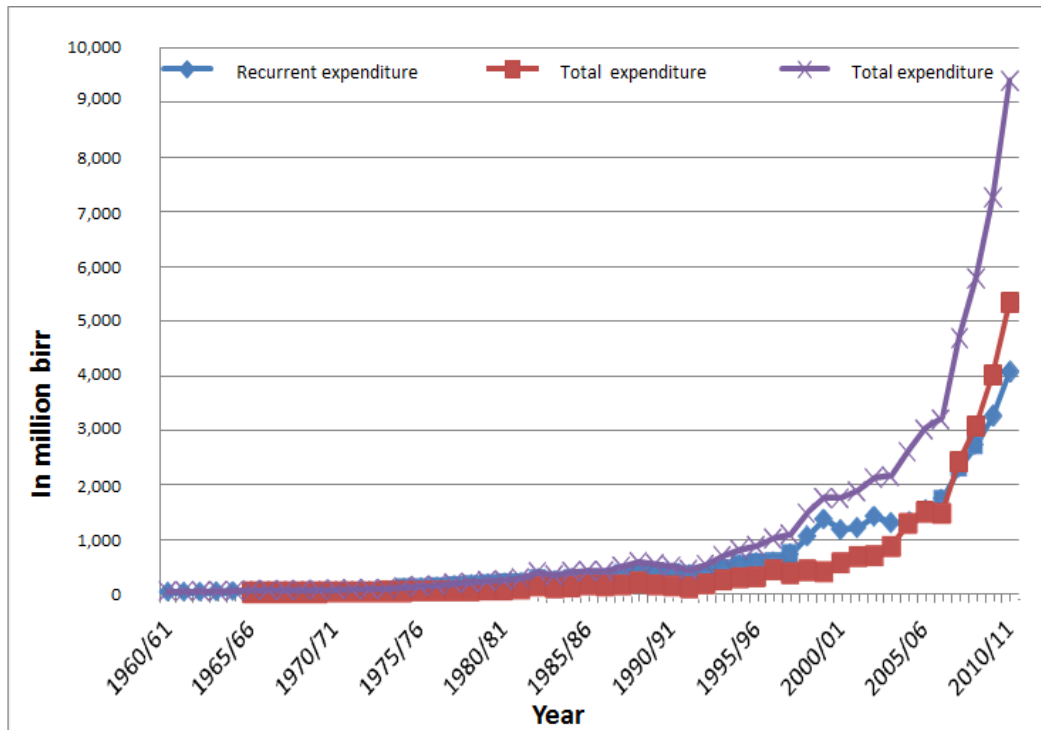
Regime	Period of time	Share from GDP (%)			Share from TGE (%)		Nominal TGE and GDP on average in millions of birr	
		Total	RE	CE	RE	CE	TGE	GDP
Imperial Regime	1960/61-1973/74	11.8	10	1.7	86.5	13.5	433.7	3812.19
Derg Regime	1974/75-1990/91	25.2	18.4	6.2	73.5	26.4	3125.9	13224.6
EPRDF Regime	1991/92-2010/11	18	11.1	7	60.7	39.3	2619.9	146800.8

*Source: MoFED and own calculation*

Recurrent expenditure for the year 1960/61 was 7.17% of GDP which is 100% of TGE. During that period there was no capital expenditure till 1964/65. The share of recurrent expenditure out of the total continued to claim more than 80% for the period from 1965/66-1973/74. This shows the behavior of government expenditure during the Imperial period emphasis was given for recurrent expenditure while public investment was minimal (Appendix A).

Since 1964/65 capital budget allocation started to take place alongside to recurrent budget allocated at sector level. In the Imperial regime the government focused more on the reorganization of the sectors and took the administration measure. During the Imperial regime on average the recurrent and capital expenditure accounted for 7.2% of GDP in the year 1973/74. For the final year of the Imperial regime (1973/74) total expenditure reached 12.8% of GDP.

**Figure 2.2 Trends of Components of expenditure**



Source: MoFED

During the period 1974/75-1990/91, remarkable change occurred in government expenditure since the down fall of the imperial regime in the year 1974/75. At the end of the military regime's period (1990/91) government expenditure constitutes 75.4% was recurrent which shows government increased expenditure on General services such as defense. The share of government expenditure observed a growth rate as high as 43.7% in the year 1982/83 from the preceding year 1981/82. In general, during the period 1974/75- 1990/91, the increment in recurrent expenditure was very fast as compared to capital expenditure and this can be attributed to the case of Somalia and civil war.

During EPRDF regime, expenditure follows four patterns; for the period 1992/93-1997/98 which the share of recurrent and capital expenditure is nearly the same, in 1991/92, 75% of the TGE was recurrent expenditure. The trend increases at a decreasing rate and in 1997/98 reached 67% of the total expenditure of the year. The second pattern, during the Ethio-Eritrea war (1998/99 and 1999/00) the share of recurrent expenditure took the highest

share (80% of the TGE) showing that most of the government budget was allocated for defense. Again during 2000/01-2003/04 the share of recurrent expenditure was more than 50% of the TGE. Thirdly, during 2004/05-2006/07 the share of recurrent and capital expenditure from the total spending was nearly equal. On the last pattern, at the end of the year 2007/08 there was dynamic change in budget allocation that is capital budget allocation (52% of TGE) was greater than recurrent expenditure and reached about 57% at the end of the year 2010/11. This was a new history for budget allocation during the three regimes (see table 3.2) and indicates government policy shift of budget allocation for investment to reduce poverty and promotes growth.

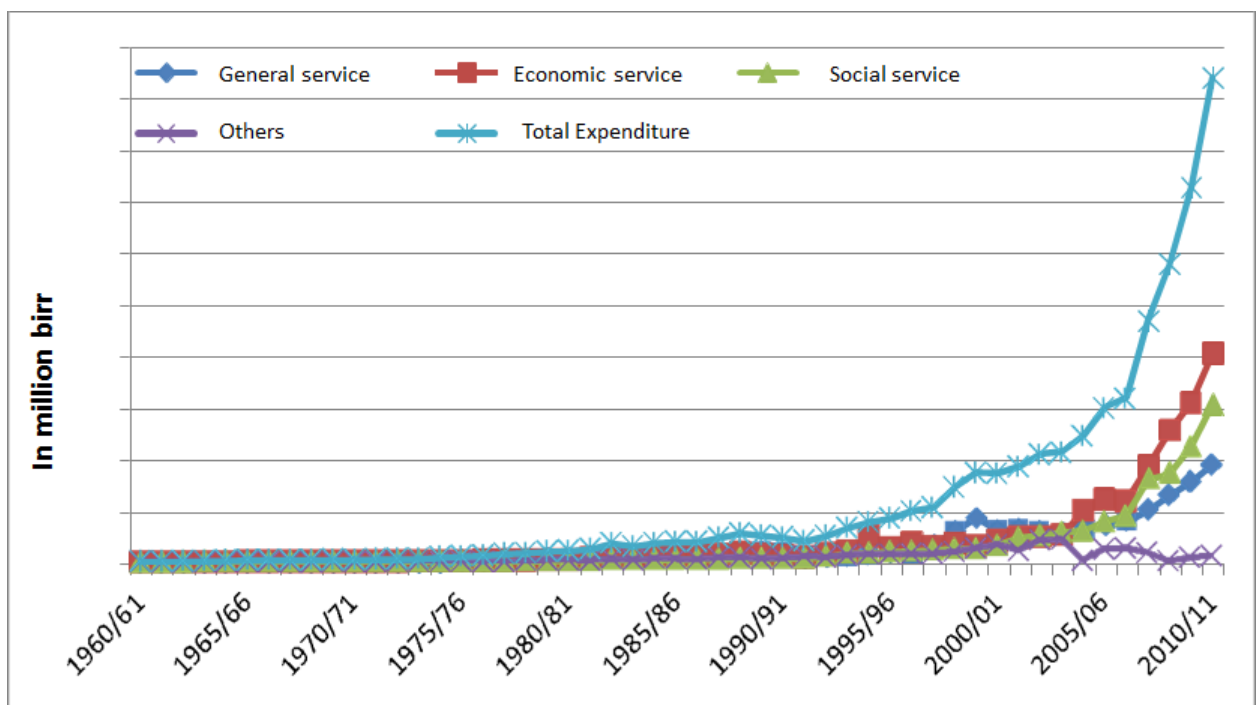
With regard to the functional expenditure of government, we can consider the four major categories of spending outlined as;

- Administration and general service (state organs, defense, foreign affairs, finance etc.)
- Economic service ( Agriculture and natural resource, road and urban development, trade and industry)
- Social Services (Education, health, other social service)
- Others (debt payment, pension, unforeseen miscellaneous)

At the time of the imperial regime (1960/61– 1973/74) the administration and general service took 49% of TGE and economic and social sectors had equal share from the total government expenditure on average. After the revolution (1974/75-1990/91) the administration and general service budget allocation on average had 41% of the total government expenditure. Next to it economic sector (28%) had a relatively a good share compared to social sector (17%) from the TGE because of the green revolution.

EPRDF as can be seen on annex-A for the years, 1991/92 – 1997/98 the share of administration and general service, economic and social and also other services were nearly the same (about 26 percent each, on average). But for the years 1998/99 – 1999/00 the budget allocation for administration and general service was about 57% of the TGE of the two years expenditure due to the Ethio-Eritrea war and the focus was given for Defense and Security services.

**Figure 2.3 Trends in Services and Total Expenditure**



Source: MoFED, annual report 2011

During 2000/01-2002/03 also, the share of administration and general service took bigger share (36 and 35% respectively) compared to the two sectors; and economic sector again had relatively better share compared to social sector expenditure from the TGE (see Annex-A). Expenditure on food security and infrastructure took the lion share from the economic sector. From the year 2004/05 onwards the government redirects its focus and most of the budget allocation was in favor of pro-poor sectors (education, health, agriculture and natural resource) consequently, the share of administration and general service increases at a decreasing rate (as shown in the annex-AIII).

### ***2.4.3.2. Public expenditure on pro-poor sectors***

It is believed that Pro-poor growth must be focused on rural areas, improve incomes in agriculture and make intensive use of labor, in order to have an immediate impact on poverty. Analytically there are two ways in which economic growth can be pro-poor.

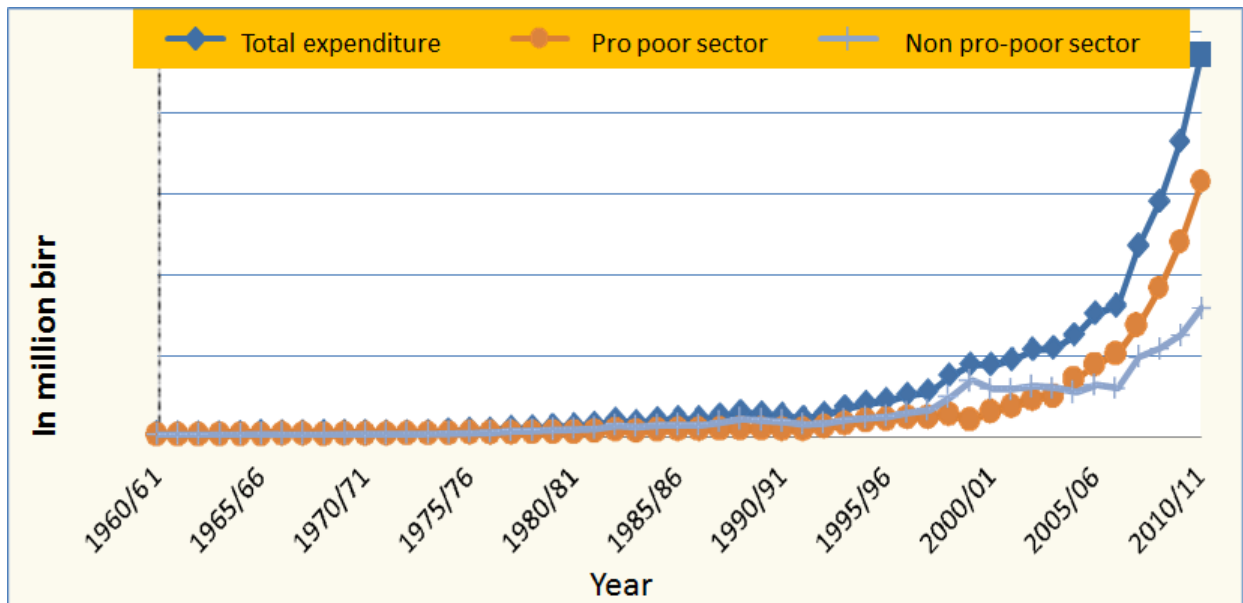
First, the pattern of growth is one which *directly* raises the incomes of the poor, and second, poor sections of the population can benefit from growth *indirectly* through public redistributive policies, such as taxes, transfers and other government spending. There is consensus that the extent to which growth will be pro-poor depends on the amount of human capital the poor possess, usually referring to education, skills training and good health, which is essential for the poor to take advantage of economic opportunities. It is also commonly frequent that growth must favor sectors and regions where the poor are (or are moving to) and use the factors of production they possess (or are able to acquire).

It is generally agreed that the vast majority of the poor are in rural areas, a majority depend directly or indirectly on agriculture for their livelihood, and the factor of production the poor possess and use most is labor. This second way of understanding pro poor growth in principle means that any kind of high growth could be made pro-poor if it involved progressive taxation and targeted government spending on the poor.

With regard to the composition of pro-poor sectors, the available data of government spending from 1960/61 – 2010/11 is analyzed and interpreted to produce a viable track of record of shares of government spending for pro-poor sectors. During the Imperial period in 1960/61-1964/65 the share of government spending on these sectors averaged 137.34 million birr; out of which the highest share was for education 47.5% of the total pro-poor sector spending; and Road and Urban development, Health and Agriculture and rural development had the share of 24.7%, 21.13% and 6.67% respectively. Pro-poor sectors share of expenditure as a proportion of the corresponding year GDP had been decreasing till 1964/65 averaged 2.28% in 1960/61-1965/66 and this trend continue to increase by 4.75% per annum on average and reached 5.42% in 1973/74. This indicate, although it was inconsistent, the pro-poor sectors

spending as percent of GDP has achieved significant change.

**Figure 2.4 Trends of the share of Pro-poor and non-pro-poor spending**



Source: MoFED, annual report 2011

On the other hand, during the military regime, the share of expenditure on pro-poor sectors to total government spending had been decreasing from what it was highest in 1975/76 (40.74%), except a minor growth record in 1985/86 (35.20%) from the preceding year expenditure share decreased to 27.93% of total spending. The military regime as it was a period of war and instability, the pattern (trend) of expenditure observed may not be surprising. During the post-Derg period, the percentage share of pro-poor sectors to TGE of the period, a major increase and remarkable growth has achieved. For instance, the share of poverty sectors from the TGE was 39.66% in 1992/93, reached 45.14% in 1995/96. Contrary to this encouraging trend of increase in the share of TGE it had been declining and reached 21.97% in 1998/99 which is the lowest in the three regimes. The decrease in the share of expenditure was due to the Ethio-Eritrea conflict and since 2004/05 the share increase more than 55% and reached 66.46 in 2010/11 (see tables– Annex-A).



Based on the expenditure by pro-poor sectors each of the three regimes had had similarities except some less significant variations. As shown in the Annex-A table I, II, and III, the percentage share of poverty sectors, especially education has a bigger share while health has the smallest as compared to others. It is important to look at the TGE trend in the three regimes with regard to expenditure level. The following table depicts the government spending for pro-poor sectors by the three regimes:

**Table 2.2: The three Regimes average expenditure in level of expenditure**

Regime	Sector	Nominal average Sectors' expenditure in millions of Birr	Emphasized Special Features
Imperial	Education	72.25	Quality education + technical capacity development
	Road and Urban development	41.9	Rural tarmac road Connecting major cities
	Agriculture and Natural Resource	28.52	Mechanization of large scale farms
	Health service	28.16	Construction of health stations and prevention of epidemic disease
Derg	Education	308.67	Literacy education to all increase access Technical capacity building

	Agriculture and Natural Resource	426.45	cooperative function Mechanization Productive asset provision Training Afforestation
	Road and Urban development	150.4	Rural tarmac road Connecting and accessing remote areas in road Urban planning
EPRD	Health service	109.67	Basic services
F	Road and Urban development	5321.1	Major road up grading New construction

*Source: MoFED and sectors' documents*

### ***Compositions of Pro-poor Sectors***

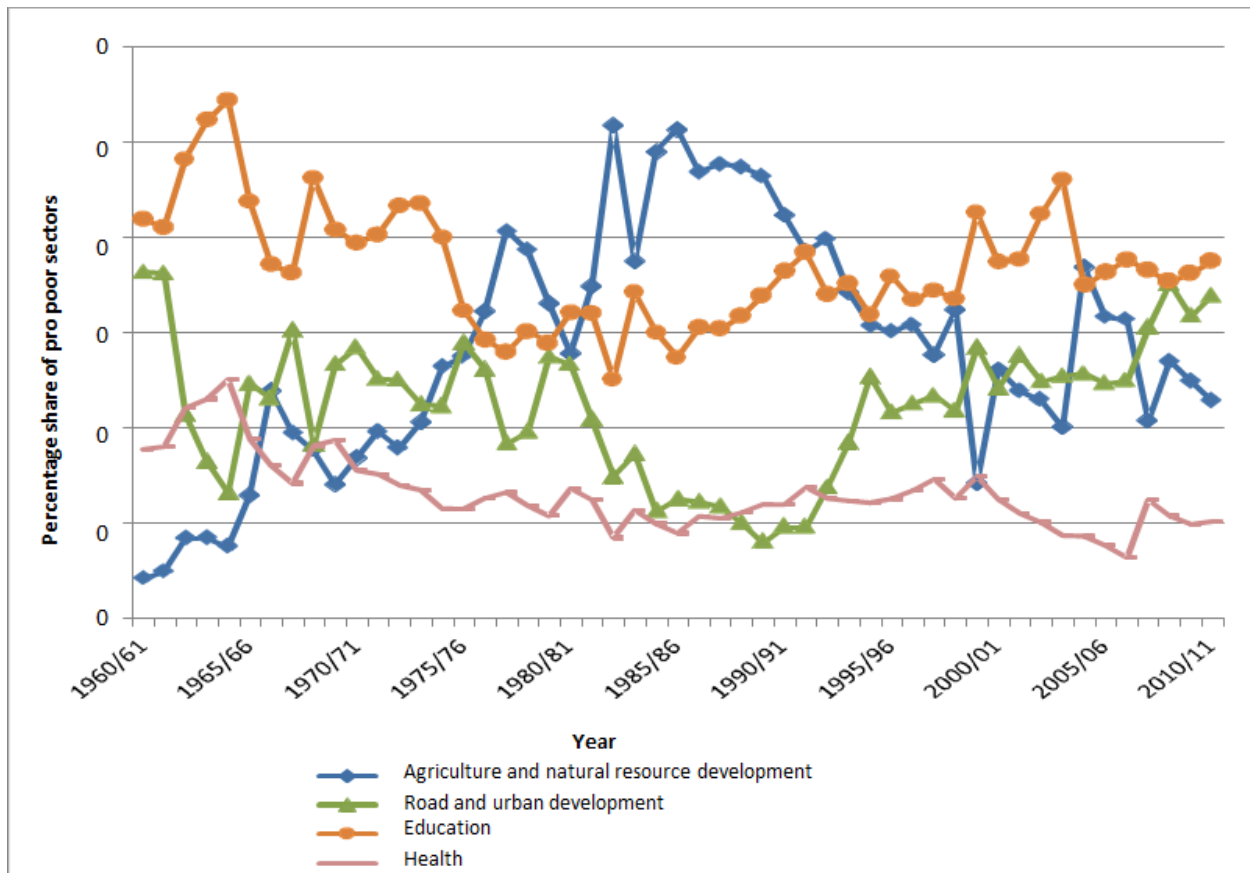
In fact, the top four pro-poor expenditures for Ethiopia between 1960/61 and 2010/11 were education, agriculture and road while lowest percentages of expenditures were for health.

Agriculture and natural resource, education and training, health and road and urban development are pro-poor sectors that have an important impact on the livelihood improvement of people. Government spending on pro-poor sectors has generally increasing during the period under study. Expenditure on these sectors as a share of GDP increased from 2.07% in 1960/61 to 12.21% in 2010/11. Spending on education is the highest average spending, 14.1% of the total government spending between 1960/61 and 2010/11 (figure 2.4.) which accounts 36.74% of total government pro-poor spending.

The share of spending on Agriculture and natural resource has increased from 1.19% in 1960/61 to 15.12% in 2010/11 averaged 28.27% of total pro-poor spending. Government spending on Road and Urban development has also taken a large average share of TGE

(8.96%) and pro-poor spending (22.31%) between 1960/61 and 2010/11.

**Figure 2.5 Composition and trends of Pro-poor sectors**



Source: MoFED, annual report 2011

Similarly, the health sector have got the lowest share as compared to the other sectors, which accounts for average share of 4.90% and 13.07% of the total spending during the period under study.

## *Education*

The education sector expenditure for the Imperial Regime had on average 0.77% of the GDP. According to the data the minimum share of the sector was 0.89% of GDP in 1961/62 while the highest was 2.4% in 1972/73. This sector has the highest expenditure during the period between 1960/61 and 1965/66 averaged 47.46% of the total pro-poor spending. Its share continues to decline steadily and reached on average 35.39% (1990/91-1994/95). And for the last ten years the share reached 37.97% of total pro-poor spending. Quality of education during the Imperial Regime is considered best since then; developing technical expertise was also a focus in the time. On the other hand, the Imperial regime had well utilized overseas volunteers in the sector mainly in teaching and experience sharing (Teshome 1993, pp. 73-100).

The education sector once again comes to the forefront of all other poverty reduction sectors in the EPRDF- led government based on its share of expenditure next to road and urban development. Except a significant reduction in expenditure for three years during the Ethio-Eritrea conflict, in 2010/11, a major increase in expenditure has been recorded.

The education sector share has reached 24.88% and 37.42% of the TGE and Pro-poor spending respectively.

Ensuring access to basic education in all parts of the country, construction of technical colleges and dozens of new universities, and branch faculties of those universities has contributed a lot to the growth of expenditure. In addition, capacity development programs and the transformation of class-education into a satellite PLASMA by item have also a meaningful part for the rising of expenditure (ESDP II 2008). Hence, one can see the extent of the priority and due weight given to the sector more than any other sector after the Imperial Regime. This priority on education during the EPRDF government is surprising when we assert that the government is being guided by ADLI; but still education is taking the lion share of expenditure among poverty reduction sectors next to Road and Urban Development.

### *Agriculture and Natural Resource Development*

The huge majority of the population of Ethiopia is an agrarian coming that generates its livelihood base on farming. Hence agricultural development programs are obviously essential and necessary for growth and poverty reduction.

Considering the expenditure on pro-poor sectors, there had been a significant change across the three regimes. With an average share of 5.13% of the average TGE (1960/61-1973/74), the Imperial Regime had had the least priority for the sector (average share of 13.12% and 12.74% for Derg and EPRDF regimes respectively). Though it had been increasing through time, the agricultural sector was the third priority next to education and, road and urban development sectors.

Agriculture during the 13 years of the Imperial period had two phases. The first phase until 1964/65 where the maximum share for the sector was 2.45% of the yearly total government expenditure and, the least being 1.19% in 1953. The second phase was post 1964/65 (1965/66-1973/74) where the expenditure for the sector had remarkably grown.

The TGE contribution grew by 4.04 in 1965/66 from 2.04 in 1964/65 and to 9.24 in 1966/67; swayed between 5 and 6% in the years 1968/69 and 1969/70 but rose up again till 1973/74 (8.73%).

On the other hand, the military regime that started its period with major public demands (especially the rural poor) had shown a rested interest on agricultural development and natural resources management. Consequently, had started vanishing out the political strata of the Imperial regime and declared “land to the Tiller” a prime issue instituting a public ownership of land its “Land Tenure Policy”. The Military Regime, started its period with a two digit expenditure for this sector for the first time under the study period and continued till it reached 18.06% (1985/86) of TGE. The least share of expenditure by the sector was 8.74% of TGE in 1980/81. During the period the sector share of TGE was 13.12% which was the highest compared to other pro-poor sectors.

Though, the Derg Regime had given a considerable priority for the sector and had expended an increased amount for it, the highest increase in the expenditure of the sector during 1984/85 had most probably an immediate response to the famine-related provision.

Unlike any other time, healthy increments of the budget, the expenditure for the sector as percentage of TGE has a jumping from the preceding year 11.63% (1983/84) to 15.9% (1984/85) and a sharp increase in 1985/86 (18.06%). The increase in expenditure in 1986/87, regardless of rehabilitation efforts, is a clear indication of this fact. The Military Regime has achieved many vital results in natural resources management, especially in Afforestation and soil conservation. EPRDF has continued the major emphasis given to the sector and affirmed the importance of the sector to the national economy. Hence, the present government has gone by and recognition of the sector as “the backbone of the economy” and has adopted ADLI strategy as its policy hallmark.

However, the expenditure side of the data places agriculture and natural resources third next to education, road and urban development. Although, the sector is taking an overall huge amount of expenditure during this period and is increasing remarkably, the trend was inconsistent and fluctuating while it was 15.78% in 1992/93, it went down to 11.24% in 1998/99 running down recorded the lowest 3.1% in 1999/00. It played between 8% and 9% till 2003/04 and starts to rise in the subsequent years and reached 19.83% of TGE in 2006/07; however went down to 15.12% in 2010/11. Therefore, government spending on the sector during EPRDF was unpredictable; though actual money value expended remained higher.

### ***Road and Urban Development***

Road and Urban Development sector had been the second most important poverty reduction sector during the Imperial Regime and the third for Derg, and the EPRDF.

The Imperial Regime has placed road construction and Urban Development the most favored priority sector next to education, and had been expended a huge deal of resources in the time. When we look at the year for which organized data is available, the Imperial Regime allotted 10.48% of TGE in 1960/61, though this expenditure went down and reached 3.6%

of TGE in 1964/65. The expenditure jumped and reached 7.72% in 1965/66 and reached 11.03 in 1967/68. However, went down to 6.16% in 1968/69 and rise again to 11.07% in 1970/71. Finally, it went down to 9.56% in 1973/74.

Expenditure for this sector as percentage of GDP had been significant in the Derg period, though the trend was inconsistent to raise and fall. During the period, 1974/75-1976/77, expenditure on road and Urbanization was registering a share of 9.01%, 11.76% and 10.45% of GDP respectively. But this amount declined and became 5.82% of GDP in 1979/80; and there after it continuously declined till it reached 2.222 in 1989/90.

Generally in the period government expenditure for the sector was inconsistent, and there was of conformity with the plans. The third period to assess is the present government period which has two main phases in relation to both road and urban development. The first phase is the period between 1990/91 and 2000/01 while the second is the period since 2001/02. The first phase has demonstrated a focus mainly in rural road construction and connect Cities-zonal and Woreda level. While urban development initiatives were mostly left to city administrations and private sector. During EPRDF government, expenditure on road and urban development started at 3.16% in 1991/92 grew to 11.45% in 1994/95, and went down to 6.23% of TGE in 1999/00 and 8.12% in 2000/01 at the time of war with Eritrea.

These nine years are grouped to phase one by the researcher. In this period, expenditure was better than the last thirteen years of Derg, but similar in lack of consistency. Until the end of this phase, road and urban development expenditure was 7.9% on average, the third largest among poverty sectors for the period (1991/92-2000/01).

However, since 2001/02 road and urban development becomes the second largest expenditure sectors next to education for the last ten years. In this phase, expenditure grows steadily to 10.6%, 11.44%, 14.38%, 17.85% and 22.51% of TGE for the years 2001/02, 2003/04, 2005/06, 2007/08 and 2010/11 respectively. The second phase is mainly the period of the planning and deliberation of construction for major Asphalt Roads, Urban

housing projects and etc. The construction works has surely contributed to the rise in expenditure on the sector and GDP.

### *Health Services*

The Imperial Regime had been the most concerned on health services provision (5.3% on average from than the two followers as compared in relation with the percentage of expenditure to the respective TGE while the Derg (3.97% on average from 1973/74-1991/92) and EPRDF (5.09% on average from 1991/92-2010/11) governments have similar and more or less consistent trend of expenditure.

During the Imperial Regime, the least share of expenditure for health sector was 4.84% (1961/62) of TGE and the highest was 7.22% of TGE in 1969/70. The average expenditure for the period (1960/61-1973/74) was 5.96%. Whereas, during the Derg regime, the highest share was 5% (1976/77), the least spending was 2.8% (1982/83). The average expenditure was 6.31% during EPRDF government, and it ranges from 3.25% to 4.6% of TGE till 2006/07, and registered a share of 6.72% of TGE in the year 2010/11.



## Chapter Three

### 3. Methodology and Econometric Modeling

To empirically investigate the relationship between government spending and economic growth in Ethiopia, econometric regression approach is developed and used to estimate elasticity of GDP with respect to selected types of government expenditure with a particular focus on human capital (estimated as investment on education and health), and Agriculture using econometric tool.

The model developed here to empirically examine the relationship between government spending and economic growth in Ethiopia, which is a variant of Co integration and Error Correction Model applied by Abu and Nuredin (2010). The theoretical foundation of the study is based on the augmented Solow Model and endogenous growth model in which the model incorporates Human capital and other variables as the causes of economic growth. Real GDP in log form is used as dependent variable in the regression model and real expenditure on Human capital and agriculture are incorporated as explanatory variables. Besides, other relevant conditioning variables like spending on road and urban development, and expenditure on non-poverty sectors are also included as control variable.

#### *3.1 Model Specification*

This section develops econometric model for the relationship between government real values of spending on human capital and agriculture sectors; and economic growth. The economic growth model used in this study is based on the augmented Solow production function with modification that extends the basic production function framework to allow human capital as additional input to enter the production function. According to Solow's formulation, economic growth is a function of capital accumulation, an expansion of labor force and exogenous factor, technological progress which makes physical capital and labor more productive. That is,

$$Y_t = (K_t, A_t, L_t)$$

Where Y= aggregate real output

K= capital stock

A= efficiency factor

L= labor

t= time dimension

But according to endogenous growth theory ‘human capital’ influences economic growth and hence the model can be modified by encompassing human capital in one aggregate function. Such that,

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

The reduced equation for the above is;

$$\text{Log } Y_t = \alpha \log K_t + \beta \log H_t + (1 - \alpha - \beta) \log(L_t, A_t)$$

Where  $\text{Log } Y_t$  = log of real output proxied as log of GDP (logGDP)

$\text{Log } K_t$  = log of capital stock proxied as log of gross capital formation (Lgcf)

$\text{Log } H_t$  = log of human capital at time t estimated as government spending on health and education

$\text{Log } L_t$  = log of labor at time t

$A_t$  is exogenously determined level of aggregate productivity or total factor productivity (TFP)

Based on the above formulations, the model can be re-written as;

$$\text{GDP} = f(K, L, H, A)$$

$$\ln \text{GDP} = \ln \alpha_0 + \alpha_1 \ln K_t + \alpha_2 \ln L_t + \alpha_3 \ln H_t; \text{ Assuming } \alpha_0 = \alpha_1; \beta = \alpha_2(1-\alpha_1 - \alpha_3)$$

The prior economic expectations are;

$\alpha_0, \alpha_1, \alpha_2$  and  $\alpha_3$  are greater than zero

This study investigates the relationship between components of government spending specifically, human capital and agriculture, and economic growth. The study explores the positive or negative impacts of spending on these sectors on economic growth. And it also takes a step further to investigate the long run relationship between the increase in the size of government expenditure and growth. To achieve the above objectives this study would employ co-integration and error correction modeling. However, the theoretical framework that the study would be based on is the Keynesian and endogenous growth model. This is sequel to the fact that, the Keynesian model states and approves that expansion of government

expenditure accelerates economic growth.

The growth model is thus a function of public expenditure. However, spending on road construction and urban development, and spending on Non-pro-poor sectors such as medium and large scale manufacturing, trade, tourism, hotels, transport and communication ...etc are also included to capture growth in the size of the components of government spending. The model in this paper is built upon the following augmented function;

$$Y_t = f(E_d, H_e, A_g, R_d, N_p) \dots\dots\dots (3.1)$$

Where  $Y_t$  is real GDP,  $E_d$  is real spending on education;  $H_e$ , represents real spending on health sector;  $A_g$  is real spending on agriculture;  $R_d$  is real spending on road construction and urban development and  $N_p$  stands for real spending on non-poverty sectors.

For the estimation purpose equation (4.1) can be represented by the following logarithmic reduced form equation;

$$\ln Y_t = \beta_0 + \beta_1 \Delta \ln E_d + \beta_2 \ln H_e + \beta_3 \Delta \ln A_g + \beta_4 \Delta \ln R_d + \beta_5 \Delta \ln N_p + \beta_6 e_{t-1} + U_t \dots\dots\dots (3.2)$$

In order to estimate the short run relationship among the variables, the corresponding vector autoregressive (VAR) error correction model for  $\Delta \ln Y_t$  is estimated as;

$$\ln Y_t = \beta_0 + \beta_1 \Delta \ln E_d + \beta_2 \ln H_e + \beta_3 \Delta \ln A_g + \beta_4 \Delta \ln R_d + \beta_5 \Delta \ln N_p + \beta_6 e_{t-1} + U_t \dots\dots\dots (3.3)$$

Where  $\Delta$  stands for the first difference operator,  $U_t$  is the random disturbance term,  $e_{t-1}$  is the error correction term and the coefficient of  $e_{t-1}$  ( $\beta_5$ ) measures the speed of adjustment towards the long run equilibrium and the Error correction model test is essential to see whether an economy is converging towards equilibrium in the long run or not; and also shows short run deviations.

### ***3.2 Co-integration and Error Correction Model (ECM)***

In order to examine the extent to which economic growth is related to government sectoral spending, the theory of co-integration and error correction model (ECM) is applied, with the help of this procedure, it's possible to examine the short run and long run relationship between the variables. The Engle-Granger (1987) two step co-integration procedures are used to test the presence of co-integration between the variables.

#### **3.2.1 Co-integration**

Co-integration was first developed by Granger (1981) and was further elaborated by Engle and

Granger (1987). It addresses the issue of integrating short-run dynamics with long run equilibrium. The presence of co-integration implies that even if the dependent and independent variables are non-stationary, the deviations (i.e. the residuals from the estimation of the equation) are stationary. According to Engle and Granger, if there is co-integration, the equation with non-stationary variables is best estimated by the error correction model for long run equilibrium and short run dynamics. Co-integration refers to a situation of a long run equilibrium relationship between variables that do not drift too far apart overtime. In a two variable case X and Y, it occurs if:

- i. Both  $X_t$  and  $Y_t$  are integrated of the same order  $d$ ; and
- ii. There exists a linear combination of  $X_t$  and  $Y_t$  which is integrated of order ' $d$ '.

In multivariate case, co-integration is possible when

- i. The variables are integrated of the same order
- ii. The order of the integration of the dependent variable is not greater than the order of integration of any of the explanatory variables. In addition there should be one or at least two explanatory variables integrated to an identical order or higher than that of the dependent variable.

The Engle-Granger procedure has two steps; explanation of the equilibrium part the ECM in order to establish whether the variables are co-integrated is the first step. This step is to estimate the long-run static model of the  $I(1)$  variables and obtain residuals. If this residual, which is the linear combination of the variables or the disequilibrium, is stationary, then the variables are said to be co-integrated. If the variables are  $I(0)$  the generating process can always be written in an Error Correction form. The second step in this procedure is to estimate the Error Correction Model (ECM) in which the first difference of the dependant variable is regressed on the first difference of the explanatory variables with their appropriate lags and the first lag of the residual obtained in the first step.

This One can be sure of co-integration if the following results are obtained; high  $R^2$ (close to unity); significant coefficients, a significantly non-zero co-integration regression DW statistics and significant DF and ADF tests of residuals from the levels' regression.

The coefficient estimate from the levels' or static regressions can be interpreted as the long-run effects.

The paper basically employs econometric model to achieve the empirical results. In this model one examines the short-run and long-run relationships between real GDP and government sectoral spending more specifically human capital which is estimated as the expenditure on education and health sector; and agriculture sector spending by applying a co-integration test and the associated Error Correction Model (ECM).

In the first stage, to test for the unit roots of the concerned time series variables, DF and ADF techniques adopted. These tests have been performed in the levels with and without time trend as well as in the first difference. In the second stage, the Error Corrective Model is employed to see whether the economy is approaching equilibrium in the long- run or not and the short-run dynamics of the co-integrated time series variables.

### **3.2.2 The error correction method**

Economic theory is usually concerned with the relationship between variables. Thus, 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 modeling differenced series. This takes the form of:

$$\Delta Y_t = \tau \Delta X_t + \alpha (Y_{t-1} - \beta X_{t-1}) + \mu_t$$

The above formula is an ECM of a two variable case. It relates the change in y to change 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 serves to influence the short-run movements in the dependent variable.

### **3.4 Stationary series and integrated process**

Empirical work based on time series data often assumes that the series are stationary in their levels. Actually we often obtain very high value of  $R^2$  in excess of 0.9 when we regress one time series variable on another time series variable even though there is no meaningful

relationship between the two variables. This situation gives us a spurious regression. It is, therefore imperative to find out if the relationship between economic variables is spurious or nonsensical. To determine the non-stationary property of these time series variables, both in the levels and in the first difference, the relevant Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests have been employed with and without time trend.

A time series variables  $Y_t$  is said to be stationary if its mean, variance and auto covariance are independent of time and

$$E(Y_t) = \mu$$

$$\text{Var}(Y_t) = \delta^2$$

$$\text{Cov}(Y_t, Y_{t-j}) = \delta_j$$

When one or more of the above conditions fail, the process  $Y_t$  is said to be non-stationary. A time series  $Y_t$  which is itself non-stationary but becomes stationary after first differencing.

i.e,  $y_t = y_t - y_{t-1} = \mu_t$

The  $\mu_t$  that defines stationary process is said to be integration of order one, denoted by I(1) and the series is stationary, differencing, is not required it is integrated of order zero, denoted by I(0). Similarly, a non-stationary series which can be transformed to stationary by differencing it “d” times is said to be integrated of order “d” i.e., I (d).

### 3.4.1 Testing for the order of integration

Dickey and Fuller (1982) present a simple method for testing the order of integration based on the unit root test. This method proceeds as follows:

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

$H_1$ : the variable is stationary

$$Y_t = \gamma + \sigma_t + \sigma y_{t-1} + \epsilon_t \dots \dots \dots \text{DF}$$

$$Y_t = \gamma + \sigma_t + \sigma y_{t-1} + \sum_{j=1}^T \theta_j \Delta y_{t-j} + \epsilon_t \dots \dots \dots \text{ADF}$$

To apply standard estimation or testing procedures in a dynamic time series model, it is typically required that the various variables are stationary, since the majority of econometric theory is built up on the assumption of stationarity (Verbeek, 2008). And hence before employing any

estimation technique, it is pertinent to examine the time series characteristic of the economic variables.

### 3.4.2 Stationarity and unit roots

The standard classical methods of estimation are based on the assumption that all variables are stationary. However, most economic variables are not stationary. Models containing non-stationary variables will often lead to a problem of spurious regression, where by the results obtained suggest that there are statistically significant relationships between the variables in the regression model when in fact all that is obtained is evidence of contemporaneous correlations rather than meaningful causal relations. Furthermore, inferences based on the standard statistical tests (i.e. t and f tests will be invalid).

Therefore it is necessary to test for stationarity of time-series variables before running any sort of regression analysis.

Often, non-stationary variables become stationary after differencing. Such a variable is said to have Difference Stationary Process (DSP). Thus, it is possible to estimate using difference of variables if differences are stationary. But such a procedure gives only the short-run dynamics. And there would be a loss of considerable long-run information. Among the methods of testing the presence of unit roots in the variable, Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) employed.

$$Y_t = \phi Y_{t-1} + U_t \dots\dots\dots 3.3.1$$

Subtracting  $Y_{t-1}$  from both sides gives

$$\Delta Y_t = \delta Y_{t-1} + U_t \dots\dots\dots 3.3.2$$

Where  $\delta = (\phi - 1)$

The test for stationarity is conducted on the parameters sigma ( $\delta$ ) (if  $\delta = 0$  or  $(\phi = 1)$  it implies the variable Y is not stationary.

The hypothesis is formulated as follows;

$$H_0 = \delta = 0 \text{ or } (\phi = 1),$$

$H_1 = \delta < 0$  or  $(\phi < 1)$  if including a constant (drift) to the regression is suggested, that is:

$$\Delta Y_t = \alpha + \delta Y_{t-1} + U_t \dots\dots\dots 3.3.3$$

Where  $\alpha$  is a constant term

However, if a series contains a deterministic trend, testing for stationarity using equation 4.3.3 is not valid. Therefore, it is important to incorporate time trend as follows:

$$\Delta Y_t = \alpha + \delta Y_t - \alpha + BT + U_t \dots\dots\dots 3.3.4$$

Where T is the trend element

For the above equations the parameter sigma is used while testing for stationarity where the decision is made using a  $\tau$ -statistics. If the calculated value of  $\tau$  is less than the critical value (reported by Dickey and Fuller) the null hypothesis is accepted and not if otherwise. Rejecting the null hypothesis implies that there exists stationarity. If a variable that is not stationary in levels appears to be stationary after nth difference, then the variables is said to be integrated of order n denoted as I (n). However, the DF test has a serious limitation in that it suffers from residual autocorrelation. To amend this weakness, the DF model is augmented Dickey Fuller (ADF). Thus incorporating lagged first differences of the dependent term in the above equations gives:-

$$\Delta Y_t = \delta Y_{t-1} + \sum_{k=1}^K \theta_k \Delta Y_{t-k} + U_t \dots\dots\dots 3.3.5$$

$$\Delta Y_t = \alpha + \delta Y_{t-1} + \sum_{k=1}^K \theta_k \Delta Y_{t-k} + U_t \dots\dots\dots 3.3.6$$

$$\Delta Y_t = \alpha + BT + \delta Y_{t-1} + \sum_{k=1}^K \theta_k \Delta Y_{t-k} + U_t \dots\dots\dots 3.3.7$$

Where  $\alpha$  is constant (drift), T is a trend, K is the lag length and  $U \sim \text{IID}(0, \delta^2)$

Taking the variables in first difference form presents only the dynamic interaction among the variables with no information about the long run relationship.



## Chapter Four

### 4. Data analysis and interpretation of results

#### 4.1 Introduction

This section relied on an econometric analysis of the relationship between economic growth and government sectoral spending more specifically on human capital which is estimated as real spending on education and health sectors; and agriculture sector in Ethiopia. To achieve the major objective of the paper, the existence of a statistical relationship among the variables is carried out in two steps. Initially the order of integration of the variables is investigated using standard tests for the presence of unit roots and the second step involves the static or levels' regression to find the long-run values (coefficients) for the variables and interpret the results. In the third step involves testing for co-integration using the Augmented Engle- Granger (1987) co-integration procedure is used.

Finally, the fourth step involves the utilization of Error Correction modeling, the Engle-Granger (1987) show that in the presence of co-integration, there always exists a corresponding error correction representation. This implies that changes in the dependent variable are a function of the level of disequilibrium in the co-integrating relationship captured by the error correction term (ECT) as well as by changes in other explanatory variables.

#### 4.2 Unit root tests

Model estimation begins with the analysis of the order of integration of each variable using DF and ADF tests for this analysis. The null hypothesis for this testing is that the series contains unit roots and the results are reported in table 4.1 below. The variables involved in unit root tests are real values of GDP ( $\ln RGDP$ ), education expenditure ( $\ln RE_d$ ), health expenditure ( $\ln RH_e$ ), agriculture expenditure ( $\ln RA_g$ ), road construction expenditure ( $\ln RR_d$ ) and non-poverty sectors expenditure ( $\ln RN_p$ ) over the period 1960/61 – 2010/11. From the table given below the test statistics shows the failure to reject the null hypothesis that is the calculated value is less than the critical or tabulated value.

**Table 4.1 Unit root test**

Variable	DF statistic with trend	Critical values	DF statistic without trend	Critical values	Conclusion
lnRGDP	-0.642	1%=-4.150 5%=-3.500 10%=-3.180	1.132	1%=-3.580 5%=-2.930 10%=-2.600	Unit root series
lnREd	-1.376		0.149		Unit root series
lnRHe	-2.064		-0.282		Unit root series
lnRAg	-3.141		-1.914		Unit root series
lnRRd	-1.53		0.155		Unit root series
lnRNp	-3.015		-0.943		Unit root series

ADF test shows that all the variables which are non-stationary at level, becomes stationary at first difference (see appendix C: graphs at level and first difference of the variables). So the statistical test shows the rejection of the null hypothesis for the test. Since differencing will remove the trend effect from the data the inclusion of time trend in the test is not important (see the table next page).

**Table 4.2 ADF test in first difference**

Variable	ADF statistic	Critical values	Order of integration
lnRGDP	-4.777	1% = -3.594 5% = -2.936 10% = -2.602	Stationary at first difference
lnREd	-4.939		Stationary at first difference
lnRHe	-6.987		Stationary at first difference
lnRAg	-5.921		Stationary at first difference
lnRRd	-5.805		Stationary at first difference
lnRNp	-6.63		Stationary at first difference

### ***4.3 Empirical analysis of Engle and Granger co-integration test***

The results for unit root tests reported in tables 5.1 and 5.2, the null hypothesis of unit root test on the level of variables cannot be rejected in all cases. However tests for unit root on the first difference of the variables, suggests that variables are best characterized as being integrated of order one. This test implies that we can reject null hypothesis of unit root test. And, hence it is evident that government sectoral spending and economic growth are non-stationary at their levels while become stationary at first difference. This stationary series allow employing the Engle- Granger (1987) approach.

By considering that all of the variables are best characterized by being integrated of order one, I evaluated the long-run relationship between components of government spending and GDP. For this reason, I used the augmented Engle-Granger (AEG) test. The ADF test is used to test whether the residual is stationary or not. The unit root test for the residual is carried out by running an OLS regression of the variables on levels and test for co-integration by testing that the residual is I(1). The result from the analysis revealed that the residual (e) is stationary even at 1% critical level, the null hypothesis of order zero i.e I(0); and therefore, is stationary at level.

**Table 4.3 co-integration test through AEG**

Dickey-Fuller test for unit root

Number of obs = 49  
Interpolated Dickey-Fuller

	Test statistic	1% critical value	5% critical value	10% critical value		
Z(t)	-4.62	-3.587	-2.933	-2.601		
Mackinnon approximate p-value for z(t) = 0.0001						
D.e	Coef.	Std.Err.	t	P> t	[95% Conf. Interval]	
L1.e	-0.6253829	0.1353571	-4.62	0.00	0.8976863	0.3531
_Cons	-0.0000312	0.0133591	0.00	0.998	0.0269064	0.02684

Durbin-watson d-statistic (6, 50) = 1.250008

A Durbin-Watson statistic of 1.25 shows the existence of co-integration. Given the appropriate critical values, I reject the null hypothesis of no co-integration which implies the existence of long-run tendency towards equilibrium. Hence, The residual from the regressions of changes in Y on the respective changes in  $\ln RE_d, \ln RH_e, \ln RA_g, \ln RR_d,$  and  $\ln RN_p$  and the residual (#) specified below,

$$\Delta \ln Y_t = \beta_0 + \beta_1 \Delta \ln E_d + \beta_2 \Delta \ln H_e + \beta_3 \Delta \ln A_g + \beta_4 \Delta \ln R_d + \beta_5 \Delta \ln N_p + \beta_6 \epsilon_t$$

Are integrated of order one i.e I(1); that is they are stationary, hence the co-integrating error correction regression will be:

**Table 4.4 Error correction regression estimate – ECM**

Number of obs = 49  
 F ( 6, 42) = 0.71  
 Prob > F = 0.6467

R-squared = 0.0916  
 Adj R-squared = -0.0382  
 Root MSE = .21741

source	SS	df	MS
Model	.200151107	6	.033358518
Residual	1.98519206	42	.047266478
Total	2.18534317	48	.045527983

dlnRGDP	Coef.	Srd.Err.	t	P> t	[95% conf. interval]	
dlnREd1	.4331067	.2863216	1.51	0.138	-.1447136	1.010927
dlnRHe1	-.225869	.2226839	-1.01	0.316	-.6752634	.2235253
dlnRAg1	-.0800148	.0946364	-0.85	0.403	-.2709988	.1109692
dlnRRd1	.0266616	.1151853	0.23	0.818	-.2057918	.2591149
dlnRNP1	-.101628	.1939842	-0.52	0.603	-.4931039	.2898479
e1	.3908354	.3146963	1.24	0.221	-.2442474	1.025918
_Cons	.0664191	.0332217	2.00	0.052	-.0006251	.1334633

The estimated ECM equation above states that  $\Delta \ln Y_t$  as

$$\begin{aligned} \Delta \ln Y_t = & 0.0664191 + 0.4331067 \Delta \ln Ed_t - 0.225869 \Delta \ln He_t - 0.0800148 \Delta \ln Ag_t + \\ & (0.0332217) \quad (0.2863216) \quad (0.2226839) \quad (0.0946364) \\ & 0.02666 \Delta \ln Rd_t - 0.101628 \Delta \ln Np_t + 0.390835 e_{t-1} \\ & (0.1151853) \quad (0.1939842) \quad (0.3146963) \end{aligned}$$

Since  $e_{t-1}$  is positive  $\ln \text{RGDP}$  is above its equilibrium value,  $\beta_6 e_{t-1}$  will need to be negative which will cause  $\Delta \ln \text{RGDP}$  to be negative. Therefore, leading  $\ln Y$  to fall in period  $t$ . Thus absolute value of  $\beta_6$  (0.390835) decides how quickly the equilibrium is restored i.e.  $e_{t-1}$  is the mechanism that adjusts to the long run equilibrium by a 39% of any distortion that may occur in the short-run (per annum). The coefficient could be interpreted that if there is one unit percent disequilibrium shock in the preceding period, the impact of a shock to change in real GDP is corrected by 39%.

The result shows that, in the short-run the effect of education and road construction are positive. With regard to the level of significance education sector is found to be significant at 5% level of significance while spending on road construction have insignificant effect on GDP. This supports on the one hand Keynesian view that government investments on social sectors are causes of growth and on the other hand the argument of endogenous growth theories of the additional effects of human capital over the static effect on the level of output that explains sustainable growth. The health, agriculture and non-poverty sectors are found to have negative and insignificant effect on GDP. The empirical findings are in line with the previous studies (Musibau and Rasak, Bakare and Olubokun (2011), Jacob and Walid (2004) and Loto (2011) which conclude investment in education sector contributes to growth and against with studies by Abu and Usman (2010), and Shioji (2001) who concludes that spending on education sector has negative effect on growth. while spending on health has positive significant effect on the long run and negative and insignificant in the short run as opposed to a study by Saad and Kamel, 2009. The insignificant impact of health sector spending is also in line with a conclusion by Amasoma et al (2011) who concludes the insignificant effect of health sector spending.

The positive impact of expenditures on education and road sectors spending on gross domestic product probably could be explained by the huge increase in investment in human capital more specifically on education which represents especially important links in determining the strength of the relationship between growth and development. The government policy's shift in budget allocation to pro-poor sector is to reduce poverty and promoting growth. As discussed in previous chapter, the share of expenditure on pro-poor sectors in general and education and health sectors in particular has increased at an increasing rate since 1980/81 and more significantly since 2007/08 could be the ground for continuous positive relationship between growth and education sector spending.

Investment in human capital employs educated and skilled workers who are also healthy, then not only the labor is productive but it will also be able to use the capital and technology more efficiently and this in turn affects output.

In the case of agriculture, the sectoral spending has negative relationship on growth both in the short run and in the long run. The negative relationship of agriculture sector in the short-run probably could be the increased migration of the healthy young people move out of agriculture, leaving behind the old, the sick and the dependant and it is often the men who move to urban areas in change of the farm. This could resulted in the increased sophistication of agriculture markets (and value chains) which excludes traditional small holders, who are poorly equipped to meet the demanding product specifications and timeliness of delivery required by, for instance, expanding manufacturing sectors (skin and hides, cotton etc..), hotels and supermarkets (vegetables, cereals and other food products). The deteriorating and poor resource base (desertification, global warming etc...) which agriculture depends are also the probable cause for negative association given the effort and investment done.

In the short run education and road sectors coefficient are positive. The spending on education has significant at 5% level while road sector spending has insignificant effect on growth. The elasticity of GDP increases by 43% and 3%, if education and road construction spending

increase by one percent respectively. However, a 1% increase in health, agriculture and non-poverty sectors will depress GDP by 22, 8 and 1 percent respectively.

The estimated ECM equation above shows that the short run changes in  $\ln RE_d$  and  $\ln RR_d$  have positive impact on the short-run changes in  $\ln RGDP$ . While, the short run changes in  $\ln RH_e$ ,  $\ln RA_g$  and  $\ln RN_p$  have negative relation in the short-run changes in  $\ln RGDP$ . Therefore, the estimated parameters  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  and  $\beta_5$  are the short run marginal effect on  $\ln RGDP$ .

## Chapter Five

### ***5.1 Summary, conclusion and recommendation***

In this paper we investigated the growth impact of government sectoral spending on human capital (education and health), agriculture, road construction and non-poverty sectors spending on economic growth in Ethiopia. To estimate the model, first the series was tested for stationarity, and co-integration test analysis is done. After indicating the presence of the long-run relationship using Augmented Engle and Granger (AGE) approach, the short run dynamics of the long run economic growth is examined by estimating an error correction mode. The objective of this paper is to investigate the impacts of specific government sectoral spending-human capital (education and health) and agriculture on economic growth. And, hence the growth model is a function of government expenditure. However, spending on road construction and spending on non- pro-poor sectors are also included to capture growth in the size of the components of government spending.

The econometric result confirmed that spending on education and road sectors have positive effect on growth. The result of that of education indicates that in the short-run education is significant at 5% level of significance, while the study found that in the short-run health sector was insignificant. The relationship of road sector spending was found to be positive and insignificant. Non-poverty sectors spending, has insignificant negative relationship with economic growth.

Regarding the agriculture sector, the sectoral spending has insignificant negative relationship with growth. This finding is consistent with the findings of Loto (2011). The economic result in general shows that government sectoral spending on human capital and road construction contributes positively to growth in the short and long-run which is in line with our a priori expectation except that of health and agriculture sectors.



## ***5.2 Recommendations***

Based on the results obtained, the following recommendations will be necessary:

- Since spending on education sector ( human capital) contributes to economic growth significantly positive while agriculture do not, government should assist the economy's forward motion by promoting the human capital accumulation through shifting public expenditure more specifically to education sector.
- Since technological and institutional factors are believed to influence the rate of accumulation of capital ( physical as well as human) and are more fundamental for long-run and sustainable growth, further investment and a particular attention should be given to human capital (education sector)
- Even though spending on education sector contributes to the economic sector, the government has to give attention to other sectors, especially for the agriculture and health sector.
- The government has to invest more on the other sectors so that it can bring a holistic economic growth in the country.
- More generally, as the major findings of the study public spending can contribute to growth through investment in education and infrastructure are believed to be essential mechanisms.

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## **APPENDICES**

## Appendix A: Government Expenditure

### I. Nominal average Government Expenditure (in millions of Birr)

Year	GDP	Agriculture	Road	Education	Health	Non-poverty
1960/61 - 1964/65	2759.2	4.4	14.6	31.2	13.8	169.2
1965/66 - 1969/70	3895	42.4	42.4	69.6	29.6	306.8
1970/71 - 1974/75	5126.6	60.4	70.2	119.6	39.2	413.4
1975/76 - 1979/80	7338.6	196.2	136.8	168.2	67.6	1043
1980/81 1984/85	11789.2	424	173.2	305.2	109	2101.8
1985/86 - 1989/90	16147.2	694.5	157.6	446.6	154.4	3272.8
1990/91 - 1994/95	25898.4	795.4	394	768.2	277	3526.2
1995/96 - 1999/00	1182.2	1182.2	1009.2	1696	583	7988.8
2000/01 - 2004/05	73669.2	2472.4	2334.4	3597	889.6	11586.6
2005/06 - 2010/11	296425	8911.3	11126	16667	3485	20267.3

Source: MoFED



I. Average Percentage share of sectors' expenditure from total expenditure (in millions of Birr)

Year	General services	Economic service	Social service	others	agriculture &natural resource	Road and urban development	Education	Health	Pro-poor
1960/61-1964/65	60.3	12.6	21.7	5.4	1.8	6.8	13.3	5.8	27.5
1965/66 - 1969/70	45.1	24.7	22.3	7.8	6.4	8.8	14.5	6.1	35.8
1970/71 - 1974/75	37.9	26.5	24.5	11	8.3	10.1	17	5.7	41.1
1975/76 - 1979/80	46.3	24.5	17.2	11.9	12.1	8.7	10.6	4.7	35.7
1980/81 - 984/85	39.0	29.1	16	15.9	13	5.9	9.9	3.6	32.4
1985/86 - 1989/90	36.8	32.4	15.1	16.3	15	3.4	9.5	3.3	31.2
1990/91 - 1994/95	27.2	29.1	22.1	20.8	13.7	6.1	13.1	4.7	37.6
1995/96 - 1999/00	34.5	31	20.9	16.2	10.5	8.6	13.1	5	37.2
2000/01 - 2004/05	30	23.7	25.2	17.7	9.3	10.2	16.8	4.2	43.1
2005/06 - 2010/11	22.3	41.6	30.7	4.00	16.5	18.9	22.8	5.9	62.6

Source MoFED and Own calculation

### III. Real average GDP and Government Expenditure (in millions of Birr)

Year	GDP	Agriculture	Road	Education	Health	Non-poverty
1960/61 - 1964/65	4564.8	7	24	51	23	279
1965/66 - 1969/70	5689	45	62	102	43	450
1970/71 - 1974/75	6746.8	79	92	157	52	541
1975/76 - 1979/80	7298	194	137	168	67	1023
1980/81 - 1984/85	9205	326	138	238	85	1637
1985/86 - 1989/90	10782.7	464	106	298	103	2179
1990/91 - 1994/95	11583	352	164	338	121	1598
1995/96 - 1999/00	14881.2	328	275	421	159	2121
2000/01 - 2004/05	17691	1595	1258	1804	448	4890
2005/06 - 2010/11	123334. 3	3829	4505	5384	1415	8713

*Source MoFED, CSA and own calculation*

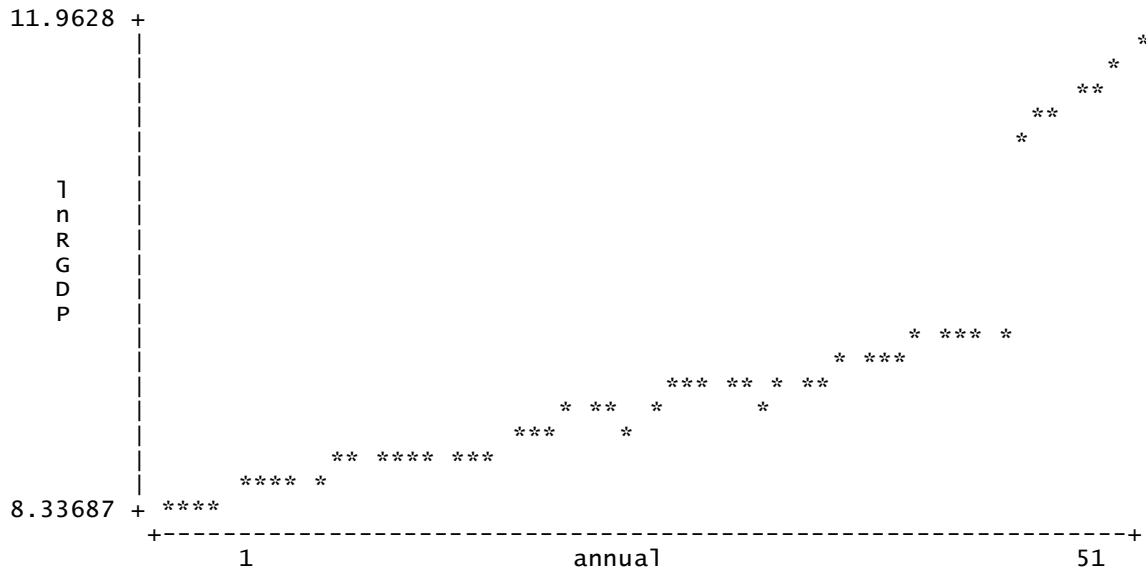
APPENDIX B: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
year	0				
RGDP	51	24476.98	38807.98	4175	156811
REd	51	984.0196	1847.321	36	7169
RHe	51	274.3529	486.0627	15	1937
RAG	51	782.902	1424.736	3	6244
RRd	51	751.2353	1570.766	19	6488
RNP	51	2467.902	2954.18	214	13053
trend	51	26	14.86607	1	51
lnRGDP	51	9.440069	.9776972	8.336869	11.9628
lnREd	51	5.783098	1.343924	3.583519	8.877522
lnRHe	51	4.723739	1.188824	2.70805	7.568896
lnRAG	51	5.402672	1.743508	1.098612	8.739376
lnRRd	51	5.235768	1.489114	2.944439	8.77771
lnRNP	51	7.262438	1.052171	5.365976	9.476773
lnRGDP1	50	9.389615	.9181076	8.336869	11.85785
dlnRGDP	50	.0725185	.2112332	-.1023102	1.489265
lnREd1	50	5.721209	1.282055	3.583519	8.757784
dlnREd	50	.1058801	.2876991	-.3223987	1.806597
lnRHe1	50	4.666836	1.128556	2.70805	7.455877
dlnRHe	50	.0972169	.3391525	-.4231462	2.073275
lnRAG1	50	5.34313	1.708028	1.098612	8.739376
dlnRAG	50	.1456231	.530173	-1.178655	2.692004
lnRRd1	50	5.164929	1.414767	2.944439	8.625689
dlnRRd	50	.1062395	.4121274	-.6039162	2.09191
lnRNP1	50	7.224161	1.026358	5.365976	9.476773
dlnRNP	50	.0762058	.2817934	-.3810587	1.618906
e	50	5.98e-10	.0987814	-.1876372	.3169255
e1	49	-.0005882	.0997165	-.1876372	.3169255

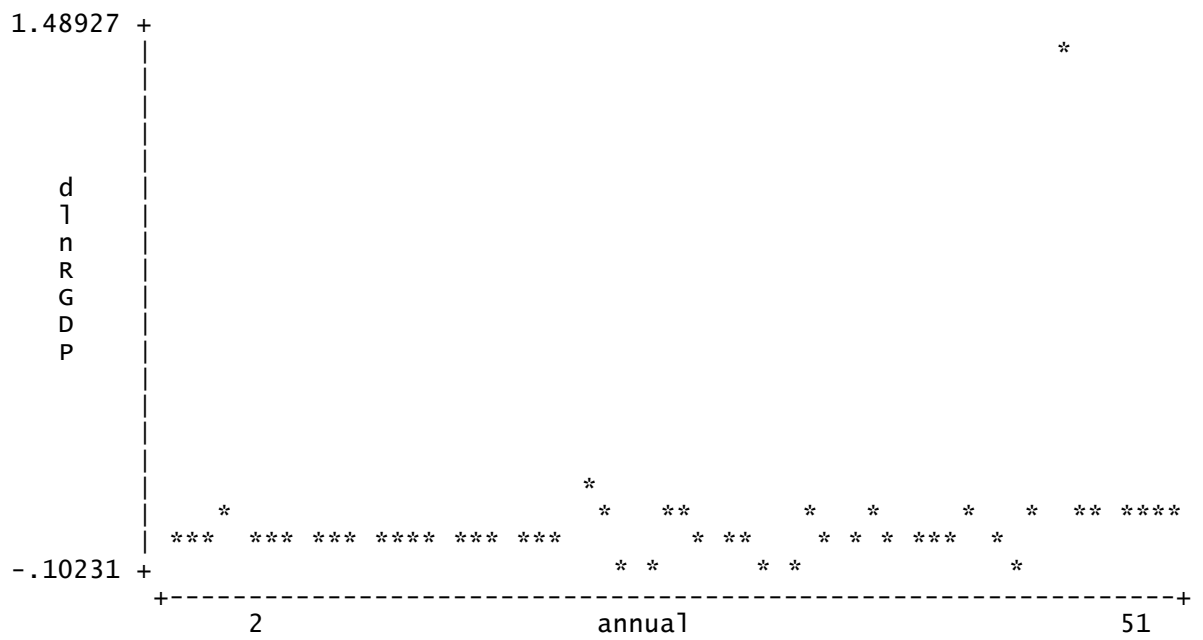
**APPENDIX C:** Graphs showing Dickey- Fuller regression estimate non-stationary (at level) and stationary at first difference

I. Log of RGDP with time trend (annual)-

a) At level - lnRGDP

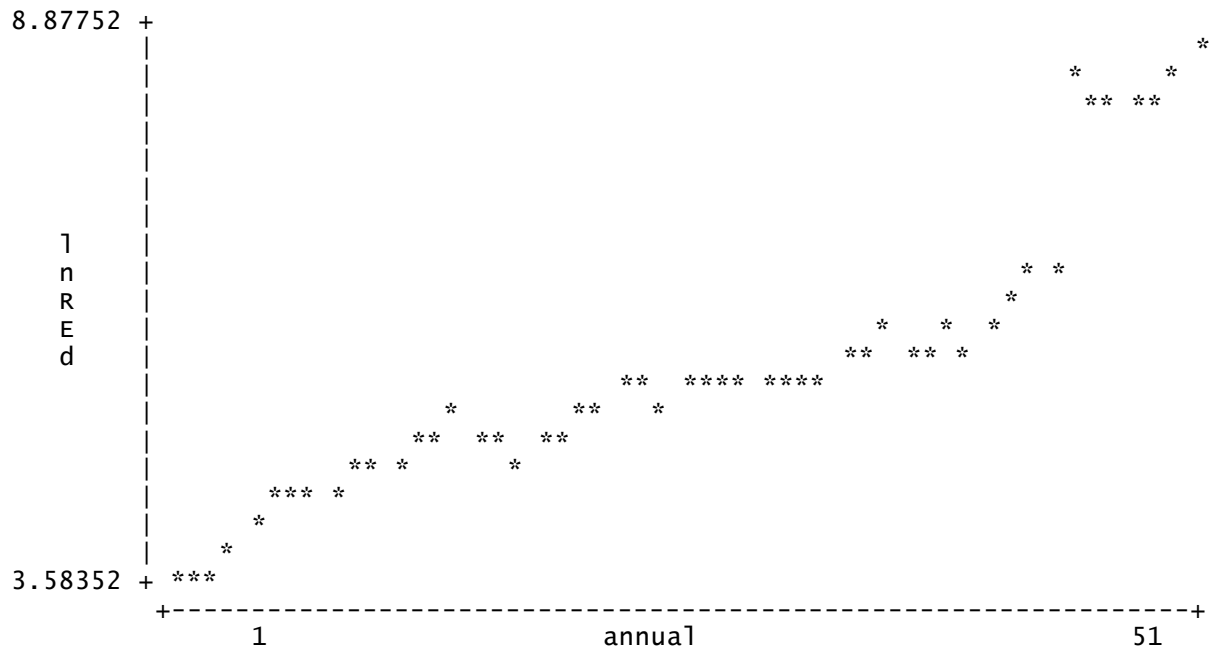


b) At first difference (dlnRGDP)

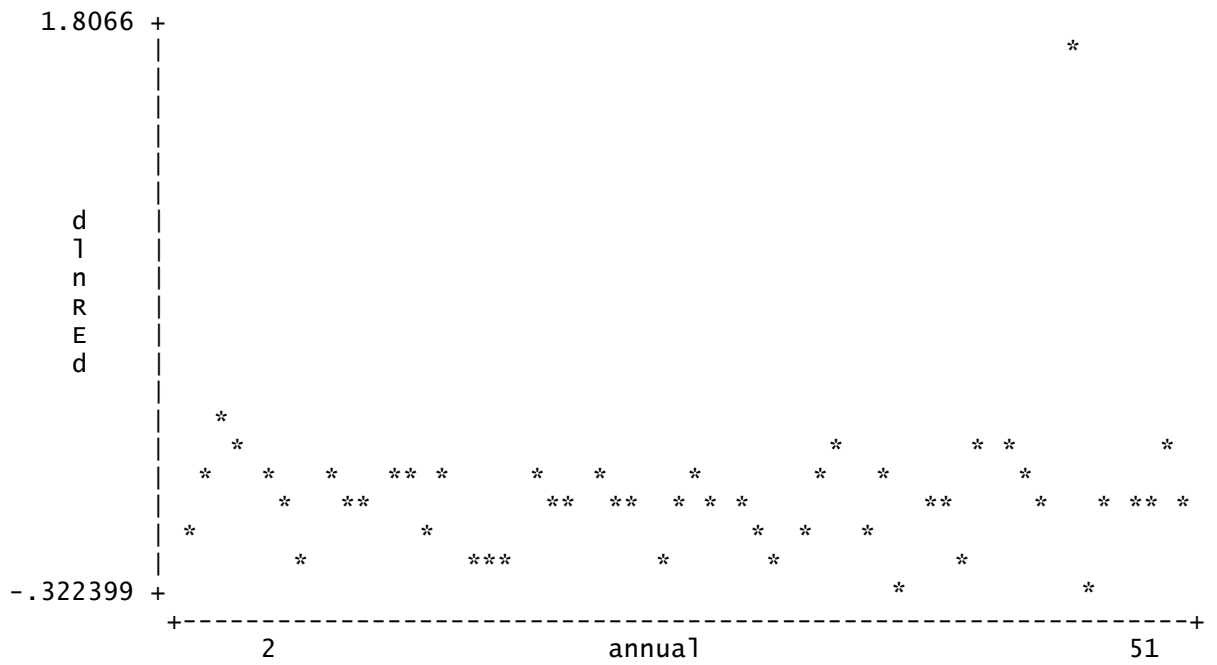


II. Log of RE<sub>d</sub> with time trend (annual)

a) At level - lnRE<sub>d</sub>

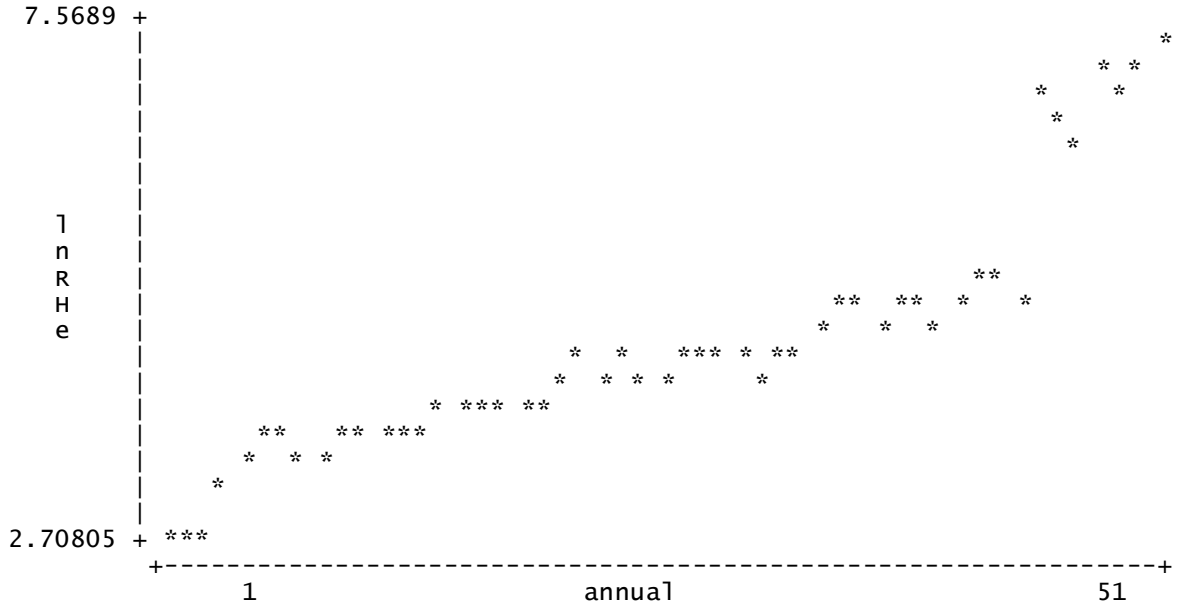


b) At first difference - dlnRE<sub>d</sub>

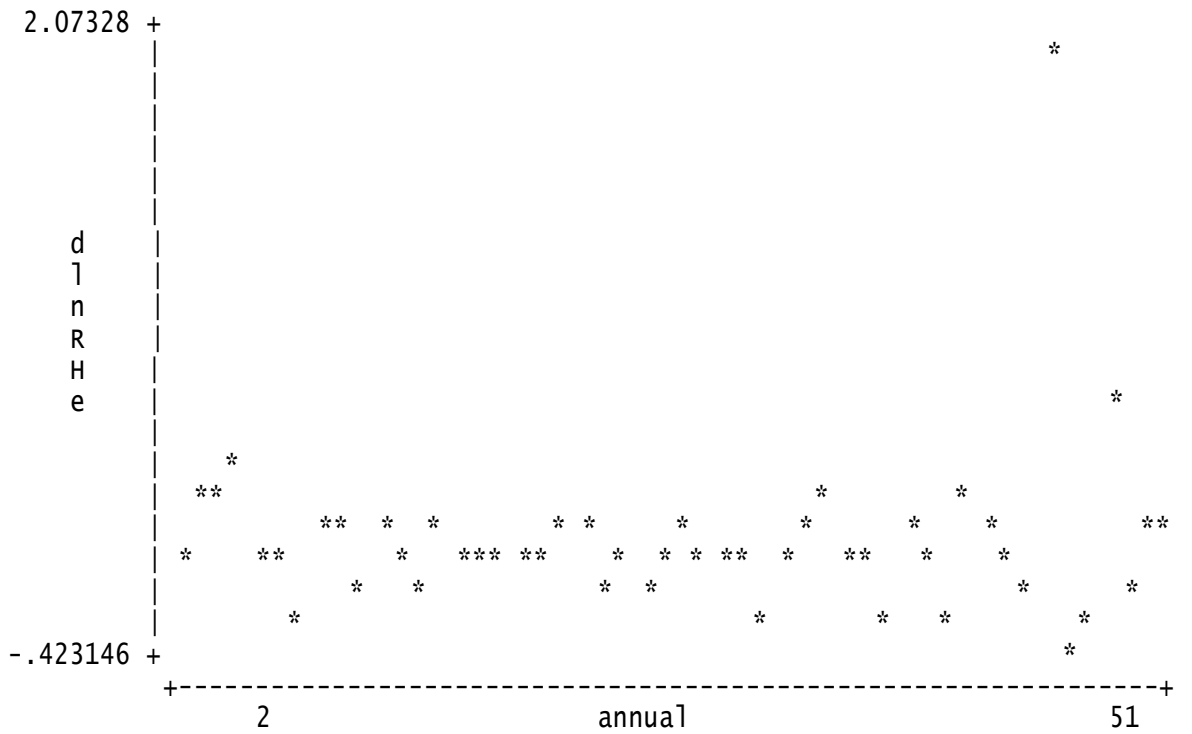


III. Log of  $RH_e$  with time trend (annual)

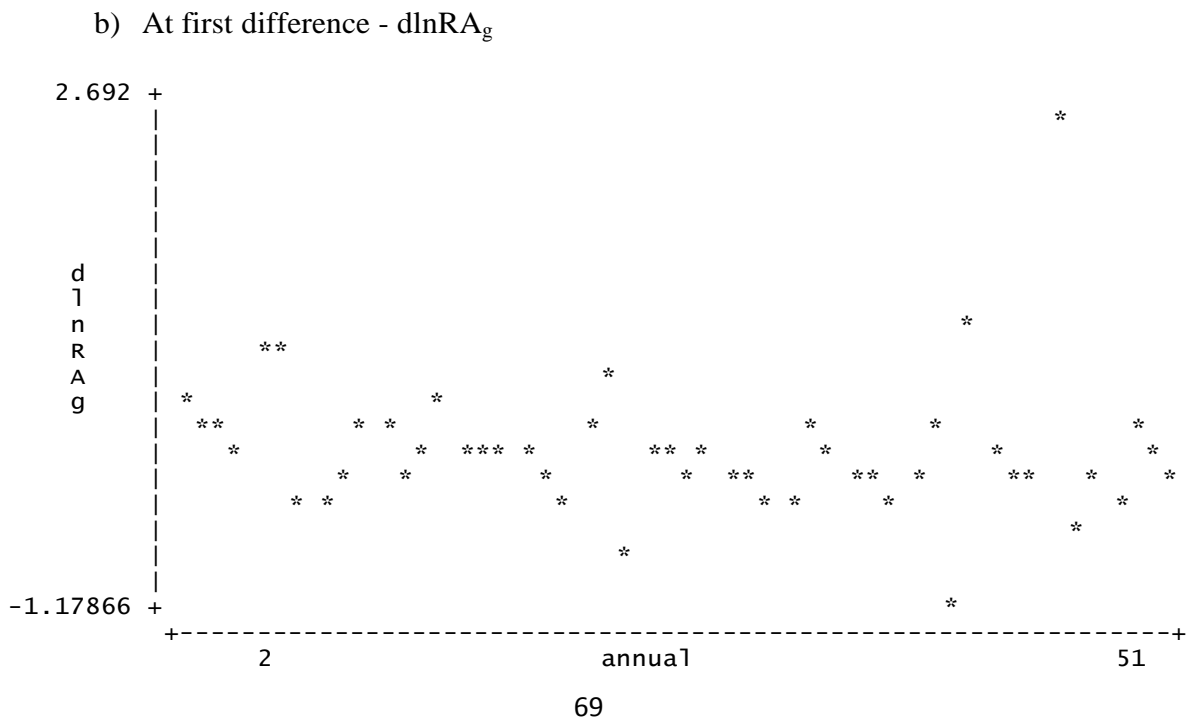
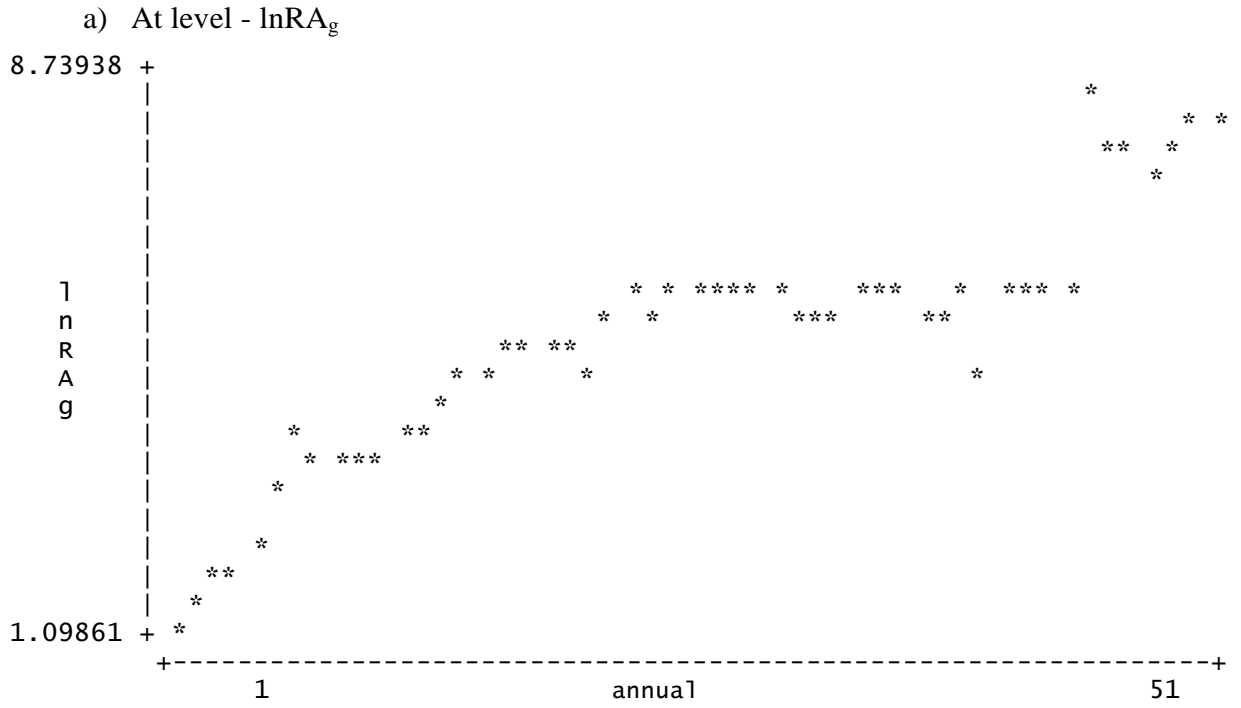
a) At level -  $\ln RH_e$



b) At first difference -  $d\ln RH_e$

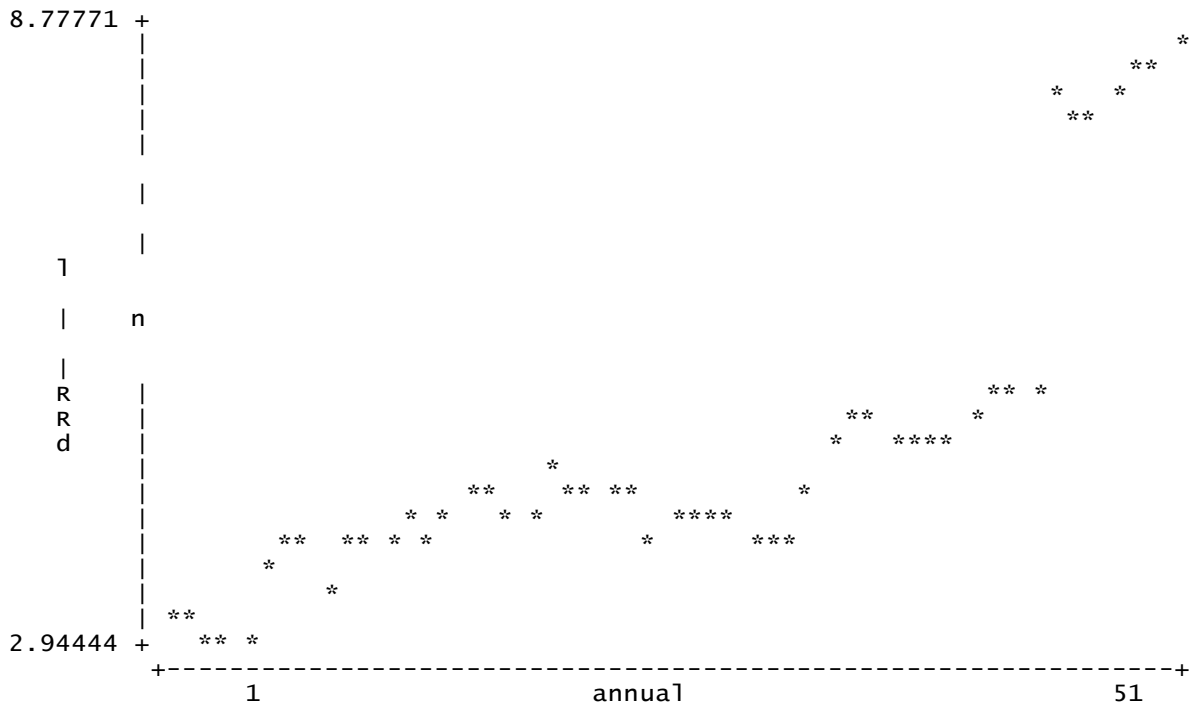


IV. Log of  $RA_g$  with time trend (annual)

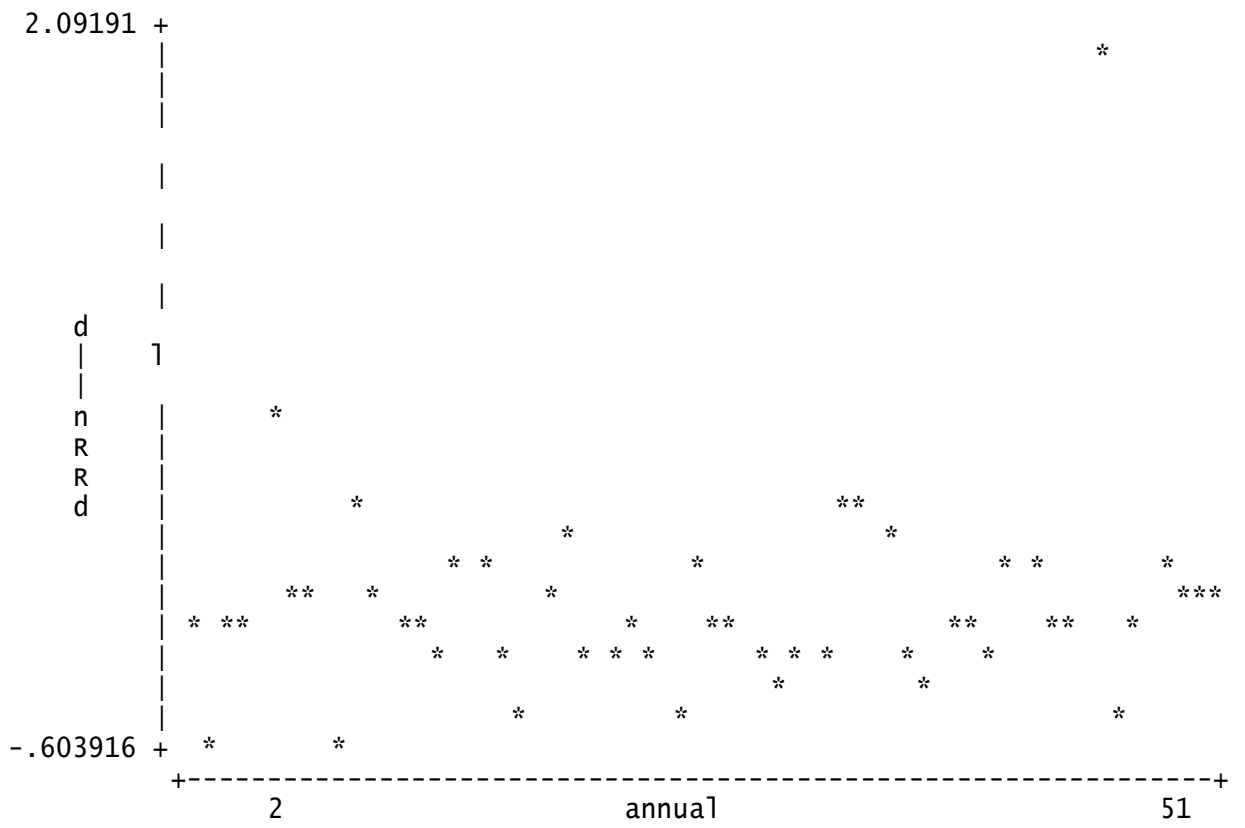


V. Log of  $RR_d$  with time trend (annual)

a) At level -  $\ln RR_d$



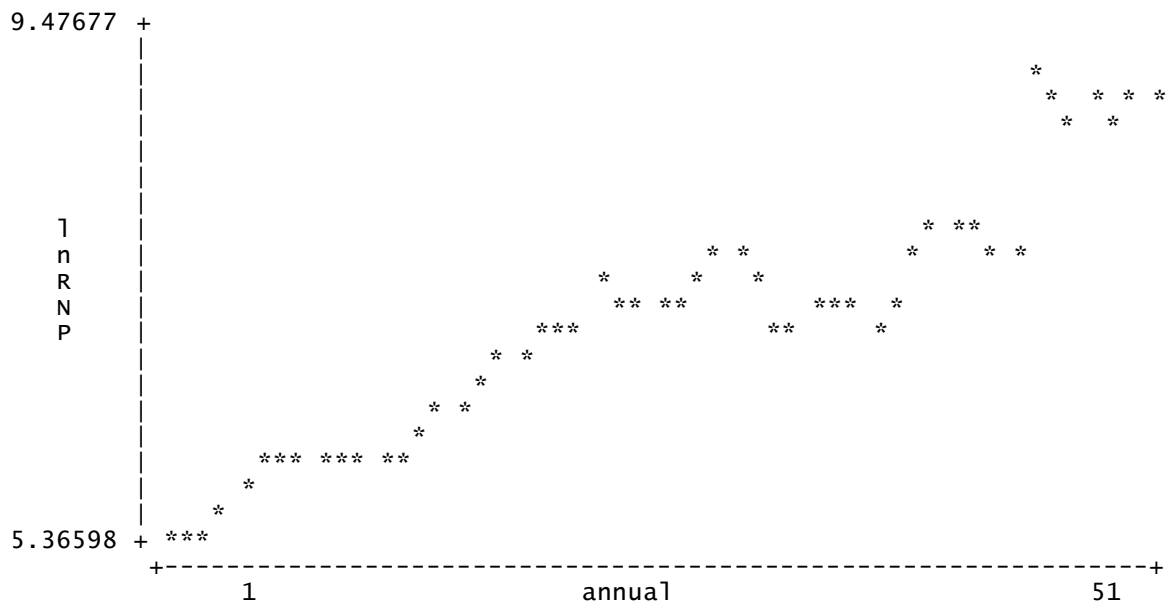
b) At first difference -  $d\ln RR_d$





VI. Log of RNP With time trend (annual)

a) At level -  $\ln RNP_t$



b) At first difference -  $d\ln RNP_t$

