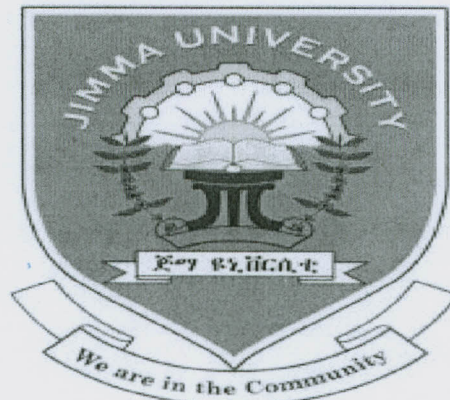


THE IMPACT OF GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH IN ETHIOPIA:

(AN EMPIRICAL ANALYSIS USING JOHANSEN COINTEGRATION APPROACH)



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JIMMA, ETHIOPIA

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ANALYSIS USING JOHANSEN COINTEGRATION APPROACH***

**A Thesis Submitted to Graduate Program of Jimma University
in Partial Fulfillment of the Requirements for the Degree of
Masters of Science in Economics (Economic Policy Analysis)**

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The Impact of Government Expenditure on Economic Growth in Ethiopia

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Acronyms / Abbreviations

ADF	Augmented Dickey Fuller
CEs.....	Cointegrating Equation
DF.....	Dickey Fuller
EEA.....	Ethiopian Economics Association
GCF	Gross Capital Formation
GDP.....	Gross Domestic Product
IMF.....	International Monetary Fund
MoFED.....	Ministry of Finance and Economic Development
OLS	Ordinary Least Square
RGDP... ..	Real Gross Domestic Product
RPCI.....	Real Per Capita Income
SSA	Sub Sahara Africa
SOEs.....	State Owned Enterprises
VAR.....	Vector Auto Regressive
VECM	Vector Error Correction Model
WB-WDI.....	World Bank-World Development Indicator

DEDICATION

I dedicate this work to my dearly loved father, Dereje Mengist (priest), that I couldn't stop thinking about his promise though he missed, and never oblige me to forget his love and hope. And also I dedicate it to Alemayehu, who is unlucky to see his future bright.

Abstract

This thesis is conducted on “The Impact of Government Expenditure on Economic growth in Ethiopia” by using time series data of 1970/71 to 2010/11, applying Ram’s (1986) endogenous growth accounting model. The general objective of the study is to investigate the relationship between the components of government expenditure and economic growth in Ethiopia. Both descriptive and econometric techniques were employed for the purpose of analysis. Descriptive part deals about the general compositions and trends of public spending, the growth patterns of economy, and sectoral composition of national output. Econometric analysis is conducted by using Johansen Maximum Likelihood Estimation procedure. Before estimating the long run model, the time series characteristic of the data is tested using DF and ADF test and found that all the variables are integrated of order one. Then, the cointegration test was conducted and concluded that there is one cointegrating equation between variables. The long run estimation result revealed that real government spending on human capital formation is growth promoting; real government consumption is growth retarding and real government physical investment becomes insignificant in explaining growth of real per capita income. Real Private investment and real openness affect the growth of real per capita income positively and significantly. Furthermore, VECM is employed to estimate the short run dynamics. The result revealed that all components of government expenditure do not have significant effect in explaining growth of real per capita income in the short run. Issues of quality, transparency, accountability and capacity building should be well established in public expenditures particularly on huge investment projects to ensure fiscal regulation and management of scarce resources and promotion of sustainable development, an effective channeling of unproductive public funds to productive activities should be implemented.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

“The relationship between public expenditure and economic growth is an important subject of analysis and debate, especially for developing countries. A central question is whether public expenditure increases the long run steady state growth rate of the economy. The general view is that public expenditure, notably on physical infrastructure or human capital, can be growth-enhancing although the financing of such expenditures can be growth-retarding, for instance, because of disincentive effects associated with taxation” (Kweka and Morrissey, 2000:1).

Economic growth is the most important macroeconomic variable reflecting the overall performance of a society that results from producing more goods and services, which require improvement in productivity and growth in the labor supply. Productivity growth involves combination of a more educated and efficient workforce; more private physical capital like plants and equipment; increased use of new technology; more public infrastructure like roads and other utilities; efficient markets to set prices; and rule of law to enforce contracts. To ensure well-functioning markets and stimulate economic growth, government must expend resources to enforce contract, maintain national security, protect against criminal and provide valuable public goods (Abu and Abdullahi, 2010).

The impacts of government spending on economic growth are leading considerable debates. Government can provide economic infrastructure to facilitate economic growth, improve resource allocation and enhance productivity of the private sector. In addition,

public spending on health and education can improve labor force productivity, and also government can provide information, reduce risks, and alter incentives. But, the quantity of public goods provided by the government may be inefficient, and also there are possible negative impacts on economic growth induced by a government's revenue raising and transfer mechanism (Albatel, 2000).

According to Barro (1990) there is a possible relationship between the share of government spending to GDP and the growth rate of per capita real GDP, and also there is a constant return to capital that broadly includes private capital and public services. Public services are considered as an input to private production in creating a potentially positive linkage between government spending and economic growth (Taban, 2010).

Similarly, Lin (1994) indicated that government can increase growth if it involves in the provision of public goods and infrastructure, social services and targeted intervention (like export subsidies). On the contrary, public goods may be provided inefficiently, government taxation may induce misallocation of resources and the public sector may engage in excessive or unproductive expenditures. However, what matters is the trade-offs between the productivity of public expenditure and the distortionary effects.

As indicated by Ahmed and Miller (1999), two contrasting views are existed on the effects of increased government expenditure on economic growth through investment. The traditional view argues that government expenditures crowd out private investment. Higher government expenditure, whether financed with taxes or debt, increases the demand for goods and services, raising interest rates, making capital more expensive and,

as such, reducing private investment. The non-traditional view sees government expenditure stimulating investment. The crowding in of investment occurs when the economy's resources are either unemployed or underemployed. That may arise in many developing countries where, for example, government expenditure on infrastructure can induce private investment.

This paper is conducted to examine the impacts of disaggregated public expenditure on output growth with the Johansen cointegration approach by using a set of time series data from Ethiopian economy, and resting on theoretical considerations of Ram's (1986) model. Since Ethiopia has shown an improvement on its growth of an economy during these periods, it is interesting to know how government spending, among other determinants, has contributed to its economic growth.

1.2 Statement of the Problem

According to Abu (2010), higher government expenditure may slowdown the overall performance of the economy. For example, in an attempt to finance rising expenditure, government may increase taxes and/or borrowing which distorts individual from working for long hours or even searching for jobs. As a result it reduces income and aggregate demand. If government increases borrowing in order to finance its expenditure; it will crowd-out the private sector and thus reducing private investment. Furthermore, in a bid to score cheap popularity and ensure that they continue to remain in power, politicians and governments officials sometimes increase expenditure and investment in unproductive projects or in goods that the private sector can produce more efficiently. In addition, studies by Laudau (1986), Folster and Henrekson (1999) suggested that large government expenditure has negative impact on economic growth.



There is neither general consensus nor consistent evidence regarding the significant relationship between government size and economic growth. This has led economists and policy makers to examine the impact of disaggregated government spending on economic growth and thereby suggest or formulate prudent expenditure and revenue policies of the government. In Ethiopia the influence of government spending on economic growth especially after the reform period, where the country shifts from command to semi-market economy and government expenditure towards pro-poor sectors is becoming high is not well studied.

In addition, developing countries' economies including Ethiopia have experienced a sustained rise in their level of public expenditure, and consequent increase in budget deficits and public debt. As MoFED 2010/11 reported, Ethiopia is now towards Millennium Development Goals that urges and pushes the government to increase its expenditure and the country should exhibit continuous and sustainable economic growth. Meeting the MDGs will also generally require changes in the structure of the budget to include higher outlays on productive social spending, a scaling up of aid, and more efficient government spending.

Based on the aforementioned facts, the researcher attempts to answer the following questions:

- What are the trends and compositions of government expenditure with respect to national output of Ethiopia?

- Does an increase in government spending and change in its composition help or hinder economic growth?
- Does disaggregated public spending affects the growth of national output both in the long run and short run?

1.3 Objective of the Study

The quick growth of government expenditure across different sectors in Ethiopia has caused concern among policy makers. Over the last four decades government expenditure in the country grew at a faster rate than the growth rate of real GDP. Given this fiscal scenario, an explanation of this requires studying the impact of government expenditure on economic growth. Hence, the general objective of this study is to investigate the relationship between the components of government expenditure and economic growth in Ethiopia. This can be accomplished by pursuing the following specific objectives:

- ♣ To examine the composition and trends of government expenditure and national output of Ethiopia.
- ♣ To adapt a systematic framework for determining the differential impacts of various components of government expenditure on economic growth of Ethiopia.
- ♣ To empirically investigate the short run and long run relationship between the components of government expenditure and economic growth.

1.4 Significance of the Study

So far there are some researches that have been done on the impacts of government spending on economic growth. However specifying and estimating impacts of the various components of government expenditure on economic growth (i.e. whether growth – enhancing or growth- retarding) in case of Ethiopia is scanty.

Mainly, within the last eight years, there is an incredible increase in government expenditure with a special emphasis on pro poor sectors and improvements on the growth rates of economy are left from the prior study. And also the real value of each components of public spending is not well investigated previously. Hence, all explanatory variables are deflated by GDP deflator¹ to see the real values of the variables. In addition, trade openness is included as an explanatory variable because open economies can have more access to foreign resources and markets. Thus, a more open economy is expected to have a higher growth rate than a closed economy.

Generally, the advantage of this study is that it employs more advanced econometric technique (Johansen approach to co integration) to study the impact of component of government spending on economic growth. Thus, the findings of this study might provide an inherent clue to policy designers, and decision makers on the allocation of public spending from the total budget based on its contribution for growth.

¹i.e., 1999/2000 = 100 used as a base year

1.5. Scope and Limitations of the Study

The thesis makes use of the variables: government expenditure (disaggregated on consumption, investment and human capital formation), private investment and trade openness all as shares of nominal GDP for the duration of 1970/71-2010/11 years for Ethiopia as a case study.

In spite of some important contributions it may provide, this study is not free from limitations. The growth pattern of the country's economy is characterised by very volatile and unpredictable one which is determined by various shocks like rainfall, political and institutional factors and the like. However, the employed growth model could not possibly capture all the determinant variables. In addition, the quality of the data is disputable. Data that is received from different institutes, even the same institute at different documents of annual reports, is inconsistent.

1.6. Organization of the Study

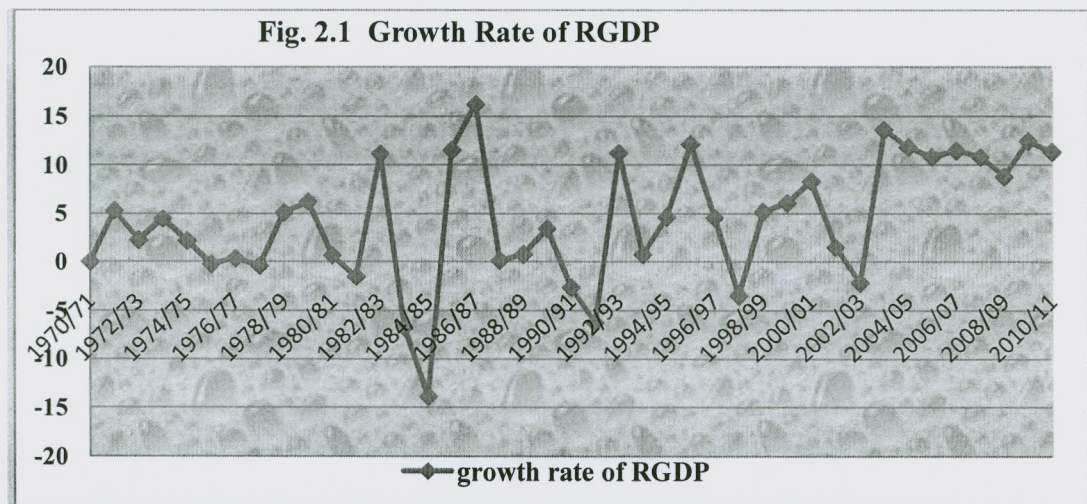
This study is organized into six chapters. Following the introductory chapter, chapter two is devoted to a brief discussion of macroeconomic variables in Ethiopia. Chapter three presents the relevant theoretical as well as empirical literatures regarding the relationship between public expenditure and economic growth. Econometric methodology of the study is presented under chapter four followed by chapter five, which covered model estimation and interpretation of results. Finally, chapter six presents the conclusions and the policy implications of the study.



CHAPTER TWO: OVERVIEW OF ETHIOPIAN ECONOMY

2.1 Real GDP and Sectoral Compositions of National output

Ethiopia has a population of over 80 million; the second populous country in Africa, the country is a federal state; consisting of the federal government, nine regional governments and two city Administrations. Agriculture is the main stay for 84 % of the population, (it contribute 41.1% of GDP), Service (46.6%) and Industry (13.4%), Strong economic growth has been witnessed in recent years. Real GDP growth has averaged 11.4 percent in the past eight years. Good growth performance has contributed to significant poverty reduction and to good prospect for achieving the MDGs (MoFED, 2011).

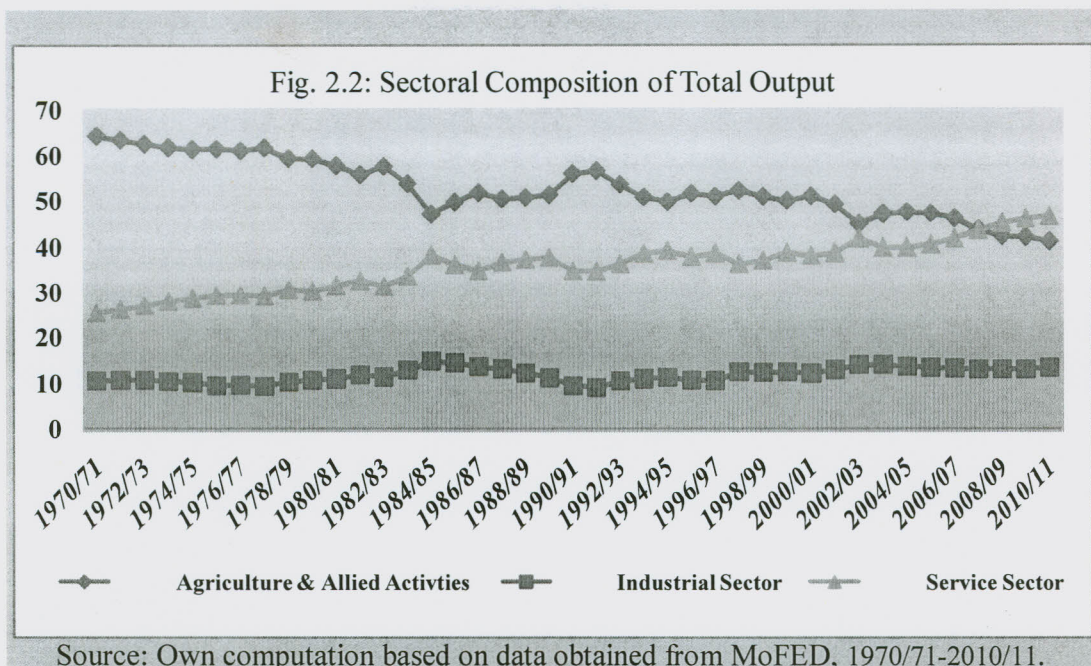


Source: Computed based on data obtained from NBE and WB-WDI, 2012.

As observed from figure 2.1, the Ethiopian economy performed very badly in the mid 1980s as a result of the restrictive government policies and the disastrous drought of 1984/85 where growth rate of real GDP was at the maximum negative (-13.87%). Annual GDP growth rate averaged only 2 % between and 1974/75 and 1990/91. But the reform

programs of the early 1990s are contributed to an improved performance of the economy where real GDP grew on average by nearly 5.4% between 1992/93 and 2000/01; particularly 11.2% in 1992/93 mainly due to the strong recovery from a very low base or a negative growth rates (-6%) of the preceding year. A higher growth rate of 12% and 8.3% was recorded in 1995/96 and 2000/01, respectively, as a result of the good weather conditions and bumper harvest.

Conversely, the growth rate slipped to -3.4% in 1997/98 because of the bad weather that reduced agricultural output, and also 2002/03 was a drought year, which led to a shock in the economic performance of the country. The economy, however, rebounded in 2003/04 and registered about 13% real GDP growth rate. Such double digit growth has been sustained throughout the eight consecutive years that led to a simple average real GDP growth rate of 11.4%. The real GDP growth rate for 2010/11 is 11.4%. However, the prevailing international economic crisis had some consequences on the growth registered during 2008/09.



As observed from figure 2.2, within the last four decades, the composition of agriculture and allied activities, industry, and service sectors on average accounts 52 %, 12 % and 36 % of national output respectively. The sectoral composition of GDP proves that agriculture still maintains the dominant position over the study periods. Agricultural sector is the predominant sector in the economy and hence its performance significantly affects the growth in GDP. The performance of agricultural sector in turn is highly dependent up on the weather condition (rain fall). Thus, GDP registers the highest figure when there is timely and sufficient rainfall as well as during recovery from a very low base and the lowest when this is not the case. That is why we see erratic nature of growth of real output in figure 2.1 above.

Though agriculture production has increased considerably due to favorable weather conditions and enhanced support by government (e.g. improved supply of fertilizer)

agricultural productivity remains low. The contribution of agriculture to overall GDP was 47% in 2003/04, and declined gradually but steadily and reached 41.1% in 2010/11. The share of industry showed no significant change, accounting on average for 13.3% of the total value added over the last eight years. On the other hand, the service sector became the dominant in the economy with its share increasing from 39.7% in 2003/04 to 46.6% in 2010/11. Impressive growth in services in recent years was driven by the rapid expansion in financial intermediation, public administration and retail business activities.

The rising role of services does not, of course, mean that this portion of the economy is becoming dominant across all measures of economic significance. The rise of the services sector brings many implications and opportunities for business in Ethiopia. With respect to Industry, its role in the Ethiopian economy is notable for its near-static share over the last decade. The share of industry has been close to 13 percent. Nevertheless the share of agriculture in GDP tended to decline over time; it still remains the largest employer, the main source of foreign exchange, and supplier of raw materials and market to domestic industries (MoFED, 2010/11).

2.2 Structure of Government Expenditure

Government expenditure is at times classified as real expenditure and transfers. But on the assumption that the expenditures on capital contribute to growth while other forms of expenditure do not, the most adhere form of classification, including in Ethiopia is the one that classifies it as recurrent and capital expenditure. The other way of classification

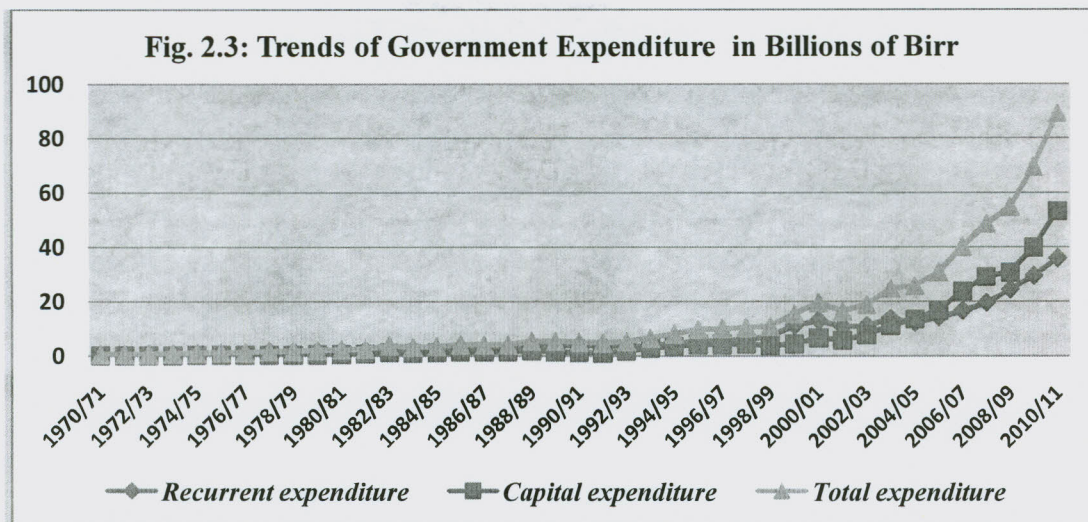
is developed by Ram (1986) in to consumption, physical investment and human capital expenditure.

2.2.1 Capital versus Recurrent Expenditure

Despite the noticeable pitfalls in putting clear demarcation between capital and recurrent expenditures practically, dealing with them sheds some light on implication of changes in the structure of government expenditure. "...Capital expenditure is broadly defined as an outlay to development projects to enhance the capacity of the economy for the production of goods and the provision of economic and social services. It also includes payment for project study and design management supervision, and direct labor cost. However, some expenditures of capital nature that are treated in recurrent budget as some recurrent outlays also appear in the capital budget..." (MEDaC,1998 as cited in Jefar, 2002:38).

Capital expenditure is categorized into three groups: economic development, social development, and general development. Economic development includes productive activities and infrastructural facilities such as agriculture, industry, mining and energy, transport and communication etc. Social development includes education, public health and social welfare, while general development includes compensation payments as its component. On the other hand, recurrent spending consists of expenditure items, which are recurring in the process of delivering government economic and social services. Wages and salaries, operation and maintenance, pension and price subsidies, and debt servicing are among the major components of recurrent expenditure.





Source: Computed based on data obtained from MoFED and NBE data 1970/71-2010/11.

As can be seen in figure 2.3, the amount of total expenditure in Ethiopia was 0.6315 billion birr in 1970/71 fiscal year. Its trend shows that public expenditure increased from 1.0489 billion birr in 1974/75 to 5.12987 billion birr in 1990/91, which had 11.7 percentage increases per annum on average. When it comes to the post-reform period, the amount of government expenditure was 4.78546 billion in 1991/92 and then sharply increased to 19.5376 billion birr in 2000/01 and an uprising of 89.12574 billion birr in 2010/11.

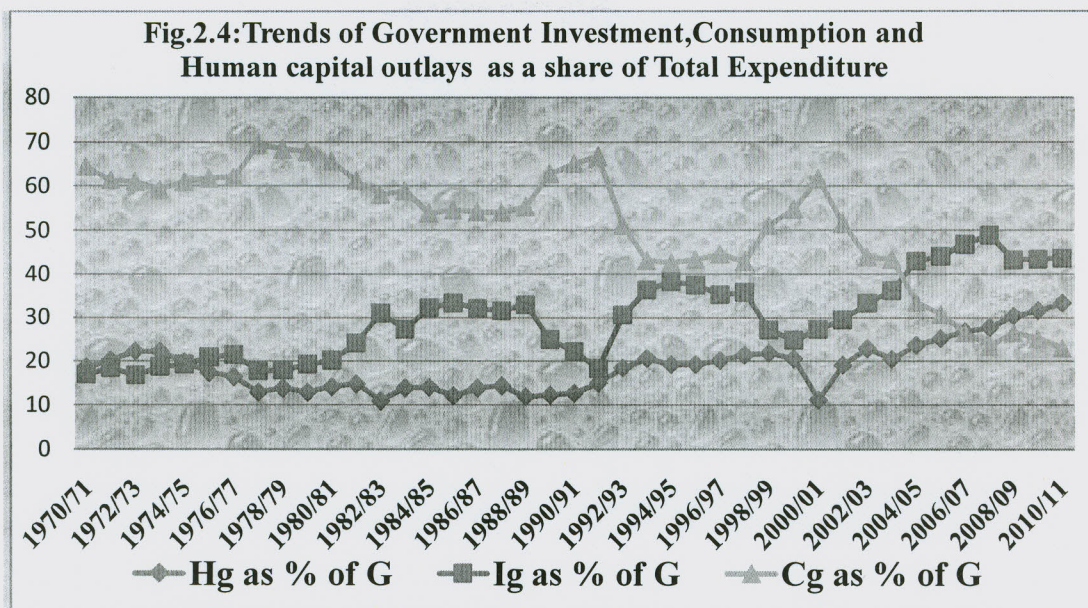
The share of recurrent expenditure from total spending was higher than the share of capital spending from 1970s until 2004/05. As Teshome (1993), the socialist management of the Derg regime nationalized many institutions in which, recurrent expenditure increased dramatically. Moreover, outlay for revolutionary developmental campaign had contributed much of the increase in recurrent/capital expenditure ratio which continued up to the beginning of the post reform period.

Government spending in different sectors like education, health, roads, agriculture and natural resources and water and sanitation have got significant attention as key poverty related sectors (WB, 2001). Thus, with the exception of some expenditures items, which have relatively lower share, the public expenditure has substantially increased during post reform period, an uprising and interesting change in the pattern of public expenditure began in 1992. As part of the market reform process, the government took important macroeconomic reform including taxation. The participation of the private sector has increased. The end result was an increase in Government revenue, which partially contributed to increase Government spending. The overall growth in sectoral spending has shown volatility partly because of the war situation with Eritrea.

Nevertheless, towards the beginning of 2000 and onwards, the patterns of overall expenditure, has shown an upshot increasing trend, to meet the growing demand for investment in infrastructure, health, education and transport and communication.

2.2.2 Other Classification of Government Expenditure

According to the model developed by Ram (1986), growth effect of government expenditure can be analyzed by categorizing it into three as expenditure on investment, consumption and human capital. In doing so, government total capital expenditure less capital expenditure on health and education is considered as investment expenditure. Government total current expenditure less current expenditure on health and education is considered to be expenditure on consumption. The sum of capital and current expenditure on health and education makes up for government expenditure on human capital.



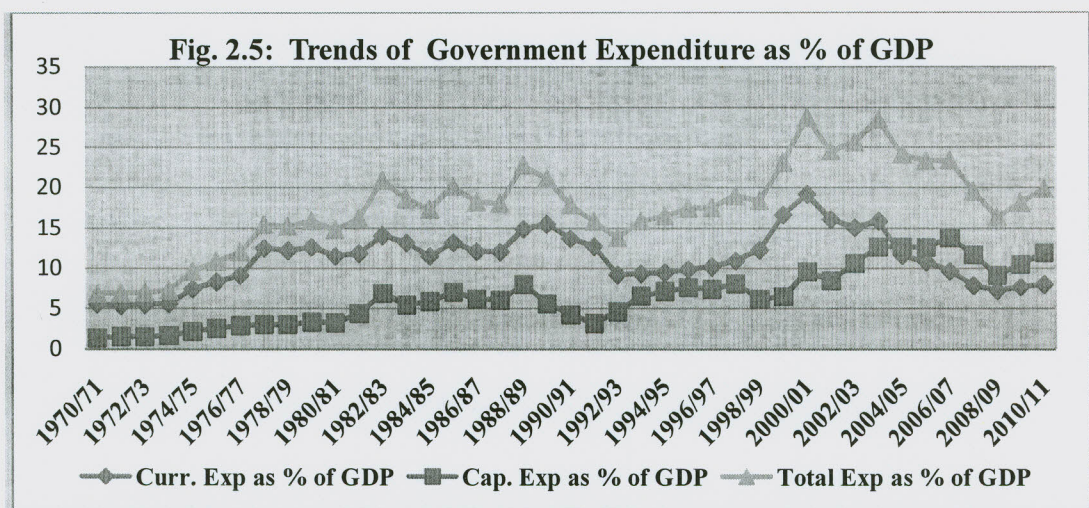
Source: Computed based on data obtained from MoFED and NBE data 1970/71-2010/11.

Total government spending is decomposed into consumption, investment and human capital expenditure. As can be seen from figure 2.4, the composition of total government spending across the study period is characterized as consumption expenditure accounts a greater proportion till 2003/04, followed by investment and then human capital expenditures. After 2004/05, capital spending net of education and health expenditures takes the lion share in the fact that pro poor spending like basic infrastructure, agriculture and industry was expanded. In addition public spending on human capital development outweighs consumption expenditure.

The above mentioned descriptions are summarized and supported by a table seen under Appendix-I.

2.3 Trends of Government Spending and Total Output

In discussing the trends of government spending, choice is made to consider rising in public expenditures in terms of rising public sector share from national output. In this case, the path of overall government expenditure is demonstrated by considering the ratio of total government expenditure to GDP, which measures the amount of government spending relative to the size of its economy.



Source: Computed based on data obtained from MoFED and NBE data 1970/71-2010/11.

From figure 2.5, the share of annual average total expenditure to GDP over the last four decades was 17.5%, of which recurrent and capital expenditure accounts for 11% and 6.5% respectively. In comparison with capital expenditures, recurrent expenditures increased dramatically between 1975 and 1991, due to many factors such as the civil war in the country, increase in wage employment in the nationalized enterprises, and programs of illiteracy eradication campaign, which intern led to an increase in expenditure on defense and security, wage bills, education and training. Subsidizing

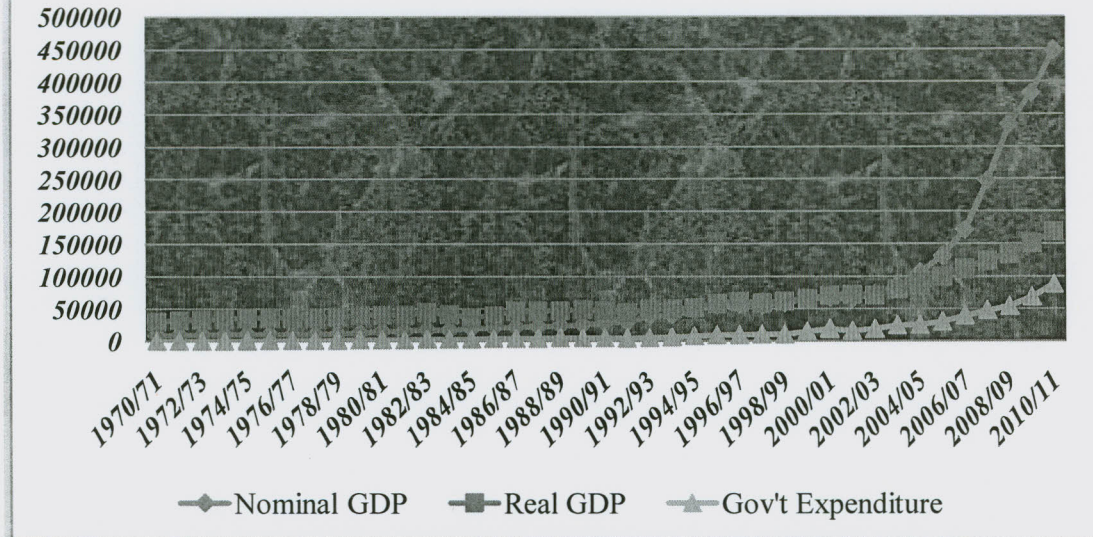
public enterprises since 1978 and the increase in debt service payment were also additional causes. Even though structural changes have been made to reduce defense expenditure since 1992, measures taken to establish institutions that can help federal structure in the country, the increase in social services, and the outbreak of the Ethio-Eritrean war during 1998-2001 pushed up recurrent expenditure.

But the share of capital expenditure was low compared to recurrent expenditure. The involvement of the government in direct production activity during the Derg regime has led to fast increase in capital expenditure. Regarding this increase in capital expenditure, Teshome (1993) noted that the rise in capital to recurrent expenditure implies a shift of investment responsibilities from the private toward the public sector, but not a significant change in the overall investment in the economy.

After the downfall of the Derg regime, the international community has been pressing for liberalization and deregulation, shift in expenditure toward social services and away from non-infrastructure economic services to enhance productivity, release resources from public to private control, and permitting a reduction in government financing. Due to this, there was significant cut in expenditures related to agriculture and allied activities. However, the increase in outlays to road construction and social infrastructure was so high that capital expenditure kept rising since 1996.

The trends of aggregate government spending, nominal GDP and real GDP are presented under figure 2.6 seen below.

Fig.2.6: Trends of Nominal GDP, Real GDP and Total Government Spending in Millions of Birr.



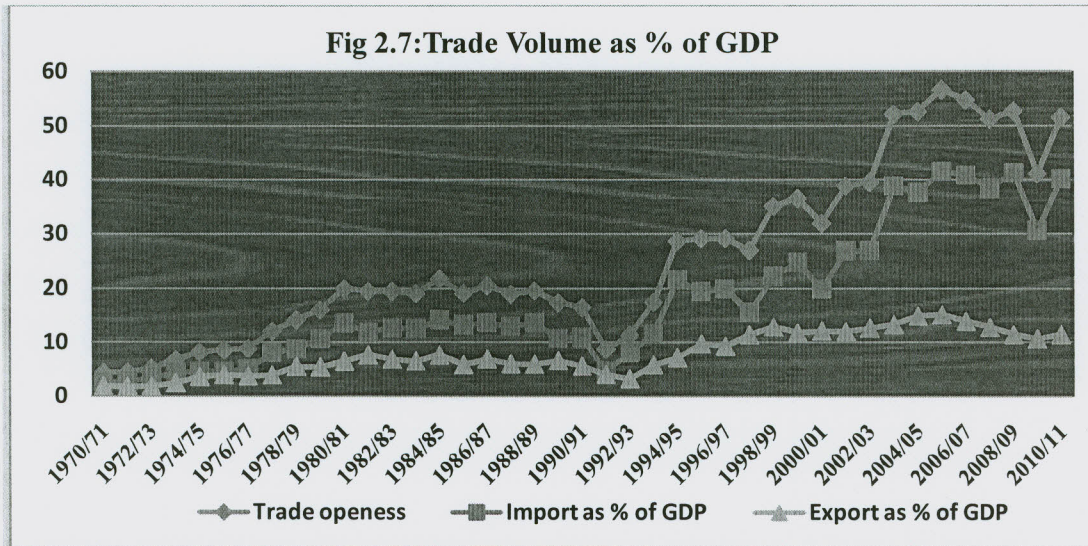
Source: Own Computation based on data obtained from NBE and WB/WDI, 2012.

2.4 The Performance of External Trade in Ethiopia

Trade volume, measured as the sum of import and export of goods and services as a share of GDP is an additional variable of interest in the study. This is due to the fact that the contribution of openness to trade for the growth performance of Ethiopia is not included by the other variables investigated in the model.

International trade is one of the determinants for growth and development for a given country by expanding markets, facilitate competition and disseminate knowledge. It can also raise productivity, increase employment and exposure to new technologies through foreign direct investment. The external trade sector mainly involves import and export activities of goods and services. The role of import in the Ethiopian economy supplies capital goods that cannot be produced locally at a competitive price and also, it augments

local production through delivering the required raw materials, basic technologies and intermediate goods. Moreover, it provides several consumer goods including food, drugs and other items.



Source: Based on data obtained from WB, International Financial Statistics, 2010/11.

CHAPTER THREE: REVIEWS OF RELATED LITERATURES

3.1 Theoretical Literature Reviews

The relationship between government expenditure and economic growth has long been a subject of analysis and debates by policy makers and governments. The analysis and debate are essentially about the role of government, or more generally the size² of the public sector, in the national economic growth. On the one hand, Government spending can be considered as an exogenous factor and affect economic growth in the form of policy instruments (Keynes's view), and on the other hand, this kind of expenditure as an exogenous factor may be the result of growth (Wagner's law). Adolf Wagner (1883) realized the positive relationship between public spending and rates of economic growth based on diachronical tendency. The public expending is one of the main factors to increase the expense of the private cost (Dritsakis and Adamopoulos, 2004).

Economic growth is fundamental for sustainable development. It is not possible, for a developing country, to improve the quality of life of its growing population without economic growth. The latter is mainly improved by the expansion of infrastructure repair, the improvement of education and health services, the rise of foreign and local investments, low cost housing, environmental restoration, and the strengthening of the agricultural sector. This approach consists of stimulating the economy by addressing the nation's foremost needs. Dealing with these issues will result in a great amount of money spending by the government and certainly lead to sustainable budget deficits.

² Conventionally, it is measured by the ratio of government expenditure to GDP ratio.

Nevertheless, this would produce a large number of socially useful jobs and business opportunities (Wadad and Kamel, 2009).

The term fiscal policy normally applies to the use of fiscal instruments (taxation and spending) to influence the working of the economic system in order to maximize economic welfare (Tanzi, 1994). The principal objective of fiscal policy in less developed countries should then be promoting long-term growth of the economy. This is because engaging only on stabilization of the economy in less developed countries would mean the maintenance of the stationary condition of under-developed equilibrium and would be quite incompatible with the requirements of economic dynamism.

In developing countries, the role of government is considerable in both scope and significance for accelerated economic growth. Despite the importance of monetary policies, government fiscal policies³ have become strong and essential instruments of economic growth in these countries. This is due to the fact that, on one hand, the financial dualism and the mainly non-monetized nature of the economy makes monetary instruments inactive relative to fiscal instruments and on the other hand very low level of social services and meager infrastructural facilities limit to a great extent the role of private sector in the development endeavors. Thus, there is a need for a government to create the means to create the social and economic infrastructures thereby stimulating private investment and ensuring better use of scarce entrepreneurial ability (Tanzi, 1994 as cited in Teshome, 2006).

³ *which includes taxation, government expenditure, and public debt*

Stiglitz (1988) as cited in Mulamba (2009) argues that the government requires finances because of its role in the society. The government executes different kinds of activities in the society. First, the government offers legal and institutional frameworks in which corporate and private individuals can engage in economic activities. It consists of providing a favorable environment in which property rights, antitrust laws and incentives for competition are guaranteed. In short, the provision of a legal framework implies that government will constantly need resources to maintain law and order. Secondly, government has the responsibility to finance social activities such as housing, sport and recreation, education, primary health care. To ensure that it maintains this role, government produces goods and services as any other private corporate. Thirdly, government purchases goods and services in order to provide for the functioning of its different organs such as national defense, education, police, fire protection, environmental management. Lastly, government has the responsibility to intervene in the economy in order to correct the inequalities caused by the market system and alleviate the phenomenon of poverty. For this purpose, government can redistribute income and wealth through the expenditure side of its budget.

Traditional Keynesian macroeconomics states that high levels of government consumption are likely to increase employment, profitability and investment via multiplier effects on aggregate demand. Thus, government spending raises aggregate demand, leading to increased output depending on the size and effectiveness of expenditure multipliers. The opposite viewers (Monetarist) maintain that government consumption crowds out private investment, dampens economic stimulus in the short run and reduces capital accumulation in the long-run. Strictly, crowding-out results from a

fiscal deficit and the associated effect on interest rates, but adverse economic impacts may be due to government spending in general (Diamond, 1989).

The Keynesians view that government expenditure, as a fiscal policy instrument, is helpful for achieving short-term stability and higher long-run growth rate. Therefore, they stipulate for government interventions in the economy through the fiscal policies as this plays a crucial role in the development process. They advocate for expansionary policies during economic contractions and vice versa for correcting the short-term fluctuations and increasing the long-term steady state growth rate, if not, the economy would rest at a lower growth trajectory. In contrast to this view, the Classical economists deem fiscal policies to be ineffective as it crowds out private spending such as including investment spending. When government spending is raised, private goods are substituted for public goods, thus causing lowering of private spending on education, health, transportation and other services. Further, heavy government spending requiring more government borrowings⁴ may displace private sector in availing up of credits for financing its expenditure. This can occur either by squeezing the supply of credit or raising the interest rate in the economy. The monetary approach to balance of payment also emphasizes the proposition that higher interest rate resulting from contraction in money supply leads to low investment and hence low growth rate of output in the economy (Mulamba, 2009).

It is also true that heavy government spending requires imposition of increasing amount of taxes. The effect of taxes may result in disincentive impact on the private sector to work and invest. Moreover, this results in inefficient resource allocation and resting the

⁴ *through bond-financing*

economy at an under equilibrium. Thus, according to this Classical's view, countries with higher government spending would experience lower economic growth. To the extent that the public sector engages in activities that can be undertaken by the private sector, and the way in which expenditure is being financed⁵ may have detrimental consequences. In contrast, in line with Keynesians, it could be argued that the government provision of necessary public goods for which no competition exists from private sector can definitely lead to faster economic growth.

Endogenous growth theory also justifies that if productivity is to increase, the labor force must continuously be provided with more resources. This resource could be physical capital, human capital and knowledge capital (technology). Therefore, growth is driven by accumulation of the factors of production while accumulation in turn is the result of investment in the private sector. Therefore, this theory implies that the only way a government can affect economic growth, at least in the long run, is via its impact on investments in capital, education and research and development. Reduction of growth in these models occurs when public expenditures deter investments by creating tax wedges beyond necessary to finance their investments and involve a sector where private institutions work better or taking away the incentives to save and accumulate capital (Folster and Henrekson,1997).

Public spending can affect the dynamics of GDP through its consequences for the effectiveness of resource allocation and accumulation of productive resources. Both of

⁵ *Inflationary financing, Distortionary taxes, public debt leading to high interest rates resulting in crowding out of private investment*

these conditions assume the influence on the productivity of private sector. An increase in government expenditures on a public intermediate good: firstly, via taxes or borrowing, withdraws financial resources from the private sector. Secondly, at the time this public intermediate good becomes freely available and fully effective, it affects the productivity of the companies and labor force which use this good. This can lead to decreased costs (especially transaction costs) of production, and frees up funds for new investments in physical and human capital, and may enhance the productivity of existing factors of production. On the contrary, underdeveloped infrastructure may distort the industry structure making it less efficient. Lack of a dense road network can cause unproductive centralization and vertical integration of the production process (Carbajo et.al, 1997).

3.2 Empirical Literature Reviews

Empirical studies designed to resolve the expenditure and growth issues are mostly upon the Denison growth accounting framework, according to which growth is explained in terms of the changes in physical capital, human capital, technology, and efficiency in resource use. If public expenditure enhances any of these elements, a positive contribution to growth is expected.

The main conclusion that can be derived is that it is the capital expenditure, which contributes to growth. Therefore, it is the composition rather than the level which is important and the distinction between capital and current expenditures can be misleading.

The focus should be to distinguish productive from unproductive expenditure, which is quite an overwhelming task. There are certain current expenditures by the government like education, health, transportation are quite productive and contributory but the capital expenditure if it is not exploited properly may be quite unproductive. Hence the classification of expenditure into current and capital expenditure is not necessarily in line with unproductive and productive but they may be different only in definitions.

The study empirically attempts to prove which component is productive, which has not been examined comprehensively taking into account the channels such as private investment through which government expenditure could affect the growth.

Ram (1986) used cross section data for a larger sample of 115 countries and time-series data (1960-1980) for 17 individual countries to see the effect of government size on economic growth. Estimation was done with OLS and also on the premise of a first-order auto-regressive disturbance term (AR1) for some countries from time series data. The main results are: first, the overall impact of government size on growth is positive in almost all cases; second, the (marginal) externality effect of government size is generally positive; third, although the number of time series observations for each country is relatively small, there is a broad harmony between the estimates obtained from cross section and time-series data; and fourth, it is possible that the positive effect of government size on growth is stronger in lower income contexts.

Naturally, investment (or, productive) expenditure by the government is supposed to raise private capital accumulation, which in turn will raise economic growth in the long run. And the impact of government consumption should be opposite to its investment

counterpart. An interpretation given by Barro (1990) for government consumption is that government consumption introduces distortions, such as high tax rates, but does not provide an offsetting stimulus to investment and growth. Alternatively, the effect of an increase in government consumption should be nil if we view it as leaving the productivity of the private sector unaffected. In contrast, the effect of public investment should be positive since this type of activity is likely to enhance the productivity of the private sector.

In addition, Barro (1991) used the ratio of public capital investment to total investment (the sum of private and public investment) as an explanatory variable in the regression estimation of the average annual growth rate of real per capita GDP. His study includes 98 countries for the period 1960-1985. Nevertheless, for estimating the impact of public investment on growth he included only 76 countries where data for public investment is available. The point estimate of his result was positive but insignificant. When he replaced the ratio of public investment to total investment with the ratio of public investment to GDP the estimated coefficient is again positive but insignificant.

Fan and Rao (2003) analyzed the impact of different types of government spending on overall GDP growth across 43 developing countries between 1980 and 1998 using OLS method and found mixed result. In Africa, public spending on agriculture and health was particularly strong on promoting economic growth. Among all types of government expenditures: agriculture, education, and defense contributed positively to economic growth in Asia. In Latin America, health expenditure had a positive growth-promoting effect. Structural adjustment programs had a positive growth-promoting effect in Asia

and Latin America, but not in Africa. In fact, structural adjustment programs hurt economic development in Africa.

Gupta et al. (2005) assessing the effects expenditure composition on economic growth for a sample of 39 low income countries during 1990s showed that countries where spending is concentrated on wages tend to have lower growth, while those that allocate higher share to capital and non-wage goods and services by cutting their current expenditures register faster growth. In contrast, opposing to the general expectations, applying co integration and error correction model in Indian context, Tulsidharan (2000) found that higher economic growth invariably is accompanied by an increase in government final consumption expenditure.

This was similar to the results obtained by Devarajan et.al (1996) for 43 developing countries; found a negative relation between the capital component of public investment and economic growth. They attribute this to the misallocation of public capital expenditure by developing countries which cause them to be unproductive at the margin. In addition macroeconomic instability may have restricted the impact of public spending on output growth because of the limited response of the private sector to undertake economic activities. And also Pritchett (1996) who incorporates an investment efficiency coefficient in his model argues that public investment may not create productive capital in developing countries due to inappropriate use.

Kweka and Morrissey (2000) investigated the impact of public expenditures on economic growth using OLS method for a sample of 1965-96 periods' time series data on Tanzania.

They used a growth accounting method to analyze the effect of the different components of public spending on output growth. Public spending was decomposed into public physical investment, consumption spending and human capital outlays. They found that increases in productive (investment) expenditure were associated with lower levels of growth, and this result was robust when modeled indirectly through its impact on private consumption. These findings are consistent with Diamond (1989) and Devarajan *et al* (1996), the negative relationship suggests the inefficiency of public investments in Tanzania. Unfavorable macroeconomic conditions may have undermined the productivity of investment. On the other hand, public consumption expenditure tended to be associated with higher levels of private consumption and of growth of real GDP. They also found no evidence for any impact of public expenditure of human capital on growth, similar to Devarajan *et al* (1996), and weak evidence that private investment contributes to growth.

In case of Ethiopia, Teshome (2006), observed the impact of various components of government spending on the growth of real GDP for the period 1960- 2003 using Johansson Maximum Likelihood Estimation procedure. In the co integration analysis it is found that there is single co integrating vector which implies that there is long-run relationships among the variables. The long run result shows that expenditure on human capital has a significant positive impact on growth of real GDP. Besides, private consumption has significant positive impact on economic growth. Government investment expenditure is not significant, which probably reflects the inefficient and poor quality nature of public investment.

Table 3.1: Summary of the Various Empirical Studies and Results

Author(s)	Sample and method	Explanatory variables	Main Results
Barro (1991)	Cross section of 98 countries, OLS	Public inv. as ratio of total inv. on growth of RPCI	Positive but insignificant
Easterly and Rebello (1993)	Cross-section of 100 ADCs and	Government surplus, GI, GC and other types of expenditures and taxes, and human capital	GI has a negative impact on growth, GC a negative impact, but positive impact on private investment. Spending on infrastructure has positive impact on private investment.
Lin (1994)	Panel for 62 Countries:1960-85 OLS, 2SLS	I and G (growth rates), growth rate of labor force	Mixed results. GC insignificant in DCs, but significantly positive in LDCs.
Devarajan et al (1996)	Cross-section 43 LDCs (1970-90)	GC, GI and functional categories	GC positive, GI negative in LDCs, reverse for DCs.
Kweka and Morrissey, (2000)	Tanzania, Time series data, 1965-1996	Functional type of G (GI,GC,HG),private investment	GI – negative impact GC - positive impact HG – no impact PI - weak evidence
Fan and Rao (2003)	LDCs,1980-1998 OLS	SAP, Expenditure on Agriculture, education, Defense, health	Africa: spending on educ. and health has positive, Asia: agric, educ., defense has positive impact. Latin: health has positive , SAP: +ve for Latin and –ve for Africa
Teshome (2006)	Ethiopia , time series data, 1960/61-2003/04, VAR	GI,GC,HG,PI,PC,X	GI-insignificant, X-insignificant GC- negative, PI-insignificant HG,PC = Positive
Yasin. M,(2003)	SSA, Panel data, 1987-1997	G,ODA,OPN,,PI, POP	GI,OPN,PI = Positive ODA,POP = Insignificant

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1. Data Type and Sources

Secondary data is used as the study is a macroeconomic research, which was collected from the EEA/EEPRI 2010 database, published and unpublished documents of MoFED, different bulletins of National Bank of Ethiopia and World Bank/WDI. Government expenditure denotes country wide budgetary expenditure, including the federal government and regional states.

4.2. Model Specification

Econometric analysis would be applied to estimate how the functional compositions of government spending affect economic growth. The theoretical foundation of the study indicates total expenditure is disaggregated in to expenditure on physical investment, consumption and human capital investment. We follow the model of Ram (1986), the economy is assumed to have two sectors, government sector (G) and private sector (P). Each sector's output is a function of the factors allocated to the sector. In addition, the output of the private sector depends on the level of output produced by the government sector. This formulation represents the beneficial effects of government sector on the private sector.

The production functions for the two sectors are then written as:

$$G = G(L_G, K_G) \dots \dots (1)$$

$$P = P(L_P, K_P, G) \dots \dots (2)$$

Where:

G is government, p is private, L_G, K_G, L_P and K_P : are sectoral inputs and the output of government sector G enter into the production function of the private sector, thus, affect output of the private sectors.

The total factor inputs (L and K) are then given as:

$$L = L_P + L_G \dots (3a)$$

$$K = K_P + K_G \dots (3b)$$

$$\text{National income: } Y = P + G \dots (3c)$$

$$\text{This implies: } Y = f(L, K, G) \dots (3)$$

Suppose marginal factor productivity in the two sectors (i.e. partial derivatives like G_L, P_L, G_K and P_K) differs and the relative productivity for both factors is identical. This assumption can be denoted as:

$$G_L/P_L = G_K/P_K = 1 + \delta \dots \dots (4)$$

Where δ indicates which sector has the higher marginal factor productivity; where $\delta > 0$, implies lower productivity in the public sector (the reverse would be the case if $\delta < 0$), and we assume $\delta = 0$,

Totally differentiating equation (3), via (1) and (2), gives

$$dY = G_K dK_G + P_K dK_P + G_L dL_G + P_L dL_P + P_G dG \dots (5)$$

Where:

G_K and P_K : Marginal factor productivity of capital in government and private sectors respectively,

G_L and P_L : Marginal factor productivity of labor in government and private sectors respectively,

P_G : Marginal externality effect of public expenditure on private sector.

From equation (4)

$$G_L = (1 + \delta)P_L \dots (6)$$

We will treat capital as distinct in each sector, and for this reason, we do not have to assume a constant productivity differential between capital in each sector (as we do for labor), and by rearranging:

$$dY = G_K dK_G + P_K dK_P + P_L(dL_P + dL_G) + \delta P_L dL_G + P_G dG \dots (7)$$

Differentiating equation (2), and using equation (6), we can rewrite:

$$dG = G_K dK_G + (1 + \delta)P_L dL_G \quad ,$$

$$\text{This implies: } \left[\frac{dG}{1 + \delta} \right] - \left[\frac{G_K}{1 + \delta} \right] dK_G = P_L dL_G \dots (8)$$

By substituting equation (8) in to (7) and collecting terms:

$$dY = P_K dK_P + \left(1 - \frac{\delta}{1 + \delta}\right) G_K dK_G + P_L dL + \left(P_G + \frac{\delta}{1 + \delta}\right) dG \dots (9)$$

We assume the existence of a linear relationship between the marginal product of labor in each sector and the average output per worker in the economy, i.e. $P_L = \beta(Y/L)$

Let: $dK_P = I_P$: Private sector investment, and

$dK_G = I_G$: Public sector physical investment.

$\alpha = P_K$: defined as the marginal products of private expenditure for capital formation.

$\left[1 - \frac{\delta}{1 + \delta}\right] G_K = \gamma$: defined as the marginal products of government expenditure for capital formation.

By substituting in the above values to equation (9), and dividing through by Y:

$$\frac{dY}{Y} = \alpha \frac{I_P}{Y} + \gamma \frac{I_G}{Y} + \beta \frac{dL}{L} + \left[P_G + \frac{\delta}{(1 + \delta)}\right] \cdot \left[\frac{dG}{G}\right] \cdot \left[\frac{G}{Y}\right] \dots (10)$$

Rearranging it in to:

$$g_y = \alpha_0 + \alpha_1 \frac{I_P}{Y} + \alpha_2 \frac{I_G}{Y} + \alpha_3 \frac{dL}{L} + \alpha_4 \left[\frac{dG}{G}\right] \cdot \left[\frac{G}{Y}\right] + \mu \dots (11)$$

Government expenditure can be thus decomposed into investment (I_G) and consumption (C_G), and we have total investment ($I = I_G + I_P$) where (I_G) is government investment, which is proxied by government total capital expenditure less capital spending on health and education, while I_P is private investment, which is proxied by private capital formation.

The share of aggregate investment allocated to private sector is calculated following the procedure used by Cashin (1995:265): first the share of public investment in Gross

capital Formation (GCF) is estimated by dividing total government expenditure less current consumption expenditure to total aggregate domestic investment over each year. Private investment is then one minus the above ratio multiplied by GCF. The reason for doing this instead of using GCF is to avoid double counting government investment, which is in one way or another accounted by capital expenditure and some part of recurrent expenditure.

The justification for using total expenditure on health and education as a proxy to expenditure on human capital (labor) is evident in the context of developing countries. Physical and mental health is not only the greatest importance in our preferences of what we really want, but they are also major determinants of human accomplishment. Although dispute may range about forms and amounts, the case for increasing governments spending to raise health levels is found to be overwhelming to improve economic productivity as well as for humanitarian reasons. Government consumption expenditure (C_g) is measured by government recurrent expenditure less recurrent expenditure on health and education. Government expenditure on human capital (H_g) is measured by the total health and education spending (current and capital) like Kewka and Morrissey (2000).

On the other hand, education stands out as a strategic factor for supporting economic accomplishment and also for enlarging the potential for richer human experience perhaps the main objective of economic growth. Spending on education multiplies values many folds in developing human capacity (Harris, 1956). Education at all levels contributes to economic growth through imparting general attitudes and discipline and specific skills

necessary for a variety of workplaces. It contributes to economic growth by improving health, reducing fertility and possibly by contributing to political stability. The major importance of the educational system to any labor market would depend majorly in its ability to produce a literate, disciplined and flexible labor force via high quality education. Consequently, with economic development new technology is applied to production, which results in an increase in the demand for workers and better education.

Most of the explanatory variables are in fact components of GDP. This can be addressed by measuring the explanatory variables as shares of GDP, and an attempt has been made to examine the impact of each explanatory variable on growth of real per capita income. To make the model complete introducing a measure of trade openness is included as an additional explanatory variable. Thus, the model to be estimated is specified in the form:

$$\text{LRPCI}_t = \alpha_0 + \alpha_1 \text{LRHgY}_t + \alpha_2 \text{LRIgY}_t + \alpha_3 \text{LRCgY}_t + \alpha_4 \text{LRIpY}_t + \alpha_5 \text{LROpn}_t + \varepsilon_t \dots (12)$$

(?) (?) (?) (+) (+)

Where: LRPCI: the natural logarithm of Real Per Capita Income,

LRIpY: the natural logarithm of the share of Private Investment to GDP in real term

LRCgY: the natural logarithm of the share of Government Consumption Expenditure to GDP in real term.

LRIgY: the natural logarithm of the share of government Investment to GDP in real term

LRHgY: the natural logarithm of the share of government expenditure on human capital to GDP in real term

LROpn: the natural logarithm of openness to trade in real term

$\alpha_1, \alpha_2, \alpha_3, \alpha_4,$ and α_5 : are elasticity coefficients for the log - log model,

α_0 : is the constant term, ε_t : is stochastic disturbance term at time t with standard properties and t is time period.

The sign of each coefficient is dependent upon the relative contributions of the corresponding explanatory variables. The expected signs of real government outlays for human capital formation, real government investment spending and real government consumption are expected to have an ambiguous (i.e. indeterminate). Real private investment and real openness are expected to have positive effect on growth of real per capita.

4.3 Techniques of Estimation and Econometric Tests

This section tries to examine the techniques of estimation that are commonly used in growth regressions and come up with a preferred technique. It also tries to shed light on the econometric tests to be implemented.

4.3.1 Stationarity Test of Time Series Variables

Regularly, before making any analysis the stationarity or nonstationarity of a time series can be identified. A time series is classified as non-stationary at levels if the variance seems to be increasing with time and there is no tendency for the series to reverse to the

mean value. If a series fails to show stationary⁶ on level, it is frequently stationary on first differences (fluctuation around the mean and finite variance). Further, the relevant sample autocorrelation function (ACF) also provides additional information as the function for the levels dies off slowly while those for the first differences decline sharply before fluctuating around a fixed mean of zero (Ghatak et al. 1997).

The first step in time series modeling involves examining the time series property i.e. the order of integration of the variables involved in the model. A variable, X, is said to be integrated of order d if it becomes stationary after differencing d times, i.e. $X \sim I(d)$. By the same token, a stationary series is an $I(0)$ variable. If data series are found to be non stationary, most of the classical assumptions for econometric estimation are violated and regression of non-stationary variables could only spurious results (Harris, 1995:30).

There are quite a number of methods available to test for stationary of variables and the most commonly used are the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests. These methods are commonly used mainly due to ease of application. The null hypotheses of the tests are that a variable is non-stationary. This test is based on the following three different situations: a random walk with drift around a stochastic trend⁷; a random walk with drift⁸, and a random walk without drift⁹. The intercept term is

⁶A given variable (a stochastic process) is said to be stationary if it has a constant mean, constant variance over time, and if the covariance between observations in two time periods depends only on the distance of the lag between the two period rather than the actual time that the covariance is computed (Gujarati,2004).

⁷ $\Delta Y_t = \phi + \rho Y_{t-1} + \sum_{i=2}^k \gamma_i \Delta Y_{t-1} + \beta t + \varepsilon_t$

⁸ $\Delta Y_t = \rho Y_{t-1} + \sum_{i=2}^k \gamma_i \Delta Y_{t-1} + \beta t + \varepsilon_t$

⁹ $\Delta Y_t = \rho Y_{t-1} + \sum_{i=2}^k \gamma_i \Delta Y_{t-1} + \varepsilon_t$

introduced to capture drifts in the series while the time trend variable is there to account for existence of deterministic trends.

4.3.2 Approaches of Testing Cointegration

The economic interpretation of co-integration is that if two (or more) series are linked to form an equilibrium relationship spanning the long-run, then even though the series themselves may contain stochastic trends they will nevertheless move closely together overtime and the difference between them will be stable (i.e. stationary) (Enders,1995).

In this paper, Johansen (1988) Maximum Likelihood Estimation procedure is used in testing for co-integration, because it avoids the use of two step Engle-Granger procedure and can estimate and test for the presence of multiple cointegrating vectors. Johansen procedure also allows testing restricted versions of cointegrating vector(s) and speed of adjustment parameters for the purpose of testing a theory by drawing statistical inferences concerning the magnitudes of the estimated coefficients. In this procedure, the existence of co-integration relationship is tested using vector error correction mechanism (VECM) and arbitrary selection of endogenous and exogenous variables is avoided. Owing to its apparent superiority to that of the Engle-Granger methodology, in this study the Johansen Maximum Likelihood Procedure is applied for empirical analysis.

The starting point in Johansen's approach is Gaussian Vector Autoregressive (VAR); it is one form of multivariate modeling where no variable in the system assured to be exogenous before the estimation. This procedure is used to test and estimate the co integration in a multivariate setting. Following Davidson and MacKinnon, (1999), the system for determining the cointegrating vector in Johansen's procedure is specified as:

$$x_t = \sum_{i=1}^p \pi_i x_{t-i} + \Phi D_t + \varepsilon_t \dots (i)$$

Where x_t is a vector of n variables at time t , π_i is an $(n \times n)$ matrix of coefficients on the i^{th} lag of x_t , p is the lag length in the model; Φ is an $(n \times m)$ matrix of coefficients on D_t , which is a vector of m deterministic variables such as a constant term, a trend and dummies, and, $\varepsilon_t \sim IN(0, \Omega)$

The VAR can be rewritten as a VECM:

$$\Delta x_t = \Pi x_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta x_{t-i} + \Phi D_t + \varepsilon_t \dots \dots \dots (ii)$$

Where Π and Γ_i are: $\Pi = (\sum_{i=1}^p \pi_i) - I_n \dots \dots (iii)$

$$\Gamma_i = -(\pi_{i+1} + \dots + \pi_p); i = 1, \dots, p-1 \dots (iv)$$

I_n : is an identity matrix of order n , Δ is a difference operator and r , $0 \leq r \leq n$ is the rank of the matrix Π and represents the number of cointegrating vectors in the system. If $r = 0$, it indicates the absence of co integrating vector; if $r = n$ then the matrix Π is said to have full rank and $0 < r < n$, Π is said to have reduced rank.

Π can be rewritten as: $\Pi = \alpha \beta' \dots v$

Where, both α and β are $n \times r$ matrices of full rank. Thus substituting (v) in (ii) gives:

$$\Delta x_t = \alpha \beta' x_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta x_{t-i} + \Phi D_t + \varepsilon_t \dots [ii(a)]$$

In equation ii (a), β represents the matrix of co integrating vectors and α is matrix of weighting elements. The matrix of the co integrating vectors β has the property that $\beta' x_t$ is stationary despite x_t being non-stationary. Testing for cointegration amounts to finding

the number of r linearly independent columns in Π , which is equivalent to testing that the last $(n - r)$ columns of α are insignificantly small (Harris, 1995).

Johansen (1988, 1991) gives two likelihood ratio tests for determining the rank of Π and hence for testing the number of co integrating vectors in equation (ii): the maximum eigenvalue test λ_{max}^{10} and the trace test λ_{trace}^{11} .

The maximum eigenvalue test claims the null hypothesis of existence of r cointegrating vectors against the alternative of $(r + 1)$ cointegrating vectors. The trace test, on the other hand, tests the null hypothesis of r_1 co integrating vectors against the alternative of (r_2) cointegrating vectors, for $r_1 < r_2 \leq n$. The trace statistics tests whether there is at most one cointegrating relationship while the maximal statistics used to test the null hypothesis that there are r - cointegrating vectors as against the alternative hypothesis of $r + 1$.

$$^{10} \lambda_{max} = -T \ln(1 - \hat{\lambda}_{r+1})$$

$$^{11} \lambda_{trace} = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i)$$

CHAPTER FIVE: MODEL ESTIMATION AND INTERPRETATION OF RESULTS

5.1 Time Series Characteristics of the Data

As could be seen in table 5.1 below, after running the data all variables were found to be non stationary at level. However, the DF and ADF statistics of the logarithmic first difference of these variables are significantly high, thereby rejecting the null hypothesis that their first difference is non stationary. Therefore, from the unit root tests conducted all the variables which constitutes the VAR are found to be integrated of the same order (i.e. I (1)). As a result, regression on the first difference of the specified variables is not spurious.

Table 5.1: DF and ADF Statistics for Testing Unit Root

Variables	Dickey- Fuller		Augmented Dickey Fuller		Status
	τ_{μ}	τ_t	τ_{μ}	τ_t	
LRPCI	1.454	0.590	0.848	0.284	Unit root
LRHgY	-1.165	-2.558	-1.095	-2.495	Unit root
LRIgY	-1.610	-1.923	-2.093	-2.358	Unit root
LRCgY	0.740	-1.241	-0.022	-2.899	Unit root
LRIpY	0.209	-2.522	1.020	1.227	Unit root
LROPN	-2.117	-1.985	-2.878	-2.751	Unit root
CV ¹² 1%	-3.605	-4.205	-3.610	-4.211	
5%	-2.938	-3.526	2.938	-3.529	
Δ LRPCI	-4.806**	-5.474**	-4.678**	-5.788**	I(1) series
Δ LRHgY	-6.390**	-6.476**	-4.180**	-4.228**	I(1) series

¹² Mackinnon critical values for rejection of hypothesis of a unit root at the level of variables

ΔLRIGY	-5.135**	-5.360**	-4.823**	-5.480**	I(1) series
ΔLRCgY	-4.564**	-4.993**	-3.349*	-3.830*	I(1) series
ΔLRIPY	-9.072**	-9.334**	-4.371**	-4.521**	I(1) series
ΔLROPN	-4.640**	-4.828**	-3.652**	-3.837*	I(1) series
CV^{13} 1%	-3.610	-4.211	-3.615	-4.219	
5%	-2.938	-3.529	-2.941	-3.533	

Note:-** and * denotes rejection of the hypothesis of unit root for first differenced of the variables at 1% and 5% respectively.

- ❖ τ_{μ} is the estimated value of the test statistic when a drift (constant) term is included in the auxiliary regression for unit root test.
- ❖ τ_t is the estimated value of the test statistics when a drift(constant) term and trend are included in the auxiliary regression for the unit root

5.2 Determination of the Lag Length

The first step in estimating a VAR model is to determine the optimal lag length of the VAR. Hence, the optimal lag length for this study has been determined using the AIC and HQ as these methods have been proven in most empirical papers to be superior to other tests. According to these criteria, the VAR estimate with the lowest AIC and HQ value is the most efficient one.

The issue of setting the appropriate lag-length is that there are variables that only affect the short run behavior of the model and if they are omitted, they will become part of the error term and this leads to residual misspecification problem. As can be seen under Appendix-2, the value of HQ is consistent at lag one as the lag length changes, but the value of AIC varies as we change lag length of the VAR. When information criteria

¹³ Mackinnon critical values for rejection of hypothesis of a unit root at first difference of variables.

suggest different values of lag length, it is common practice to prefer the HQ criterion. Because setting lag length at different values results in implausible estimates of the cointegration vectors (Harris, 1995).

5.3 Tests for Co-integration and Long Run Relationship

An important property of I(1) variables is that there can be linear combinations of these variables that are I(0). If this is so, then these variables are said to be cointegrated (Maddala et.al 1999).

To determine the number of cointegrating vectors two test statistics called the maximum eigenvalue (λ_{max}) and trace statistics (λ_{trace}) are computed. In order to decide the number of cointegrating vector (rank of a matrix), the null hypothesis of no co integration between variables is tested against the alternative hypothesis that there is at least one co integration vector between variables. The number of distinct co integrating vectors can be obtained by checking the significance of the characteristic roots of the variables.

Table 5.2: Unrestricted Co-integration Rank Test (Trace)

Hypothesized	Trace	0.05
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No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.691233	123.8277	95.75366	0.0002
At most 1 *	0.578809	79.17122	69.81889	0.0074
At most 2	0.513376	46.31380	47.85613	0.0693
At most 3	0.256091	18.94380	29.79707	0.4969
At most 4	0.183253	7.702021	15.49471	0.4978
At most 5	0.000259	0.009830	3.841466	0.9207

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

* denotes rejection of the hypothesis at the 0.05 level

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

Table 5.3: Unrestricted Cointegration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.691233	44.65644	40.07757	0.0142
At most 1	0.578809	32.85742	33.87687	0.0658
At most 2	0.513376	27.37000	27.58434	0.0532
At most 3	0.256091	11.24178	21.13162	0.6232
At most 4	0.183253	7.692191	14.26460	0.4109
At most 5	0.000259	0.009830	3.841466	0.9207

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

From the Johansen maximum eigenvalue statistics perspective, the trace statistics could not reject the existence of two cointegrating vectors while the maximal eigenvalue points to exactly one cointegrating vector. In such situations it is better to rely on the maximal eigenvalue statistics since it is argued that the trace test is less powerful than the maximal eigenvalue test (Yuan and Kochar, 1994), and therefore we conclude that there is one

cointegrating vectors among the variables based on the most powerful test of maximal eigenvalue test. Both the trace and maximal eigenvector tests reject null hypothesis of zero in favor of one cointegrating vector. What is most important at this stage is the existence of a long-run relationship among the variables of interest.

The existence of one cointegrating vector suggests that the first row of (β) and first column of alpha (α) matrices are important for further analysis. The table below reports the α and β matrices.

Table 5.4: Standardized Beta and Standardized Alpha Coefficients

Standardized Beta coefficient (Long run parameters):						
LRPCI	LRHgY	LRIgY	LRCgY	LRIpY	LROPN	
1	-1.16611	0.424351	1.175907	-0.43549	-0.73999	
0.31811	1	0.875034	-0.2023	-0.23795	-0.76283	
-0.96502	2.3317	1	-0.40958	-0.53403	-3.01848	
-4.99198	6.65533	-2.94648	1	-2.55346	0.063548	
3.352077	3.863345	-0.5052	-0.13473	1	-1.23243	
-4.94137	-0.32338	0.093821	-1.09257	1.069996	1	
Standardized Alpha (Speed of Adjustment) Coefficients:						
D(LRPCI)	-0.031116	0.004557	-0.007566	-0.014667	-0.011013	-0.000640
D(LRHgY)	0.029035	0.077694	-0.018540	0.019709	-0.025616	0.001343
D(LRIgY)	-0.028682	0.128734	0.004950	-0.047346	0.011547	-0.004241
D(LRCgY)	-0.072753	0.078059	-0.003746	0.027570	0.007140	-0.024642
D(LRIpY)	0.095783	0.042061	-0.010674	-0.046574	-0.011465	-0.022439
D(LROPN)	-0.005708	0.038363	-0.080863	-0.017465	0.007431	-0.001263

The standardized β' eigenvector (normalization is done with respect to RPCI) and the corresponding standardized α (feedback effect) coefficients associated with the first

vector to which other cointegrating vectors span are then relevant for the interpretation of the long run structural economic relationships.

Now, we have found that there is one cointegrating vector; the next step is to impose restriction on the first column of the (α)matrix. This helps us to identify weakly exogenous variables in the system and can enter on the right hand side of VAR. The result, using the likelihood ratio test as shown in table 5.5 below, revealed that the null hypothesis of weak exogeneity is rejected for real per capita income (LRPCI) at 5% level of significance. However, for the rest variables, the null hypothesis of weakly exogenous is not rejected. Therefore, the long run relationship can be formulated by taking LRPCI as endogenous variable, while the rest variables are exogenous.

Table 5.5: LR - Test for Zero Restriction on α - Coefficients

Dependent Variable	LRPCI	LRHgY	LRIgY	LRCgY	LRIpY	LROPN
LR test, chi 2	6.209	0.554	0.221	2.160	0.260	0.026
Prob.	0.012*	0.456	0.637	0.141	0.609	0.871

**denotes rejection of the null hypothesis of weak exogeneity at 5% significance level.*

Thus, the relevant single equation model with the estimates of the long-run coefficients with their respective standard errors and t-values in parenthesis can be constructed as:

$$LRPCI = 5.36 + 1.166LRHgY - 0.424LRIgY - 1.176LRCgY + 0.435LRIpY + 0.739LROPN$$

$$t\text{-stat: } - \quad (0.55944) \quad (0.31183) \quad (0.21182) \quad (0.20386) \quad (0.36081)$$

$$Prob. \quad - \quad [-2.08441] \quad [1.36084] \quad [5.55156] \quad [-2.13623] \quad [-2.05093]$$

Multivariate Diagnostic Tests:

Vector AR 1-2 test: $F(72, 92) = 1.2704 [0.1389]$

Vector Normality test: $\text{Chi}^2(12) = 34.256 [0.0006]**$

Vector hetero test: $F(252, 31) = 0.26755 [1.0000]$

Vector hetero-X test: $\text{Chi}^2(567) = 580.86 [0.3343]$

Regarding to diagnostic tests, there is no problem of auto correlation and heteroscedasticity, but it indicates vector normality problems, the null hypothesis of normality, however, is rejected at 1% level of significance. However econometric theory states that the existence of normality problem does not affect and distort the estimators' BLUE and consistency property, because the main purpose of normality tests is for testing hypothesis about the population parameter using confidence interval (Enders, 1995). Therefore the non existence of vector normality in our model doesn't affect the coefficients and t values. If the sample size gets larger and larger, we can easily remove the normality problem & the distribution approaches normal.

Stability Test: The adequacy of our model and stability of the parameters in the long run is conducted by the plots of *recursive least square graphic test* of non-zero eigenvalues. This is called the diagnostic graphs of residuals (1-step residual ± 2 ndSE). The recursive method uses by increasing the sub-sample size and then estimate the parameters continuous until the total sample data is completed. In recursive plots, there are two standard errors band around the selected coefficients. As the sample size increase and significant variation occurs within the bands, then the coefficient is stable over the entire period and indicates the constancy of the variance of the estimated model. As can be seen from the graphs under Appendix 4, the first vector, which corresponds to real per capita

income equation, is more stable. Thus, the null hypothesis of overall parameter consistency from the VAR cannot be rejected based on the 1-step recursive residuals.

5.3.1 Interpretation of Econometric Results

Real government expenditure on human capital has positive and significant effect for the real per capita growth of Ethiopia. This confirms the fact that healthy, productive, and trained human resource is essential for the implementation of government policies, strategies and programs. Investment in human capital stock with its externalities raising the productivity of labor, capital and other elements are important for further production process. The highest priority given to expansion of adult education, higher education, and basic preventive health care by government could probably explain the effect. This is consistent with the results of Barro and Sala-i-Martin (1995), and Abdullah et.al (2008). They found a positive and statistically significant impact of public expenditure on health and education on real per capita GDP; and could contribute indirectly towards raising the marginal productivity of private sectors via their contribution on human capital accumulation.

However, the effect of real government consumption expenditure (mostly on wages and salaries, subsidies for inefficient SOEs, current transfer payments, and debt servicing) on growth of RPCI is significantly negative. This is in line with the result of Teshome (2006) implying the unproductive and inefficiency of government consumption spending in Ethiopia.

The relationship between real government investment and real per capita income is negative but insignificant. This contradicts the standard hypothesis that public

expenditure on capital goods is supposed to add the country's physical capital (mainly infrastructure - roads, bridges, dams, power plants, etc).As Teshome (1994) indicated, the lack of complementary policies, inefficient administration and political instability could be cited as possible reason for poor performance of government investment spending in Ethiopia. Further, rent seeking and bribe actions by officials, unmotivated civil servants, and poorly administered huge projects of SOEs may result inefficient and poor quality of public investment. In addition, during the previous regime, there were huge and inefficient public sector investment activities which could be provided by the private sector effectively and efficiently. The result obtained is consistent with the works of Teshome (2006), Kweka and Morrissey (1999), Diamond (1989) and Devarajan *et.al* (1996).

Moreover, real private investment has positive and significant effect on growth of per capita income. There had been an intentional control of the private investment during the 1970s and 1980s following the planned economic system; however, restructuring in the post-1991 has brought about a significant improvement in private sector participation which stimulated to growth.

Lastly, real openness to trade measured as the ratio of export and import to GDP has a positive and significant effect on the growth of real per capita income. In theory, trade can enlarge people's choices by expanding markets for goods and services and by providing stable incomes for households. Trade can also raise productivity and increase exposure to new technologies through foreign direct investment, which can also spur growth. This is supported by Yasin (2008) who showed that trade openness have a positive and significant effect on economic growth in SSA because open economies can

have more access to foreign resources and markets. Thus, a more open economy is expected to have a higher growth rate of national output.

5.4 The Short Run Dynamic Modelling (VEC Model)

As we know, determination of the coefficient of short-run dynamics is conducted by estimation of parsimonious VECM after the determination of long-run relationships. It is very important to specify how short run adjustment of macroeconomic variables is took place, and a fertile ground for policies analysis & implementation.

This system is defined by Hendry general-to-specific approach to modeling (Harris, 1995:134). The long run information is obtained from the error correction term which is derived from the long run coefficients, enters in to the model by lagging one year (*i. e.*, ECM_{t-1}). The rationality for lagging a year is to show how the time path matter to correct errors.

An important quality of the error correction model is its statistical significance of the respective error correction terms. The estimated coefficient of the error correction term is -0.094 showing the speed of adjustment to equilibrium, being negative and statistically significant indicates the process is converging to its long run equilibrium. The small estimated coefficient of the error term implies a slow speed of adjustment towards equilibrium that it takes many years for all deviations to be corrected. Hence, 9.4% of deviations from long run equilibrium are eliminated per year.

In this approach a large model is estimated first which includes as many explanatory variables and their lags as possible. Then all insignificant explanatory variables are continuously dropped until a parsimonious model with fewer explanatory variables but

acceptable in terms of significance, economic interpretation and diagnostic validity is obtained. The null hypothesis in the model reduction process is that the coefficient of the excluded variables are zero and thus irrelevant to the model. If the null is not rejected, the reduction is valid and the reduced model is justified.

Table 5.6 Results for the Dynamic Equation

Variables	Coefficient	Standard error	t-stat	Prob.
Constant	0.013521	0.010440	1.295101	0.2048
$DLRPCI_{t-1}$	0.098432	0.159549	0.616942	0.5418
$DLRHgY_{t-1}$	-0.088030	0.068746	-1.28051	0.2099
$DLRIgY_{t-1}$	0.061459	0.054483	1.12805	0.2680
$DLRCgY_{t-1}$	0.031890	0.052181	0.611154	0.5456
$DLRIpY_{t-1}$	-0.025894	0.040217	-0.64385	0.5244
$DLROPN_{t-1}$	-0.110063	0.057071	-1.92850	0.0630
ECT_{t-1}	-0.093811	0.028341	-3.31007	0.0024

R-squared	0.347678	Durbin-Watson stat	1.666758
S.E. of regression (σ)	0.058706	Sum squared resid.	0.106837
F-statistic	2.360368 (0.046911)		

Where:

D: the difference operator indicating the first difference of variables.

ECT_{t-1} : represents the first lag of cointegrating vector for LRPCI specification

$$D(LRPCI) = 0.0135 + 0.098DLRPCI_{t-1} - 0.088DLRHgY_{t-1} + 0.061DLRIgY_{t-1} \\ + 0.032DLRCgY_{t-1} - 0.025DLRIpY_{t-1} - 0.11DLROPN_{t-1} - 0.094ECT_{t-1}$$

All components of real government expenditure as a share of GDP fail in explaining short run fluctuations, private investment as a share of GDP and openness as well.

Diagnostic tests were conducted to test the adequacy of the model. The model satisfies all diagnostic tests shown under Appendix 3. Autocorrelation tests indicate that there is no problem of autocorrelation. The null of no serial correlation at lag order of one cannot be rejected using LM test. Moreover, the residuals of the model are homoskedastic as the null of homoskedastic residuals cannot be rejected using White Heteroskedasticity (no cross terms) test. Jarque - Bera test of residual normality cannot reject the null of multivariate normal residuals implying that the residuals of the model are also normally distributed.

CHAPTER SIX: CONCLUSSIONS AND RECOMMENDATIONS

6.1 Conclusions

The relationship between public expenditure and economic growth is an important subject of analysis. Since both theoretical and empirical studies surveyed in this study do not reach a consensus that subjected to repeated empirical tests. Economic growth is the most important macroeconomic variable reflecting the overall performance of a society that results from producing more goods and services, which require productivity growth and growth in the stock of factors of production. Fiscal policy in general and government expenditure in particular, influence the dynamics of national output through its consequences for the effectiveness of resource allocation and accumulation of productive resources by creating conducive environment for the private sector.

This study has tried to empirically investigate the impacts of public spending on economic growth of Ethiopia. In considering the latest development in time series econometric analysis, this thesis discussed both short run and long run impact of disaggregated public spending on real per capita income using Johansen Maximum Likelihood procedure taking a time series data from 1970/71 to 2010/11.

The growth performance of Ethiopian economy was characterized by an erratic movement. Since agriculture and allied sector plays the predominant role in the economy, its performance significantly affects the growth in GDP. The ratio of public spending to GDP under the study period was 17.5%, of which recurrent and capital expenditure accounts 11% and 6.5% respectively. And also government consumption spending net of education and health takes the greater amount followed by physical investment and human capital spending until 2003/04. But the situation reversed due to the shift of

government spending towards pro poor sectors like basic infrastructure, agriculture, industrialization and social services (i.e. education and public health).

The natural logarithm of real per capita income is taken as dependent variable while the share of private investment, government investment spending, government consumption spending, government human capital outlays and trade volume to GDP , all deflated by GDP deflator and expressed in log form, are taken as explanatory variables. Prior to the estimation of the specified model, test for stationarity was carried out using DF and ADF tests. The results from the unit root testing exercise revealed that all the variables used in the estimation are all integrated of order one series, so that estimation is not spurious. In the cointegration analysis it is found that there is single cointegrating vector implying that there is long-run relationship among the variables.

The results from the long run estimation indicate that the real government spending on human capital formation, real private investment spending and real openness have positive and significant effect on growth of real per capita income. But real government consumption spending becomes growth retarding and significant in affecting RPCI, while real government investment is said to be insignificant in explaining growth of RPCI. In addition the VECM result showed all variables do not have short run impact on real per capita growth.

6.2 Policy Recommendations

This study has provided empirical results on the impacts of real government spending at its disaggregated level, real private investment and real openness on the growth of real per capita income of Ethiopia. These empirical findings emphasize a number of useful policy and theoretical implications for the growth and development of the country.

- Public spending on human capital formation has a positive and significant impact on the growth of real per capita. Hence, the government should expand its spending on education by ensuring quality and relevance to the country's economy. In addition, spending on primary health care and preventive services should be expanded by improving the effectiveness of service delivery in various health institutions.
- Although huge amount of public spending is allocated to consumption items (like wages and salaries, subsidies to inefficient SOEs, transfer payments, and debt servicing), it retards the growth performance of the country. As such, the government should give attention in redirecting to productive activities.
- Since real government investment has insignificant effect for the growth of real per capita, government should take actions on the quality of investment and efficiency of huge investment projects. Concerns of quality, transparency, accountability and capacity building should be well-established in all types' public expenditures particularly on huge investment projects to ensure fiscal regulation and management of scarce resources and promotion of sustainable development. For instance, the contract awarding process of capital projects should be closely scrutinized to prevent against over estimation of execution cost. The government should improve the payroll system to reduce high turnover of experienced and qualified employees and also to

attract others; training and capacity building programs should be expanded at different levels for workers to reduce inefficiency and for better utilization of scarce resources.

- Though real openness and growth of real per capita have positive and significant relationship in Ethiopia, it doesn't mean that the more we open our economy the higher we grow our real per capita income and do not simply opening our economy. There should be step by step, intensely investigated open up on different sectors.

Further Investigation

Finally the researcher insights for further investigation that the growth patterns of most developing countries like Ethiopia is highly dependent not only public spending and private participation but also various shocks (i.e. rainfall, political and institutional factors, foreign aid, and etc) to investigate the major determinants of growth of an economy for the country.

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