



**THE IMPACT OF FOREIGN AID ON ECONOMIC
GROWTH OF ETHIOPIA**

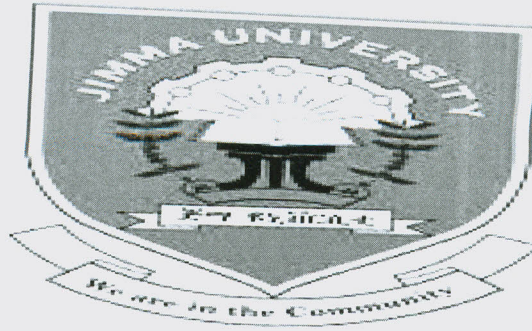
**BY
KITESSA DELESSA**

**JIMMA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

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BY

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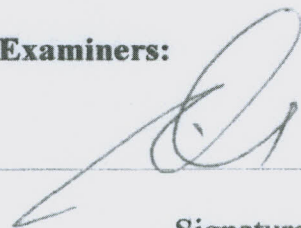
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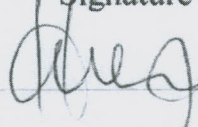
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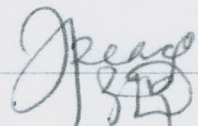
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ACRONYMS

2SLS	Two Stage Least Squares
ADF	Augmented Dickey-Fuller
ADI	African Development Indicator
AERC	African Economic Research Consortium
AIC	Akaike Information Criteria
APF	Aggregate Production Function
CGE	Computable General Equilibrium
DAC	Development Assistance Committee
DF	Dickey- Fuller
ECM	Error Correction Model
EEA	Ethiopian Economic Association
EPRDF	Ethiopian People's Revolutionary Democratic Front
ERP	Exchange Rate Premium
GCF	Gross Capital Formation
GDS	Gross Domestic Saving
GE	Grant Element
GTP	Growth and Transformation Plan
HQ	Hannan-Quinn statistics
HIPC	Highly Indebted poor Countries
ICOR	Incremental Capital Output Ratio
IMF	International Monetary Fund
LDCs	Less Developing Countries
MDGs	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development

NBE	National Bank of Ethiopia
OA	Official Assistance
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PP	Phillips Perron
PSBR	Public Sector Borrowing Requirement
SBC	Schwartz-Bayesian criteria
SSA	Sub Saharan Africa
TFP	Total Factor Productivity
TOT	Terms of Trade
UN	United Nation
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
WB	World Bank
WWII	World War the Second



ABSTRACT

Poor countries including Ethiopia need successful transformations that lead them to targeted economic growth which in turn improves the living standard of their people. But under the scenario of visible resource gap notably low domestic saving that does not satisfy the increase in investment demand the targeted growth cannot be simply achieved. Thus, to fill the resource gap the problem calls for the country to look up for and depend on external assistance from developed countries. However, there has been a great debate on the contribution of foreign aid for economic growth since the long years channeling of resources to this country. Therefore, the main nidus of this study is to examine the impact of foreign aid on economic growth of Ethiopia using multivariate cointegration analysis over the period of 1969/70 to 2010/11.

The result of cointegration test, using Johansen cointegration approach, indicates the existence of long run relationship among the variables entered the specified growth model. The estimated short run model comments that the current and past level of aid inflow entered alone has a negative impact on economic growth. Similarly, current level of aid interacted with policy has also negative effect on economic growth. However, in the long run foreign aid inflow entered alone has a negative and significant impact on economic growth. Whereas, aid interacted with policy appears to have a positive contribution to economic growth of Ethiopia in the long run.

Thus, the results of the study calls for better focus on internal factors specifically investment on human capital (labor force) and domestic investment arising from domestic saving to foster economic growth than external one which can be uncertain even when donor countries face long recession. In addition, the study also found that aid remains as a key tool of enhancing the economic growth of Ethiopia if and only if assisted by favorable macroeconomic environments (i.e., good monetary, fiscal and trade policies).

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Now a day almost all the peoples of developing countries and governments have the highest aspiration to achieve economic development in different ways; like getting food security, adoption of new technology, transition from agriculture -based to industry-based economy, access to education and health care, and the general improvement in living standards.

But, economic development cannot simply achieved by a mere wish. In place, it requires practical actions mainly in saving and investment. The saving requirement can be fulfilled either by domestic saving or foreign resources in an open economy. But, most of developing countries are neither in a position to generate adequate resources from domestic saving nor able to borrow money for their investment in international capital market at ongoing market interest rate. Thus, official development assistance (ODA), with its main objective of promoting economic development and welfare, in the form of foreign aid represents an important way through which resource is transferred from developed nations to underdeveloped economies. This transfer of external resource enables the recipient country to raise the level of investment under the scenario of low domestic saving performances and also helps for supply of investment goods that cannot be produced domestically (Kanbur, 2003).

Yohannes (2011) stressed that the practices and rationale of aid in assisting the economy comes into effect with the introduction of the 1940s Marshall Plan. Accordingly, the aid programmes flowing from donors (specifically from United States, US) to the western European countries after the agitation of the Second World War (WWII) had the prime goal of rebuilding and proliferating their war ravaged economy as explained in (Todaro, 1994). Then, after having got the experience as if aid really supports the economy, the attentions of donors diverted to give aid to the capital deficient countries of the LDCs with the prime motive of affirming their long term economies and in the second place fulfilling the political sphere and strategic agenda of donors. World Bank (WB, 1998) and Jifar (2002) also share the same view.

From the then onwards, WB (1992) urged that the flow of aid conveyed in amount (measured in millions of dollars) and as a share of GDP to the LDCs in general and to African countries in particular was eliciting from time to time. For example, Yohannes (2011:1) marked that, ODA "... drastically increased from 1.9 percent in 1960-61 periods to 2.9 percent in 1970-71 periods and to 5 percent in 1983-84 and reached 9.6 percent in 1990-91 periods. And, also the share of foreign aid to GDP has also increased to 18% during 2000-2010 fiscal years". But, what is mattering a lot is not the increase in amount and share as a percentage of GDP in place the issue of aid effectiveness (whether it meets the goal for which it was given and practically assists economic growth) has been a contested debate for many years (Hansen and Tarp, 2000; Lancaster, 1999).

Lancaster (1999) argued that even though foreign aid continued to play a significant role as a main source of capital to developing countries and has a potential in promoting economic growth of Sub-Sahara Africa (SSA), the overall evaluation of the economic performances of the less developing countries (LDCs) and of SSA in particular has not been producing strong effect and little development has taken place. Some studies also breathed new life into the empirical question of aid effectiveness. For example, Burnside and Dollar (2000), obtained that aid has no effect when other determinants of growth in general and an indicator of economic policy in particular are controlled. Aid only makes a positive contribution to economic growth in those countries which give due emphasis for the policy indicator.

Being one of the LDC; Ethiopia has been the major recipient of aid since the 1950s that can be seen through a continual and increase in flow of aid as a share of investment until recent times. This is so because the country faced long years binding constraint of capital deficiency leading to the saving- investment gap, low quality and unstable export performances with import oriented economy leading to the export-import gap and the foreign exchange gap pushing the country to depend on external assistance (Yohannes, 2011).

But, though the rationale why aid flows to Ethiopia is largely economic reason, the elevated flows have raised a number of concerns ranging from the fear that aid can lead to increase in recurrent expenditure and decrease in capital expenditure(aid fungibility issue), the weakening of foreign exchange and export performances(the Dutch disease problem). And, also there was a fear that aid can discourage the government effort to collect revenue capable of covering its expenditure's. From the other side, with high aid inflow to the country for

many years there is degree of indebtedness, high unemployment, absolute poverty and poor economic performance. This made some past studies to take the side that aid worsens growth performances than improving it. The simultaneous move of the increase in aid inflow associated with low economic growth made the issue the area of controversy among research scholars. This for most part made many agencies, experts and academic community to undertake a study as if aid supports the economy of Africa in general and that of Ethiopia in particular and to know the reason why aid became ineffective in such region. Others also inquired to know as if aid back ups the resource need of the continent's weak development performance and if so to investigate the channel through this can be implemented. Still others raised opposition from the policy and academic areas that aid lead to retard in economic growths (Bauer, 1972) as stated in (Lancaster, 1999).

Generally, a number of studies have been carried out to assess the impact of foreign aid on economic growth in LDC's and in Ethiopia and come with different result and policy implications.

1.2 Statement of the Problem

Economists have shown that capital accumulation is the building block of development process of one country as the ultimate goal of any country is to achieve sustainable economic development. Their straight forward view is that economic growth is driven by the capital formation regardless of its sources.

But the LDCs in general and African countries in particular are characterized by the saving-investment, trade and fiscal gaps that makes difficult to achieve what is known as sustainable economic growth and development.

Ethiopia, being one of the LDCs is characterized by the low saving performances and investment activities that in turn have a little effect its economic growth. Abeba (2002) argued that the long year slow growth of the Ethiopian economy is due to the deficiency in capital stock at large. Possibly, scarce capital is the general case for the majorities of SSA countries including Ethiopia. It is with this argument that the prevailing resource gap impelled to rely on the external assistance to fill the gap and then to achieve sustainable growth and development. Yohannes (2011) also shared this thought.

However, the practical impacts of aid flows to fill these gaps in achieving growth and development of developing countries have not been materialized and this has questioned the place of aid flow in developing countries. This is due to fact that the LDCs of the world continue to suffer from economic hardships even though capital inflow in the form of aid has its due importance in some aspects. This raises a question whether foreign aid is a worthwhile in boosting economic growth in the recipient countries in general and in Ethiopia in particular by supplementing saving and investment of the country (Mallik, 2007)

Thus, while it is paramount important to draw an empirical relationship between foreign aid and economic growth there is no solid consensus among previous researchers on the actual impacts of foreign aid inflows. Some research scholars and experts of aid argue that aid has positive growth impact while others support its negative impact. Even others further propose that there is no conclusive relationship between the two.

Thus, this paper tries to explain and fill the gap whether foreign aid has a significant and positive impact on economic growth of Ethiopia i.e., using recent year's data (from 1969/70-2010/11); it tries to explain whether it helped the country in financing the saving-investment gaps, raising the aggregate investment and accelerating economic growth.

1.3 Research Questions

As growth theories suggested, an increase in capital flows (here aid) would lead to a higher economic growth by filling the resource gaps. For instance, if aid is used to fill the saving gap then saving rate increases and lead to higher capital accumulation (investment) in the country. This higher rate of investment would in turn leads to a faster economic growth.

In line with this growth theory hypothesis, some of the research questions that need explanations on the impacts of foreign aid on economic growth of Ethiopia are:

- Does foreign aid contribute to avoid the bottlenecks of economic growth in Ethiopia?
- Is there a long run and short run relationship between foreign and economic growth?
- Is the effectiveness of aid policy dependent?

1.4 Objective of the Study

The prime objective of this study is to analyze the impact of foreign aid on the economic growth of Ethiopia. In doing so, the study incorporates the following specific objectives;

- a) Empirically investigate the long run and short run impacts of foreign aid on economic growth.
- b) Show whether the foreign aid is dependent on macroeconomic environment explained in policy wise or not.
- c) Draw concluding remarks and appropriate policy implementations for sustainable development of the country based on the empirical findings of the study.

1.5 Significance of the Study

The research work and previous empirics on aid growth relationship was mainly based on cross sectional analysis. Accordingly each country is treated as a sample by taking the impact of foreign aid as constant across a country and the same in all LDCs. However, the role of foreign aid differs significantly from country to country as the economic structure; economic policy measures and other political and social structures are not uniform as cited by Abeba (2002).

As the cross sectional approach fails to incorporate the impact of aid on growth specifics of the country, i.e. Ethiopia, to fill the gap this study helps to know the country specific impact of foreign aid by using time series approach.

Moreover, it will contribute to the existing literature by extending the works of others and help in filling the knowledge gaps in this area. Furthermore, the results of study could help the concerned policy makers with the appropriate ways of intervention to go for appropriate policy set up and good macroeconomic environment that favors the aid's effectiveness in promoting economic growth and reducing poverty.

1.6 Scope and Limitation of the Study

The study explores the impact of foreign aid on economic growth of Ethiopia by estimating growth model. To achieve this objective, the period 1969/70 to 2010/11 was chosen based on availability of data on variables used in the study.

Despite the fact that the current study sheds some light on the growth impacts of foreign aid, it suffers from some limitations. One of its limitations is that the study does not include the impact of other forms of capital inflows on economic growth except the development aid or ODA. From one hand, this is due to the fact that there has been a considerable increase in aid flows to developing countries like Ethiopia although other types of capital inflows such as private capital inflows and foreign direct investment are declining (Ekanaye and Chatrna, 2008; Getnet, 2002) and from the other hand to be consistent with the objective of the study.

The result of the study is also confined by quality of data. This limitation arises from the inconsistency of data reported by different institutions and even by different departments in the same institution. Additionally, because of lack of data, it has been unable to use long time period for the study.

1.7 Organization of the Study

The study is organized into six main chapters with first chapter constituting sections including the general introduction. The remaining parts are arranged as follows. Chapter two highlights relevant literatures including theoretical and empirical reviews and the observed research gaps. Chapter three summarizes brief macroeconomic performance and foreign aid in Ethiopia. Chapter four presents the model specification and methodology adopted for the study, touching on issues such as specification of growth model, description of variables, sources of the data and methodology used in estimation of the model. The fifth chapter estimates and interprets the estimated model. Finally, section six concludes and provides policy recommendations and also shows some direction for further research.

CHAPTER TWO

LITERATURE REVIEW

The purpose of this chapter is to review the related literature on the area of the impacts of foreign aid on economic growth. This establishes a framework which guides the study. The section constitutes areas discussed under theoretical and empirical literature. The first part deals with theoretical literature and second part reviews empirical study in other countries and in Ethiopia. At last the observed gaps of the previous works of the same area is explored and filled by the study.

2.1 Theoretical Literature

The issue of the impact of foreign aid in LDCs has been an area of debate to many scholars and researchers for many years since its incipient. This is because of the divergence between theoretical and empirical arguments and due to this there is no robust evidence exists to say that aid promotes economic growth. Thus, the subsequent section provides a review of the existing literatures.

2.1.1 Definition and Classification of Foreign Aid

Foreign aid can be defined differently with different scholars. Generally, it can be defined as a bilateral, multilateral and concessional transfer of resource between countries.

Foreign aid is the transfer of concessional resources, usually from foreign government or international institution, to government or non-governmental organization in a recipient country. It may be given for a variety of reasons; including diplomatic, commercial, cultural and developmental. It is mostly used to fund expenditures that further (scale up) development in the recipient country. Discrete investment projects like building roads, building schools, providing training and education, family planning and so on are largely financed by aid. Since 1980, significant portion of aid was used as a balance of payment and budget support for governments agreeing to adopt economic or political reform programmes (Lancaster, 1999).



The Organization for Economic Cooperation and Development (OECD), defined international aid also called ODA (the constituent of both loan and grants) as flow of resources to developing countries. That is:

- ✓ Undertaken by the official sector of the donor country.
- ✓ Planned to promote economic development and welfare in the recipient country as their main objective and
- ✓ Provided as concessional financial terms either grant or subsidized loans (loan having a grant element of at least 25 percent (Hjertholm and White, 2000)¹.

These alternative definitions show the similarity in the above three assessments given to international aid, or foreign aid (or an equivalent term) over the period spanning four decades ago.

Grants and subsidized loans are grouped as concessional financing, while loans that hold market or near-market terms and therefore are not foreign aid are non-concessional financing. According to the Development Assistance Committee (DAC), loan is considered as aid if it has a grant element of 25 percent or more that the present value of the loan should be at least 25 percent below the present value of an equivalent loan at market interest rates usually assumed to be 10 percent with no grace period. Thus, the grant element is zero for loan with 10 percent interest rate and 100 percent for absolute grant and a value in between for other loans (Radelet, 2006).

According to Getnet (2002), the concept 'grant element' is used to identify aid from other capital inflows. A grant element is calculated as a ratio of grant equivalent to the face value loan (FV)². The grant equivalent is defined as the difference between the face value of the loan and the present value of future payments, i.e., contractual debt services (amortisation and interest) which is the one in the bracket in the numerator of the following equation. Algebraically, the grant element is given as follows:

$$GEL = \left(\frac{FV - [\sum_{t=1}^n (P_t + I_t) * (1 + i)^{-t}]}{FV} \right) \text{----- (2.1)}$$

¹ While the definition given is generally accepted, there is of course much conditionality to these criteria, and the expertise giving this definition do deviate from them as they need to.

² The Concept 'grant element' is applied to identify aid from other capital inflows. The general idea of 'grant element' is a measure of concessionality (or softness) of a loan depending on its financial terms: interest rate, maturity and grace period. According to OECD definition, a loan whose grant element is ≥ 25 percent is identified as concessional loan or aid.

Where P, I and i respectively stand for principal payments of loan, interest payments of loan, and the rate of interest by which present values of future repayments are going to be discounted. Based on the OECD definition, a 10 percent interest rate (a proxy for an internal rate of return of investment) is used to calculate the present value of future payments.

Based on different grounds and the objective for which aid is flowing from one country to another country; foreign aid is majorly classified the following ways. The DAC of OECD classified it into three broad classes. The first one is, ODA, a type of loan representing largest share of aid flowing from rich to low and middle income countries. The second classification is the one called, Official assistance (OA), a type of is aid given for richer countries based on per capita incomes of specific country like a loan given for a country with whose per capita income is above \$9,000³. Lastly, Private voluntary assistance is a type of aid given by non political and nonprofit associations like non-governmental organizations, religious groups, charities, foundations, and private companies (Radelet, 2006). Yohannes (2011) also classified like this.

Based on its transferability aid can be bilateral and multilateral assistance. Bilateral aid is a type of aid that is directly transferred from one country to another. Donors also provide aid indirectly as multilateral assistance, a type of aid that pools resources together from many donors that are provided by multilateral institutions such as International Monetary Fund (IMF), World Bank (WB), the African, Asian and Inter-American Development banks, and various United Nations (UN) organizations like United Nations Development programme (UNDP) (Radelet, 2006). Yohannes (2011) also classified like this.

Getnet (2002) argued that foreign aid flowing from donors to recipient is classified into two major classes based on the purpose for which it is given. According to him, aid given to finance the prevailing trade gap (situation when the revenue from export is far below to cover the import bills) through purchase of imported capital goods for an investment purpose is classified as a project aid. Equally important, part of aid given to meet other development objectives as explained by (OECD, 1991) cited in (White, 1999:7) countries are striving for to achieve is classified as programme aid and this part is commonly handled with the implementation of different programmes like the structural adjustment program by

³ More precisely, assistance to countries with per capita incomes (for three consecutive years) above the World Bank's "high income" threshold, but the DAC makes some exceptions.

establishing some sort of consensus and collaboration between the IMF and WB and the recipient.⁴ Yohannes (2011) also used the same classification.

2.1.2 Rationale of Foreign Aid

The basic justification for the transfer of resources to LDCs in the form of aid takes many factors into account. Of these all, the 1950s and 1960s of the 'Marshal Plan' of aid incipient gave a financial assistance to revive the economy of western Europeans. Though it started with the goal of reestablishing the war-torn economy, latter on its scope and objective were widened and aid started to flow to the majority of LDCs largely to meet the development purposes.

For example, authors like Krueger (1986) in his article entitled, "*Aid in development process*", argued that the flow of resources became effective in promoting the economic development of LDCs to a satisfactory rate of growth on self sustaining basis.

Thus, from then onward the flow of foreign aid to developing countries have been increasing from time to time although the determining factors of aid inflow to LDCs and the motives of donors in giving aid are an important issues to be addressed.

Many literatures proposed that donor countries give aid primarily because it is their political or economic self interest purpose. Some donors and development assistances may be prompted by moral and humanitarian desire to assist the less fortunate's like emergency food relief programs. But there is no evidence to suggest that over longer period of time donor nations assist others without awaiting some corresponding benefits (political, economic, military etc) in return. Thus, motivation of donor nation in giving foreign aid can therefore be classified in to two broad aspects, but often interrelated, categories, political and economic (Todaro, 2002).

⁴ Programme aid includes financial and non-financial aid (basically programme food aid). The financial one includes balance of payments support and budget support. While the former consists of debt relief and import support in which the recipient gets foreign currency or commodities (mostly recurrent imports); the latter comprises general budget support and sectoral budget support in which the government receives foreign exchange for sale to raise local currency to support the government budget. For details see White (1998a and 1999).

2.1.2.1 Political Motivation

According to Todaro (1994), to grant aid, for the major donor countries like the United States, political motivation has been more important than any other else. Even the 1940s Marshal Plan aimed at reconstructing the war thorn economy of the Western Europe has been a means of spreading their political ideology.

After the flow of resources to war devastated economy the support shifted to the LDCs economies in mid-1950s. Here also the aid program of the US has a policy of making support for “friendly” less developed nations by making emphasis towards political, economic and military aspects, especially those considered geographically strategic. Most aid programs to developing countries were therefore focused more toward their needs for political security and the like than encouraging the long-term social and economic development (Todaro, 2000).

Opeskin (1995) as cited in Abeba (2002) showed three broad reasons why donors used a national self interest as a leading and decisive instrument in giving aid. These are; at the first place the aid given to poor was with the motive of making uniform the political views between them by expanding their own ideologies. Secondly, the increase in aid flow from rich to poor may lead to the increase in income of the poor and lead to a closer economic tie between the two in such a way that the aid recipient country can buy the products of the aid givers and lead to boost their exports and make the donors the beneficial of trade in this way. Lastly, peace and stability in the nations of poor (aid recipient country) may reduce the burden of unwanted and illegal migrations.

2.1.2.2 Economic Motivation (Resource Gap)

Within the broad conditions of political and strategic priorities, foreign aid programs of the developed nations had a strong economic reason. In fact, even though the political motivation may have paramount importance, the economic rationale was at least given lip service as the overriding motivation for assistance.

Tassew (2009) stated that there is a debate on the effects of aid. The wide spread perception of contradiction aroused from the early aid-growth literature treating aid as an exogenous amount free of wastage and fully translating to capital stock of the recipients. The literature

further assumed that there is a strong link between aid and growth that can be shown through a one to one correspondence of aid-saving and aid-investment relationships. But, the re-examination of the literature and comparative analytical framework made by Hansen and Tarp (2001) claimed that a dollar increase in flow of foreign aid does not cause the saving and investment of the recipient country to increase with the same amount. They debated the assumption that foreign aid was not part of the national income constituting both consumption and investment. This was how the optimistic views and the pro-aid development economists like Rosenstein-Rodan (1961) were challenged and the revisionist contributions were made showing that there are circumstances in which development objectives of aid programmes have been distorted and aid can be fungible.

The empirical work of the 1960s as to how aid fills the resource gaps and lead to achieve a targeted growth rate was prompted by the gap models. Gap model has a paramount importance in determining the amount of resource required by the aid recipient country to accomplish the level of investment demand and then to attain the targeted growth rate. In one aspect, it has a crucial role in narrating physical capital formation as a key factor that determines economic growth and in another way; it also tells that under the scenario of resource gap how much of aid is used to fill the gap (Tassew, 2009)

The basic rationale of gap model is that insufficient amounts of domestic saving and foreign exchange constraint creates a hardship on the economic growth of the recipient and it is with this argument that aid can play decisive role in supplementing domestic resource in order to relieve saving or foreign exchange bottlenecks. This is the so called two-gap analysis of foreign assistance. The basic argument of the two-gap model is that most developing countries confront either a shortage of domestic savings to match investment opportunities or lack of foreign exchange to finance needed imports of capital and intermediate goods and external assistance is used to fill these gaps in order to achieve a target rate of growth. According to the gap model, the Harrod-Domar model posits that capital formation is the most important and determining factor of one's economic growth. At the same time, investment and its efficiency are the determining factors of growth in output. Thus, these resource gaps are the principal economic arguments for the flow of aid to LDCs (Hjertholm et al, 2000).

Though aid was given for different purposes based on different criteria the early Harrod-Domar growth model posits a homogenous output that can be consumed or invested. The

model assumed that the main objective of aid is assisting investment by supporting saving that runs to investment. This is so because of the fact that, even though growth is the function of labor and capital, there is no such problem of labor supply and in place there is a plenty of it. Thus, growth is solely falls behind and handicapped due to inefficient and inadequate level of investment arising from weak saving performances showing that the capital- labor ratio and the saving ratio consequently constrain growth. For LDCs if their objective is to attain a higher economic growth under the scenario of low domestic savings, the option is only one and one, i.e. searching for external assistances. As capital can rise the growth rate by raising the availability of its output, and there by the resource available for investment. It is in this way that aid contributes to economic growth and the Harrod-Domar growth model supported the flow of aid to encourage the low savings as cited in McGillivray (2005). Eventually, it is hoped that the need for aid will disappear as local resources become sufficient to make development self sustaining (Tassew, 2009) showing that efforts should be made towards mobilizing the domestic savings and close the gap overtime so that development can sustain without aid.

In addition to the above role of foreign aid in filling the saving-investment gap, a two gap approach identified that an imported commodity not produced domestically is essential for the production of investment goods. The availability of foreign exchange rather than the supply of domestic savings, can then constrain the growth of the economy. In these circumstances foreign capital raises growth not by raising the resources available for saving, but by increasing the availability of foreign exchange to import capital goods. The model has been used to argue that the contribution of foreign capital to growth is greater in a situation where growth is constrained by the availability of foreign exchange (Chenery and Bruno, 1962; Chenery and Strout, 1966).

Most developing countries, however, are assumed to fall into the second category, where the foreign-exchange gap is binding. That is, an increase in foreign aid raises growth rate warranted by foreign exchange more than the growth rate warranted by the domestic savings. These countries have excess productive resources (mostly labors), and all available foreign exchange is being used for imports. The existence of complementary domestic resources would permit them to undertake new investment project if they had the external finance to import new capital goods and associated technical assistance. Foreign aid can therefore play a

critical role in overcoming the foreign exchange constraints and raising the real rate of economic growth (Ibid).

Bacha (1990) and his associate, Taylor (1990) extended the two gap model into a three gap model, wherein the fiscal gap constraints the private sector investment at a level below what available national saving permit. For a government to finance its deficit (a case where government expenditure is greater than government revenues for the most LDCs) there must be the option of searching for finance in different ways. For example, the government may resort to borrow from central bank (CB) by printing money leading to a seingiorage (inflation tax) and this excess inflation debilitates the private investment. The other way of financing is the government borrowing from private sector and this is limited due to the thin capital in most LDCs. In such circumstances, according to the three gap model, foreign aid can relax the financing constraints by supporting the budget (Brone, 1994). Tassew (2009) also argued like this.

In general, though the gap model had the tradition of stressing physical capital formation as a central deriving force of economic growth and aid played a major role in filling the above three gaps, its effectiveness and welfare implications remain debatable.

2.1.2.3 Why LDCs Accept Aid?

Low economic growth and long year underdeveloped economy is the sign of insufficient capital stock at a larger extent. Economists like Singer (1949) and Nurkse (1953) made their own contributions to analyze the cause of low growth performances. But, there was a controversy on the importance and form the capital should take. But, whatever the form it may take, the crucial role capital plays in the production process is solidly established Befekadu (1992).

Domestic saving alone is not well enough to finance huge investment demand prevailing in the economy. The insufficiency arouses from low income attributing for low saving and low capital accumulation. From the other side, low level of income results in low production with no surplus for development (when there is no gain in capital) as noted in Singer (1949). Nurkse(1953) also explained that a unit increase in saving a proportion of income(the marginal saving ratio) is the decisive determinant of economic growth. Domar (1957) further elaborated that in the economies of LDCs there was no problem of labor input used in

production process and the limiting factor comes from inadequacy in capital. It is due to this economic argument that aid takes a major role of assisting the capital deficient economy of LDCs.

Since the 1950s and 1960s (introduction of aid to LDCs), the attention was turned from its importance in supplementing capital deficient economy to the optimal amount required to achieve a targeted growth rate. Befekadu (1992) argued that this can be seen from the notion of the supply and demand side factors for which aid is flowing.

The supply side part was started and expanded by UN and its office units like the United Nations conference on trade and development (UNCTAD). From this side an increase in volume of aid is made for two major reasons. First it narrows the income and living standard gap of the poor and the rich and lead to the realization of equity where the poor benefits from the investment projects undertaken by the inflow of aid. The second reason is the assumption that the flow of aid can create a closer economic tie between the recipients and the donors and the benefits in trade can be grasped being the trading partner of the donors Befekadu (1992).

The demand side factor is another way which is purely of an economic criterion and indentifies the amount of resource the recipient are needing taking into account the absorptive capacity constraint facing the recipient and factors hindering the efficient utilization of its resources. The approach promised the need for foreign resources as the economies of LDCs do not have the capacity of generating sufficient saving that translate to economic growth and the possible and targeted growth rate cannot be attained without aid. And, this was noted by Rodan (1961), Hoffman (1960) as cited in Befekadu (1992).

2.1.3 Aid and Policy in Displacement Theories

Displacement theories suggest that there are possibilities that more aid inflows may not raise investment by as much as of the value of aid inflow and therefore an increase in aid may not lead higher rate of economic growth. One possibility is that aid inflows may displace domestic savings as a result "crowd out" private investment. The debate in this view has been reproduced within the saving debate and the fiscal response debate. Another prospect concerns the impact of aid on real exchange rate. Aid could wear away export earnings,

which in turn reduces the ability to import and thus the ability to increase investment as required. This is the case of "Dutch disease effect".

2.1.3.1 Aid and the Saving Debate

In the economic literature of the four decades studies have been undertaken in LDCs to determine whether foreign aid inflows and domestic savings are complementary or substitute. An examination of the most well known theoretical point of view shows that, still no single theory or perspective has emerged with anything nearing a consensus regarding the impact of foreign aid on the savings of the recipient country. However, a clear explanation of the relationship between foreign aid and domestic savings can be found in Harrod-Domar model and dual-gap model.

The Harrod-Domar model posits that the rate of growth of output is equal to the savings rate,

" s " divided by the incremental capital output ratio (ICOR), " v ", i.e., $g = s/v$ where " g ", is incremental rate of output. The dual-gap analysis (Chenery & Bruno, 1962) and (Chenery & Strout, 1966) argued that foreign aid act as to supplement domestic savings and hence raised the growth rate to $s + f / v$, where " f ", is foreign aid. This boost in growth rate would increase incomes and, since it is believed that the marginal propensity to save is greater than the average propensity to save in LDCs, the savings rate would increase and the higher growth rate would become self-sustaining. Thus, inflows of foreign aid would have the effect of raising the savings rate in subsequent periods.

The aid-saving debate was initially introduced by Griffin (1970) and Griffin and Enos (1970). This debate focused on the hypothesis that aid inflows may displace domestic savings. They argue that aid inflow is seen as a complement to rather than stimulant for income. As they indicated the marginal propensities to save and consume are between zero and unity, thus aid inflow will be allocated between saving and consumption. As a result, the saving and investment will not rise as much as the values of aid inflow do.

To support this argument, Griffin and Enos (1970) estimated the aid- saving regression in the following form:

$$\frac{S}{Y} = \phi_0 + \phi_1 \frac{A}{Y} + \delta \text{-----(2.1)}$$

Later, for a similar reason of aid- growth relationship, many researchers have incorporated more explanatory variables in the aid-saving nexus model in order to obtain unbiased estimators. The following aid-saving regression is used to ascertain the impact of aid on savings:

$$\frac{S}{Y} = \phi_0 + \phi_1 \frac{A}{Y} + \phi_2 \frac{Z}{Y} + \delta \text{ ----- (2.2)}$$

where $\frac{S}{Y}$ and $\frac{A}{Y}$ are the ratio of domestic savings and foreign aid to GDP, respectively and $\frac{Z}{Y}$ is a vector of variables affecting savings (for example the level of exports or inflation). In this model, the expected sign of the aid-saving coefficient (ϕ_1) is negative.

White (1998) showed that the big fault of Griffin's model is possibly the fact that it holds income constant in the face of aid inflow. If aid also affects income, then the impact on savings becomes ambiguous.

The proponents of the aid-saving displacement theory estimate the aid- saving regression equation using data from cross country and time series studies and report negative values for the aid-saving coefficients ranging between -0.73 to -0.84 (Griffin,1970). Chenery and Eckstein (1970) and Weisskopf (1972) also obtain a negative value for the aid-saving coefficients. On the contrary, Over (1975) finds a positive value for aid-saving coefficients in a similar sample used by (Griffin, 1970). In recent studies, the evidence on aid-saving nexus remains ambiguous.

2.1.3.2 Aid Fungibility and the Fiscal Response Effects

As argued in the aid-saving displacement theory, Griffin (1970) indicated that recipient countries tend to substitute aid inflow for domestic resources. When most of the aid goes to support public expenses, recipient government may reduce their tax efforts. If this is the response the recipient governments pursue to accommodate aid inflows, it could create unfavorable environment for encouraging domestic saving and private investment. Indeed, by reducing tax revenues governments could face chronic budget deficit problems, as government spending could rise to accommodate the escalation of aid inflows. Sooner or later the recipient governments may not be able to avoid the need to print money and/or to raise the public sector borrowing requirements (PSBR) to finance their budget deficits. These moves

could affect private savings (investment) through the negative effect of the high powered money (the increase in PSBR will bid up the interest rate). Besides, the government may change the composition of its expenditure towards unproductive investment and/or consumption (i.e., the issue of aid fungibility). The influence of foreign aid on public investment may thus be unproductive and not promote economic growth.

The existence of aid fungibility is not always associated with the negative impacts of aid on private investment. This is because, the issue of aid fungibility is not a sufficient condition to indicate that aid may or may not have a negative impact of growth. Nevertheless, in the case of aid fungibility crowding out private investment, the negative impact of aid on private investment is due to the pressure on the recipient governments to increase PSBR, which in turn could bid up the interest rate and lower investment demand. Moreover, there is a view that the negative impact of aid on the private sector could be channeled through the high level of aid inflows exerting upward pressure on the domestic price level, especially on non-tradable prices. In this regard, Mosley et.al (1987) claimed that, the transfer of aid money raises the prices of some goods, depresses the prices of some other and hence has side effects on the private sector.

This claim, however, could indicate that aid inflows might have dual impact (positive and negative) on the recipient economy. On the other hand, the increase in non-tradable prices might cause the appreciation of real exchange rate if non -tradable prices rise faster than tradable prices. The latter is the issue known as the "Dutch disease" effect.

On fiscal response there were no well-developed theories that predict the effect of aid inflow on recipient collection of revenue, its expenditure and the government borrowing behavior. From the revenue part, aid might increase the tax collection efforts of the government particularly when it is tied to a project and part of the cost of the project is covered by the domestic resource mobilization of the government. By increasing the collection in tax from the domestic resource aid is supplemented and used together with the domestic resource. Studies undertaken on the fiscal response argued that the government effort in collection of tax may decrease with the inflow of foreign aid (Griffin and Enos, 1970; Heller 1975, Mosley et al., 1987). Aid inflow specifically the grant component may reduce the effort of the weak government to collect the tax revenue as their institutional set is also weak. This is so because the government assumes this inflow of foreign resources as an additional resource to finance

its expenditures. This situation makes the domestic resource to decrease down in place of increasing and the outcome of such decline is retard in economic growth (Griffin and Enos, 1970; Weisskoff 1972). Rodan (1961) also argued that lowering of the tax collection effort of the government along with the inflow of the foreign resources makes the hostile effect of foreign resource on economic growth. This is line with the studies obtained the result that aid reduced domestic saving and reached on the conclusion that aid retards economic growth.

World Bank (1998) claimed that the negative impact of aid on tax collection effort of the government encourages the evils of growth most notably incompetence, misguided policies and corruption.

From the side of the expenditure, the increase in availability of resources helps the government to finance its expenditure assuming that the decrease in tax does not offset the inflow of aid and for which aid will increase definitely. But, the type of expenditure that increases with aid inflow matters and this differs from country to country. This is due to the fact that most of the governments in the recipient countries use the inflow of resources to expend on consumption like expenditure on military, salary of servants and the like (Heller, 1975). In contrast, others use it for financing of the development projects like dams and irrigation scheme constructions (Gang and Khan, 1991). It can be obviously seen that use of foreign resource for different expenditure has different growth effect. This is because of the fact that the growth outcome from the foreign resource depends on how the resource is used and on its effect on the tax revenue of the government. This area remains to debate that whether increase in consumption and reduction in tax rather than investment has low growth impact.

Most of the studies analyzed that the effect of different type of aid inflow on the recipient country's revenues and expenditures differ. This is in accordance with the hypothesis that the flow of foreign aid has the grant and loan component. The grant component of aid is directed to the increase in consumption of the government while the loan component is used for the productive areas of productive investment expenditure on the notion of the fact that grant component is not paid back and has no debt problem at all and loan is paid back and has debt problem associated with it. This creates incentive problem on loan than grant.

2.1.3.3 Aid and the Dutch Disease Effect

In the effectiveness of aid literature, "Dutch disease" is used to refer to the situation where high level of aid inflow may generate undesirable effects on the economy (Edward and Van Wijnberger, 1989). Dutch disease arises when the high level of aid flow brings about real exchange rate appreciation and creates booming sector (non-tradable sectors) at the cost of recession in the other sectors(tradable sectors).The symptom of Dutch disease can be observed once the increase of aid inflows draws resources away from tradable to non-tradable sectors. As a result, tradable production declines and hence threatens export performance (Corden and Neary, 1982). It is obvious that the effect of Dutch disease will erode the recipient's export earnings and hence the ability to import. Therefore, more aid inflow which may cause the Dutch disease will not be matched by a one for one swell in investment (White, 1998).

As Dutch disease arises due to the high level of aid inflow creating a booming in the economy, it is important to analyze the level of aid inflows that may cause the Dutch disease effect. White (1992) indicates that the Dutch disease effect happens in both the developed and developing world; however sector booms in developed world are not the result of high capital inflow.

In summary, Dutch disease literature regards the high level of aid inflow as the potential source of side effects on the recipient's economy. For this reason, aid may not have a positive impact on growth if high levels of aid inflow make tradable sectors less competitive in the world market through the appreciation of the real exchange rate and the lowering of export earnings. Eventually, the Dutch disease effect will lower the ability to import, invest and grow.

2.2 Empirical Literature

The standard aid-growth and its impact starts from the saving-investment gap and this has been the center of the various empirical studies. Studies undertaken so far on the actual impacts of foreign aid on growth came with contradicting results some favoring its impact by getting positive relationship between the two though others disagree with this result. Thus, following are some of the empirical literatures reviewed in a systematic manner.

2.2.1 Studies in Other Countries

Radelet (2006), *a primer on foreign aid*, postulated that aid has a positive relationship with growth across countries though not in individual countries subject to the diminishing returns with increase in the amount of aid inflow. According to him aid can spur economic growth in the following ways:

The first way supports the view of classical that aid augments savings, finances investment, and adds to the capital stock. It is an argument based on the fact that poor countries do not have adequate savings to finance the required investment that lead to the targeted growth. To make it more reliable, poorest countries are more probably in the poverty trap in which there is no way of generating the required saving from the existing low income the sustain growth to a higher standard. A more close idea to this argument is that aid is used to fill (relax) the two gap model proposed by Chenery and Strout (1962). The second way through which a positive relationship between the two come is when the increase in flow of aid lead to increase in productivity and skill of workers through investment in human capital and social progress like health and education. Lastly, aid can be used a channel through which a transfer in technology or knowledge can be made from rich to poor countries in different ways among which; taking the role of paying for imported capital goods, technical assistance support, support through direct transfer of technologies (like introduction of new seeds and fertilizers in the green revolution)(Ibid).

Other proponents like Bauer (1972) as cited in Radelet (2006) boldly argued that aid has no effect on growth and in place it has the effect of undermining it. And, this argument has many empirical supports forwarded by the latter works of many researchers. Such researchers put their own strong solid reason for which aid is not effective and does not support growth. Their major arguments are possibly: aid can be simply wasted and encourage corruption, it can keep bad governments in power leading to perpetuate poor economic policies and postpone reform. Aid provided to such countries provoke even war by diverting the resource to the purchase of weapons items in place of financing the development goals, i.e. aid simply adds to instability. In another the effect of aid on the recipient country depends on the extent to which the country is capable of absorbing the resource inflow (absorptive capacity constraint) like few skilled workers, weak infrastructure or constrained delivered system. It can also reduce both domestic and government savings through its impact on interest rate and

government revenue respectively. Aid can spur inflation and cause currency to appreciate (appreciation of exchange rate), i.e. the Dutch disease effect and the private sectors for investment or to improve productivity. Thus, Bauer has “also argued that official aid is liable not go to poor people, but rather to their rulers whose spending policies are determined by their own personal political interest with low priority for long-term development” as cited in Daniel (2004).

A recent study conducted by Mosley (1987) and his associates to examine the aid growth link employed a cross-sectional econometric analysis to estimate the aid growth link. They attempted to refine the previous work done by Papanek (1973) by including potential variables affecting growth like labor force and export; and also they made an effort to correct an identification problem raised. Thus, by using the OLS methods of estimation for a panel of 80 countries they found that foreign aid has insignificant negative effect on economic growth. They also obtained that the share of aid allocated to the growing countries are higher showing that high growth attributes to the amount of aid allocated for the development purposes as cited in Wondwosen (2003).

Areskourg (1973) analyzed the effect of policy on aid. In doing so, he looked policy from two alternatives. Policies increasing government consumption in place of expenditure on capital are noted as the expenditure-increasing policies working through operation the macroeconomic policies of fiscal and monetary policies. On the other side, policies turning (allocating) aid for investment purposes in place of consumption expenditure are remarked as expenditure-switching policies working through the assumption of trade control or flexible exchange rate. Study made for 20 developing countries by using pooled data for the period of 1948-1968. From the OLS regression result he reasoned out that foreign aid is effective if the country pursues expenditure switching policies (Ibid).

In recent study Girma et al (2002), by identifying three transmission mechanisms of aid to economic growth (i.e., investment, import financing and government spending), tried to analyze the impact of aid on economic growth on 25 SSA countries. By applying the residual regressor approach over the period 1970 to 1997 they found a positive significant effect of aid on economic growth.

Morrissey (2001), also proposed that aid affects economic growth positively because it increases investment, the capacity to import capital goods or technology, aid doesn't have an adverse impact on investment and saving and lastly because aid increases the capital productivity and promotes endogenous technological change.

Burnside and Dollar (1997) utilized a new way of analyzing the relationships among aid, policies and growth. Policies constructed from the combinations of fiscal, monetary and trade policies the extent of fiscal deficit/surplus, magnitude of inflation and balance of trade for countries under consideration. Accordingly, the growth model formulated was regressed for a panel of 56 developing countries for a period of 1970-1993. In another way, the effect of policy on economic growth is to be seen from the effect of aid interacted with policy. As per the result of the study, good policies promote the effectiveness of aid in developing countries while poor policies worsen its effect. They also argued that, the result is also applicable whether a country is low or middle income, whether there is outlier or not, whether policy is endogenous or exogenous. Their findings further reveal that there is no way any systematic effect of aid on policy. That is, the effect runs from policy to aid; not from aid to policy. In another study, Burnside and Dollar (2000), they stressed that if one is expecting the positive role of aid on economic growth the precondition to be met is having good policies. Wondwosen (2003) also shared this.

Yohannes (2011) noted that Ekanayake and Chatrna (2008) explained the effect of foreign aid on economic growth. The study was done by panel data set for about 85 developing countries and the result of the study shows that the effect of foreign aid on economic growth is not clear cut in place mixed results are obtained.

Nyoni (1997) examined the impact of foreign aid inflow to the Tanzanian macroeconomic performances. In doing so, the effect of aid on macroeconomic variables such as exchange rate, export performance, government expenditure, investment and growth. To test the hypothesis that the flow of aid causes the appreciation of currency, the cointegration techniques and the error correction model were used to estimate the long run equilibrium and the short run real exchange rate respectively. The estimated result shows that foreign aid inflow lead to the depreciation of real exchange rate and both openness and currency devaluation has the same effect on exchange rate as that of aid inflow while government expenditure lead to appreciation of exchange rate. Finally, the study points that to induce a

positive supply response from the inflow of aid directing it to the domestic productive investment is the correct policy response. The study also urges that the government should minimize its unproductive expenditures and resort to economic liberalization.

The study made by Mallik (2007) entitled, "*Foreign Aid and Economic Growth: A Cointegration Analysis of the Six Poorest African Countries*" by using a country specific data, the study assessed both the long run and short run impacts of foreign aid in six SSA. Countries with lowest real per capita GDP and at the same time grouped as Highly Indebted Poor Countries (HIPC) were included as a target group for the study. The empirical results show that in the long run in all of the selected countries except Togo, the impact of foreign aid on economic growth negative. In the short run aid is effective in affecting economic growth only in Niger as pointed out by Tassew (2009). The negative results of foreign aid lead to the debt trap problem on one hand and a number of factors may underlie for the negative effects like bad policy environment, low level of human capital, aid meeting the humanitarian needs rather than expanding the productive capacity of the economy and the like (Burnside and Dollar, 2000; Boone, 1996; Mallik, 2007; Kosack and Tobin, 2006).

M'amanja (2005) and his associates made an analysis to examine the impact of foreign aid and fiscal variables on economic growth of Kenya for the period of 1964-2002. They employed a time series approach and to assess the individual impact of variables entering as an explanatory variables in growth model, a multivariate cointegration test and the error correction model was used. The study was made by classifying aid into loan and grants. The results of the study shows that for the period under review grant had the role of assisting economic growth of Kenya while loan was not. From this they inferred that a positive role of aid in supporting economic growth can be observed if it is given in the form of grant and coupled with good fiscal policy (Ibid :28).

Reichel (1995) used 2SLS to estimate the model consisting of three endogenous variables (growth, aid and domestic saving) and found a significantly negative coefficient for the aid-saving relationship. In the sample of 39 SSA countries, Hadjimichael et al., (1995) found that the aid-saving nexus varied depending on the growth performance and the degree of which adjustment efforts were sustained. In the group of sustained adjusters foreign aid appears to have stimulated domestic savings, where as in a group of countries with negative per capita growth rate and protracted economic imbalances, foreign aid has a negative impact on saving.

Bowles (1987) used time series data for 20 developing countries for the years 1960-81, investigated the causal relationship between foreign aid and domestic saving. In ten of the twenty countries, he found no causal relationship in either direction but for the remaining ten cases, Bowles found a mixed direction of causality. He then concluded that in those countries, which received the most aid from the multilateral institutions, their inflows were more likely to be determined by their saving behavior than vice versa. While in the three cases, changes in savings are shown to cause changes in aid, and in five cases the converse (for one of these, there was a positive relationship) This finding suggest that aid will not be endogenous which is contrary to the belief of Franco-Rodriguez et al. (1998) who strongly argued that aid is endogenous.

Van Wijnbergen (1986) applied a single regression equation to estimate the aid-real exchange rate nexus model for African countries. He found a significantly negative relationship between aid and the real exchange rate in four out of six African countries. He also demonstrated that the effect of the aid boom permanently lowers the total productivity in the export sector. Despite the real exchange rate allowed to depreciate after the effect of aid boom, productivity does not return back to the level before the aid boom. As the private sector can re-borrow and re-invest after the economic revival from this effect.

Using the computable general equilibrium (CGE) model, Weisman (1990) investigates the impacts of aid inflows on Papua New Guinea. He found that aid inflows increased government spending, which in turn increased the prices of non-traded goods and services. Producers respond to the increase in prices of non-traded goods by increasing supply in this sector and shifting resources from the production on traded goods. Therefore, aid inflows brought about the Dutch disease effect that threatened the export earnings of Papua New Guinea.

Collier and Gunning (1992) also applied the CGE model to examine Dutch disease effects in African economies. They find that, aid supported government spending that raised aggregate demand and exerted upward pressure on the prices of non-tradable sectors. As a result of booming of non-tradable sectors, labor and capital are drawn away from the tradable sectors. They illustrated that devaluation will reduce the inverse effect on tradable sectors.

2.2.2 Studies in Ethiopia

For capital deficient countries like Ethiopia, where their level of domestic saving does not meet the requirements of demand for investment at all, the role capital inflow (specifically foreign aid) plays in financing the resource gap is undeniable. Thus, assessing the actual impact of foreign aid whether it is pro-growth or not is plausible. Thus, in this way to assess the impacts of capital inflows (here foreign aid) in LDCs including Ethiopia different studies where undertaken and came with different results and policy implications. Below are the summaries of empirical literatures reviewed on the relationship between foreign aid and economic growth in Ethiopia.

Dawit and Yemisirach (2001) assessed the aid growth nexus. In doing so, they employed a time series approach of the error correction model (ECM) for the period of 1970-1999. They checked the effect of aid on economic growth through its effect on output, investment and import. This is with the basic notion that aid supports output, desired investment and import requirements and then translates to economic growth. As per the estimation techniques applied, the ECM result of the output equation (as a function of aid) indicates that for the period under review aid affects output negatively. On the contrary, from the aid-output equation it can be seen that there is a positive relationship between aid and the level of investment showing that as the level of aid increases the amount of investible resources scales up. Similarly, there is a positive relationship between aid and the import demands of the country showing that the amount of imported capital goods the country is demanding increases with increase in the level of aid inflow. From these two (aid-investment and aid-import) equations the role of foreign aid in assisting investment and import demand of the country is confirmed as cited by Wondwosen (2003). But, as both aid and investment are used as explanatory variables in growth equation, the growth impact of aid is underestimated.

Another study built by Haile and Alemayehu (2000) attempted to assess whether there is a long run and short run relationships among saving, foreign aid and economic growth for period the period of 1967-1997. They applied a Johansen cointegration test and the VECM to estimate the effect of aid on economic growth. From the cointegration test, they obtained the insignificant and negative effect of aid on economic growth. Here also, using both investment and aid in one growth equation lead to double counting problem and the effect of which understates the effect of aid on economic growth. Thus, to analyze the independent effect of

aid on economic growth investment should be disaggregated to investment financed with and without aid (Ibid: 45)

The study made by Tolessa (2001) thoroughly gone through the assessment of the impact of foreign aid on economic growths of Ethiopia with the specification of three equations each as a function of aid. These are the saving, investment and growth equations. As aid flows in the form of loan and grant there might be critics that one might have greater effect than the other on economic growth. Hence, he assessed the independent effect of loan and grant on each of the specified equation. The estimation was carried out by the Johansen cointegration and ECM tests to capture both the long run and short run impacts of both loan and grant. The result of the test shows that in the long run loan has positive effect on output while grant is not. In the short run both have no effect. The author also tried to show that for aid to be effective in supporting economic growth of the country it should be followed with good policy explained through policy index composed of the fiscal gap, trade liberalization and the foreign exchange premium (Ibid:45-46).

Abeba (2002) examined the macroeconomic impact of external assistance on the economic performance of the Ethiopia for the period 1960/61-1999/00 using Johansen Maximum Likelihood estimation procedures. The study has provided empirical evidences on the impacts of external assistance at its disaggregate level on the domestic saving, government income, government spending, real exchange rate and economic growth in general. Accordingly external finance negatively affected the investment rate and hence the economic growth of the country. The results of the study shows that the overall effect of aid (captured through the effect of loan and grant) on economic growth is negative. This is due to the adverse impact of aid in different ways like it displaces and substitutes the domestic saving in place of supporting it, lead to an increase in government recurrent expenditure (specifically the consumption expenditure) than the capital expenditure and weakening of export performances incapable of generating sustained revenue covering the imported goods and appreciation of foreign exchange and etc. The immediate implication of the study is that foreign loan has almost no impact on the growth of the economy justifying minimum aid flow as a reason. And, from this the researcher argued that foreign aid inflow through loan should increase to curbe the problem of shortage in capital. The study also stressed that the transfer should target on rural population by capacity building to increase their productivity.



Jifar (2002) addressed the effect of foreign aid on public spending with particular reference to the case of aid fungibility in Ethiopia for the period covering from 1966/67 to 1999/00 for four developmental sectors and three non-developmental sectors. From which he constructed seven equations to explain sectoral spending. Agriculture, construction, education and transport & communication were classified as developmental expenditure while, defense, general service and debt servicing were classified as non-developmental expenditure. Hence, the estimated result in education and agriculture sectors were marked by non-fungibility in which case the sectoral aid impact on sectoral spending have crowding in effect. However, for transport & communication and construction sector, aid fungibility seems to exist which means that there is crowding out effect. In this case, the sectoral aid impact on the sectors spending is negative. For non developmental expenditure, aid is found to be significantly affecting debt servicing expenditure but insignificant for general service and defense expenditures. Linking aid to overall public expenditure program that provides adequate resources to crucial sector may be better way of transferring resources to developing countries like Ethiopia. The results also indicate that aid to particular sector does have an influence on the composition of public spending, so that sector aid programs have determinant role to play in development assistance. Moreover, redirection of sector specific aid among developmental expenditure categories may greatly benefit some sectors and adversely affect other sectors spending. It is even more undesirable if the redirection of aid fall into non developmental categories. Therefore, effective way of monitoring purpose oriented aid is more needed to make sectoral spending efficient.

Another study by Wondowesen (2003) assessed the relationship between aid, policies and economic growth in Ethiopia for the period of 1962/63 to 2000/01 using a time series approach of Johansen's maximum likelihood technique by identifying two equations-investment and growth equation. He found that aid has significant contribution to investment both in the short run and long run. But, aid was found to be ineffective in increasing economic growth. However, he found that when aid is interacted with policy, the growth impact of aid found to be significant-i.e. aid is conditional on quality policy environment. His result further implied that awareness should be paying attention on improving the existing macroeconomic policy environment for an inflow of aid to be used effectively.

Tiglun (2006) examined the incentive effect of foreign aid under alternative regimes. Inspired by the role institutions play in determining economic performance, aid effectiveness and aid

allocation, the study explored the relationship between aid, institutions and democracy. Using cross-country data for 91 developing countries the study analyzed the determinants of aid and institutional quality and finds that selectivity is present and strong since the end of the cold war in aid allocation by donors. However it finds no significant positive incentive effects of this approach yet, but the pattern in the data shows democracies are relatively weak in responding to the incentive effect the new rule of aid allocation has on institutional reforms.

2.3 Observed Gaps in the Existing Research

With the flow of aid from one country to another country there is a goal to be met with such flow (mostly the development goal). In line with these, the area made different writers, scholars, experts and academicians to investigate and see whether there is actually a link between aid and economic growth. Surprisingly, vast literatures narrating the relationship between the two do not have any conclusive agreement to say that the effect of aid on economic growth is either positive or negative. To others the result is mixed and weak or no relationship between the two. Majority of the studies undertaken using the two-gap model or the poverty trap model employing the same data came with different results and policy implications. Thus, it is not easy to have a common finding and conclusion on the growth effects of aid as it depends on many factors like the country specific dependence of aid, weakness and lack of perfect model to estimate their relationships and the like. Thus this is an area where economists should further dig out a lot to have a perfect and plausible model that accurately determines the relationship between the two to obtain a vivid and interpretable result (McMillan, 2011)

From economic theory is well known that most investment projects have long gestation periods in which their impacts are not immediate. Likewise, as aid is investment by itself too assure its effects on economic growth it needs time. Thus, consenting the traditional growth theory which says, "aid increases investment and investment produces growth" do not lead us to know the accurate time at which this growth is achieved. This show that time by itself is an important factor to determine after what time the effect of aid translate to growth. As this time factor is kept silent by many researchers it is an area that needs further research (Ibid)

It is experienced that research work and different studies that are implemented at the country level mostly uses a macro data of which aid data is one part. But, it is obvious that not all aid projects are directed for the development purpose. Thus, using an aggregate aid given for

different purposes may lead us to wrong results from which wrong conclusion and policy implication is inferred. Aid given for investment and economic growth should be separated from the other forms and this is another area that researchers should go for (Ibid: 163)

The previous inquiries on the aid-growth relationship are mainly cross-sectional type in nature. As the approach extrapolate the effect of aid across a country in the sample it ignores the fact that “each country is differently situated, differently governed, differently structured” (McMillan, 2011: 163) and growth is affected by other country specific variables which the model does not incorporate. The drawback in using such approach can be observed from various sides. Some of them are: the result is not consistent and interpretable for a single country; it is difficult to derive a country specific policy implication (policies working better in one country may not work better in another country) as cited in Kenny and William (2001). And, this due to the fact that the study still come up with different conclusions even under the assumption of the same data set and the same time period.

Due to the above stated facts to analyze the individual country base factors responsible for the success or failure of aid in promoting growth researchers are moving towards county specific study. That is, attempt to identify country specific factors to allow aid to be effective is a more reasonable approach to aid and economic growth.

This study, therefore, tries to analyze the effect of foreign aid on economic growth in Ethiopia, i.e. country specific, by applying a time series approaches. In doing so, the study differs from the previous research work on the area in a way that the study uses broader data set to assess the impact of foreign aid (specific aid directed towards growth) on economic growth of Ethiopia for the selected years ranging from 1969/70 to 2010/11.

CHAPTER THREE

MACROECONOMIC PERFORMANCES AND FOREIGN AID IN ETHIOPIA

The Ethiopian economy is continually showing successive growth. This high growth measured by the growth rate in real GDP conformably translates to high per capita income which has a potential of reducing poverty with a significant margins and further leading to economic growth.

However, the major issue is that this high growth rate is followed by low domestic saving which are seemingly paradoxical incidence and a contested debate among policy makers, researchers and other stakeholders. The saving rate shrank significantly widening the resource gap and witnessing heavy dependence on foreign resources to increase investment and bring economic growth.

Thus, the aim of this chapter is to discuss the macroeconomic performance of the country measured by the growth rate of real GDP in general and to review the GDP growth, the performances of saving-investment, export-import, revenue-expenditure and showing revealing resource gaps in particular. Finally, the role of foreign aid in filling this resource gap is explored.

3.1 General Overview of Ethiopian Economy

Being one of the LDC, in Ethiopian economy the agricultural sector takes the lion share. Subject to many factors affecting this dominant sector adversely, for the last three regimes the sector did not bring meaningful and expected structural transformation to the country. The backward production techniques coupled with dependence on the unpredictable weather condition and natural rainfall made the sector's contribution to the economy of Ethiopia weak. External trade performances like coffee, skin, hides and skins are from this sector. For many years, recurrent drought, famine, poor policies and war had been the characteristic feature of the Ethiopian affecting the agricultural sector at large (Hailemariam, 2010).

The following table summarizes the growth rates of real and per capita GDP in different policy regimes.

Table 3.1 Trends of Growth of Real GDP, Population, Per capita and Sectoral Contributions.

<i>Macro Variable</i>	<i>1960/1- 1973/4</i>	<i>1974/5- 1990/1</i>	<i>1991/2- 2010/11</i>	<i>Average</i>
Growth rate of GDP	2.7	1.7	9.02	5.14
Agriculture % of GDP	60.8	52.4	46.8	53.33
Industry as % of GDP	13.3	13	11.89	12.73
Service as % of GDP	25.9	34.6	39.2	32.23
Per capita GDP Growth	1.33	-0.07	8.44	1.7
Population growth rate	2.6	2.9	2.74	2.75

Source: Hailemariam (2010), EEA and Own computation from MoFED (2010/11) data.

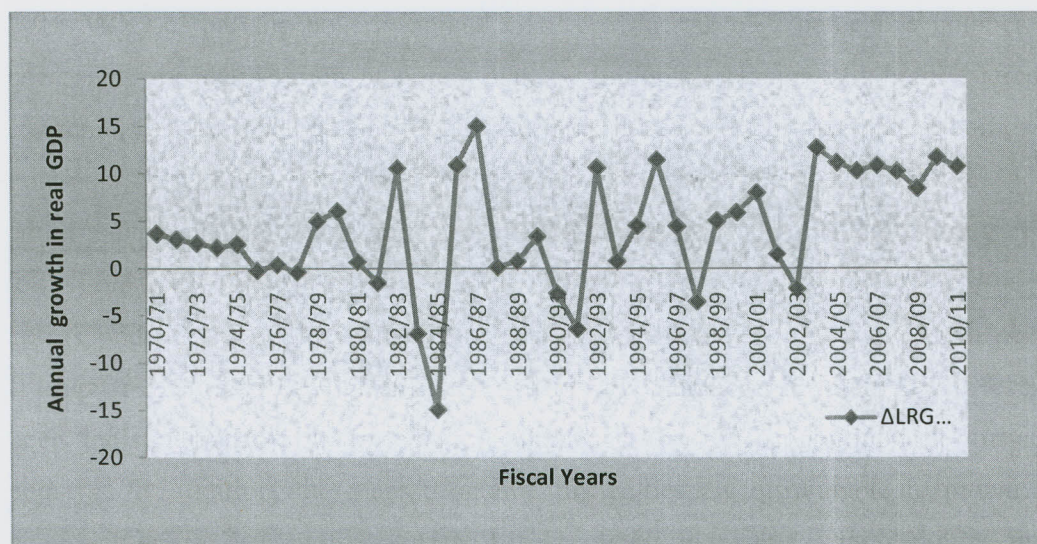
From the above Table 3.1, it can be easily observed that for the past five decades the Ethiopian economy has been increasing at an average annual growth rate of 5.14% while the population has been growing at annual average growth rate of 2.75 percent.

The economy of Ethiopia is based on agriculture, which accounts for a major share of gross domestic product (GDP), of exports, and total employment. Though, Ethiopian agriculture is plagued by periodic drought, soil degradation caused by overgrazing, deforestation, high population density and poor infrastructure (making it difficult and expensive to get goods to market), it is the country's most promising resource. For the last five decades though there are ups and downs subject to factors noted here the overall growth of the country is held by the major contribution of growth in agricultural sector accounting for about 53.33% percent of GDP on average (PASDEP, 2007).

For the years between 2003/4-2010/11, Ethiopia's real GDP growth averaged 11.4% per annum introducing among top performing economies of SSA countries. With such growth the country has two broad missions to achieve. Its medium term vision is to achieve the Millennium Development Goals (MDGs). This should be achieved at the end of the implementation of the five-year plan, named as the Growth and Transformation Plan (GTP). Its long term vision, on the other hand, is to build on the achievements of the GTP and become a middle income country in the coming ten years (MoFED, 2011).

Even though, growth feat is well in excess of the population growth rate and achieving the 2015 MDG of halving poverty annual GDP growth rate of 7 percent, a number of issues necessitate the deliberation of policy makers. Ethiopia's economy is highly defenseless to exogenous shocks by virtue of its reliance on production of primary commodities from the dominant agricultural sector of the economy. All through the past five to seven years the country experienced most important exogenous shocks. These are notably droughts and poor terms of trade (like instability decline prices of coffee and fuel). There is a strong correspondence between weather conditions and Ethiopia's economic growth performance (Lufumpa et al., 2010). High inflation and low accumulation in international reserves have been indistinguishable macroeconomic challenges on the economic performances of the country. In Addition, the macroeconomic difficulties are attributable to global food and economic crisis, structural weakness of the economy like supply side rigidities and supply-demand gap leading to the rise in inflation and the shortage of foreign exchange and the like.

Figure 3.1: Growth Rate of Real GDP



Source: Own computation from MoFED (2010/11) data.

Despite the upturn in Ethiopia's economic fortunes in the new millennium, the failure of Ethiopian economy to diversify commodity-dependent structures has prevented it escaping from persistent fragility. Its growth prospects, and hence, capacity for resource mobilization, remain vulnerable to external shocks.

The agricultural sector has not yet succeeded in generating strong positive, economy-wide spill-over effects to other sectors within wide scale. Ethiopia with poor resource and poor income is heavily constrained by meager capacity to mobilize domestic resources as well as attract external resources—apart from official aid flows sustaining a minimum level of investment that prevents the development process from stalling altogether.

Even with this too for the last decades with successive regimes leading the country the role and contribution of agriculture for the country overall growth performance and to other sectors is undeniable and similarly the roles of other sectors notably the manufacturing and service sectors is paramount. On average, as can be seen from the above table the industry and service sector contributes about 12.73% and 32.23% of GDP respectively.

3.2 Saving and Investment Performances in Ethiopia

The saving- investment part is intended to capture the extent to which the economy is vulnerable to the saving and investment gap which is the hall-mark of resource constrained economy like that of Ethiopia. Policies aiming to capture the increase in savings to increase the rate of growth in real GDP are backed by many literatures in which higher rate of savings will increase the availability of loanable funds, which will in turn increase investment. Higher rate of investment will increase future economic growth (Lewis, 1955) as cited by Ogoe (2009). In case of third world countries in general and Ethiopia in particular investment that can be used as a main source of economic growth is financed from different sources of which gross domestic saving the dominant one and the gap is filled by the capital flows through external debt, foreign aid and foreign direct investment (Hailemariam, 2010).

Table 3.2: Share of Gross Domestic Saving and Gross Capital Formation as a Percentage of GDP.

	<i>Period</i>	<i>1960/1- 1973/4</i>	<i>1974/5- 1990/1</i>	<i>1991/2- 2010/11</i>	<i>Average</i>
Absorption	Saving(GDS)	17.7	7.3	7.27	10.8
	Investment(GCF)	14.7	13.2	18.86	15.6
	Resource Gap (GCF-GDS)	-3	5.9	11.59	4.8

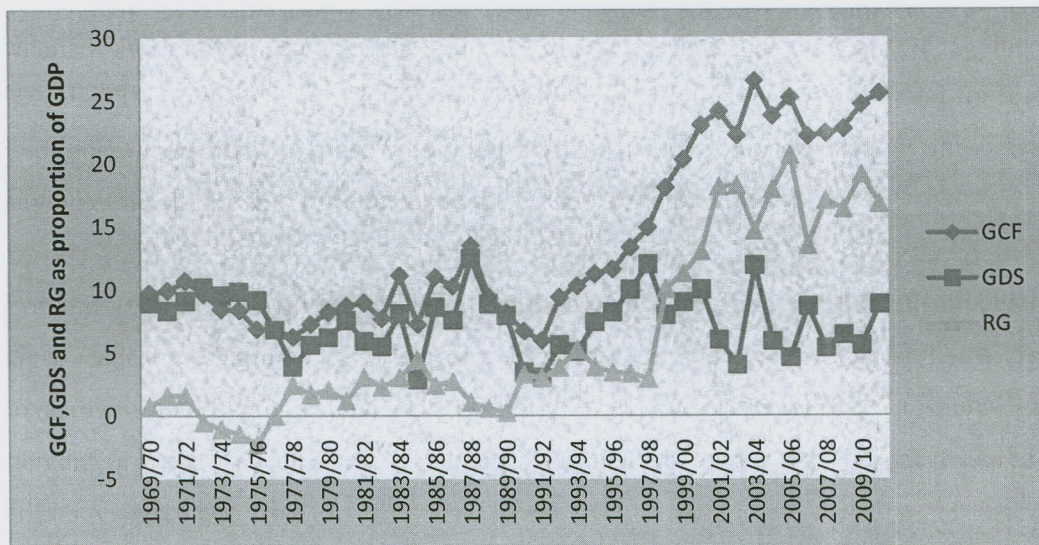
Source: Hailemariam (2010), EEA and Own computation from MoFED (2010/11) data.

From the above table one can easily observe by how much the share of gross domestic saving (GDS), i.e., 10.8 percent deviates from the share of gross capital formation (GCF) of 15.6 percent. This lead to a widening resource gap and from the year 1960 to 2010/11 about 4.8 percent of saving investment gap prevailed.

Abeba (2002) noted that more or less the demand for domestic investment is fulfilled through finance in domestic saving and due to this a surplus resource where saving exceeds investment prevailed. Thus, during the imperial regime the country's demand for resources to undertake investment purpose was filled by the raise in domestic capacity through domestic saving at large showing little dependence of external capital flows.

For the 1974/5-1990/91 there was a noticeable resource gap with serous fluctuations and significant lower amount of saving as a share of GDP showing a remarkable difference with investment as a share of GDP. On average, during the Derg regime a resource gap of 5.9 percent prevailed which made the then government to search for external resource flows to fill its resource gap (Ibid)

Figure 3.2 Gross Domestic Saving, Gross Capital Formation and Resource Gap as a Percentage of GDP



Source: Own computation from MoFED (2010/11) data.

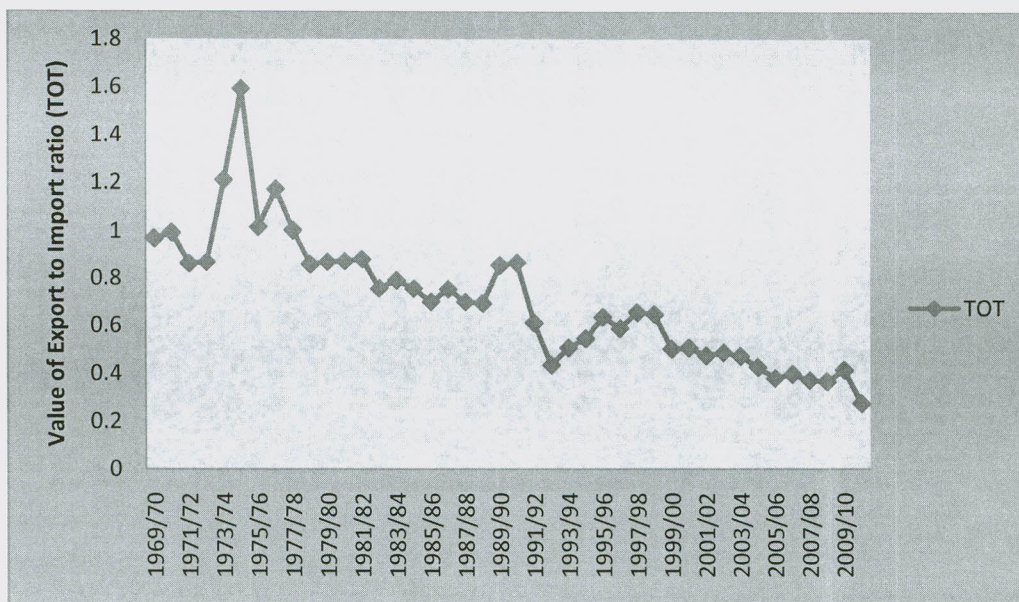
Even after various reforms have been undertaken to encourage savings since 1992/93, which includes financial liberalization measures that provided positive real interest rates, domestic resource mobilization still leaves much to be desired.

During the current regime though there are attempts to mobilize domestic resources likely through development of financial institutions taking the key role, the high investment demand of government is not fulfilled by the domestic capacity alone. A huge resource gap accounting for 11.59% prevailed for the period of 1992/93-2010/11. A contracting scenario is that even with this continual widening resource gap compared to the preceding two regimes, there is a continual growth momentum achieved from year to year showing that the role external capital inflow takes to fill the gap and complementing domestic savings is paramount.

3.3 Trade Performances in Ethiopia

The overall performance of the export sector of the country has been very weak over the past four decades as evidenced by the lower export/GDP ratio and the declining share of exports in financing imports. The ability of exports in financing imports has been contracting. One of the major sources revenue of foreign exchange to import capital goods and technology that are believed to be important ingredients to economic growth is export revenue. The decline in supply of foreign exchange due to the decline in export of goods and services could, therefore, lead to a decline in the imports of such important factors of production. In the case of Ethiopia, the decline in export revenue relative to the import bill has led to import compression of essential goods and to the raise of debt burden. The relative decline in export revenue coupled with the insignificant foreign direct investment puts a constraint on the country's ability to import intermediate and finished capital goods.

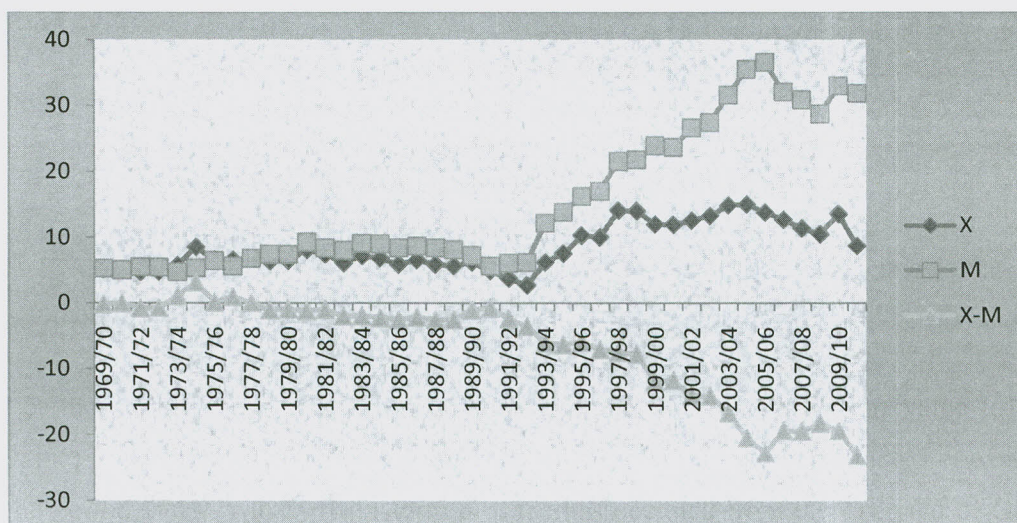
Figure 3.3: Export to Import Ratio (Term of Trade, TOT)



Source: Own Computation from MoFED (2010/11) data.

For the period under consideration terms of trade (the ratio of export value to the import value) is continuously declining. This shows deterioration in term of trade. For example, from the period 1969/70 to 2010/11 term of trade has declined from 0.96 percent of GDP to 0.27 percent of GDP and further explains that the country export is highly deteriorating and lags in value and diversification from international competitive markets of the world.

Figure 3.4: Export, Import and Trade gap.



Source: Own computation from MoFED (2010/11) data

It is well known that the Ethiopian exports are mainly dominated by the primary commodity compositions of agricultural products at large. Backward technique of production coupled with low competition on international markets to win hard currencies capable of covering the expenses of imported items, currency devaluation leading to low export return through products supplied for world markets by cheaper prices and the like lead to the weakening and low export performances of the country for many continued years till now. This shows the fact that our country Ethiopia is not in a position of benefiting from trade that much and in place facing an adverse trade deficit for the whole period from 1960s till now except the two periods of the imperial era. Surprisingly, this trade deficit (the gap between export and import) is enlarging at an alarming rate though government is trying to devise some tools like boosting export both in quality and quantity and substituting imports through local production.

3.4 Fiscal Performances in Ethiopia

Most Sub-Saharan African (SSA) countries including Ethiopia have a prior plan of mobilizing more revenues to finance their development agendas as weak revenue mobilization is the root cause of fiscal imbalances (Drummond, 2012).

For the promise of rapid economic growth to materialize the country has to raise investment which requires investible resources. The general revenue and grant performances of the government for the successive three regimes were far below the total expenditure leading to a huge and continually widening budget imbalance (noticeable fiscal gaps).

Table 3.3: Fiscal Performances

Variables		Imperial Era	Derg Regime	EPRDF	Average
Revenue	%age of GDP	9.6	11.3	16.26	12.39
	Tax Share	72.5	66	59.21	65.90
	Non tax share	11.9	21.7	22.33	18.64
	grant	15.6	12.3	18.46	15.59
Expenditure	%age of GDP	11.9	16.6	20.27	16.26
	Recurrent	80.4	73.4	56.08	69.96
	Capital	19.6	26.6	43.91	30.04
Deficit/GDP	Excluding grant	2.3	5.3	7.18	4.93

Source: Abeba (2002), Authors computation from MoFED and NBE (2010/11) data

For the period considerations as shown in the table 3.3 above, the total government revenue stood at about 12.39 percent of GDP while the total spending amount to 16.26 percent of GDP resulting in 4.93 deficits as a percentage of GDP excluding grants. Most of the deficits were financed from the external resources.

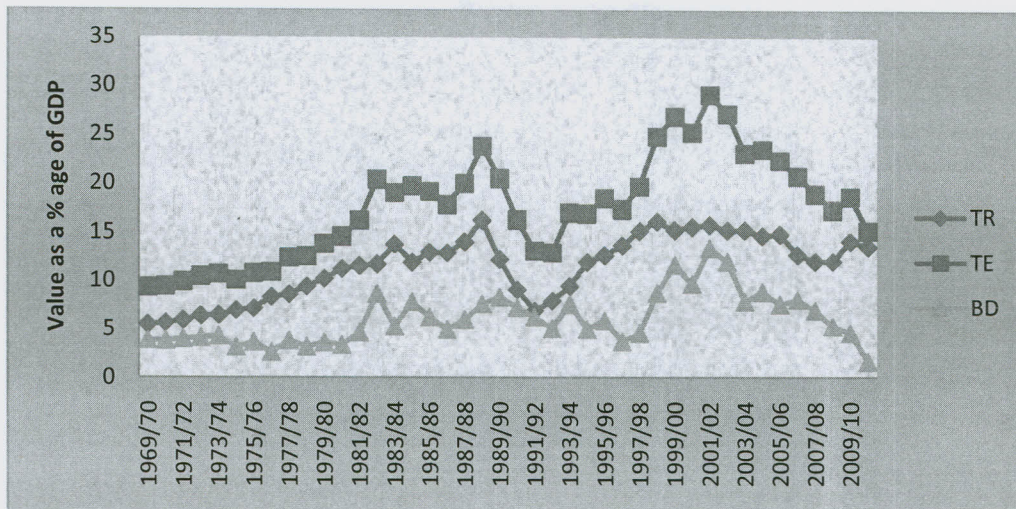
It can also be seen that about 65.9 percent of total revenue was collected from taxes while the rest (about 18.64 percent) was collected from non-taxes on average. Although tax revenue performances measured in terms of tax-to-GDP ratio did not change much improvement, the total tax revenue collected was showing improvements in recent periods in close contact with continued and strengthened efforts and enforcements taken by the tax administration, enhanced tax compliances and the like (MoFED,2012).

The expenditure pattern across sectors follows the overall expenditure policy of the country which is to allocate more resources to build economic and social infrastructure and provide basic services with the aim of eradicating poverty and achieving rapid economic development (Ibid).

For the period under consideration, capital expenditure accounted for 30.04 percent of total government spending on average while the remainder (69.96 percent) constituted recurrent expenditure. The government commitment to enhance growth through providing infrastructure and improving service delivery lead to the share of capital expenditure to increase at the expense of the recurrent one.

The fiscal policy of Ethiopia focused on strengthening domestic revenue mobilization and pro-poor spending. The government anticipates that growth in spending has been largely covered by the increase in revenue. Hence the actual government budget deficit declined 4.93 % of GDP on average. Out of a total deficit of the major share was covered from foreign sources, while the financing from domestic sources was minimal share of GDP. Government plan of privatization and tight fiscal policy was used to finance the deficit.

Figure 3.5 Fiscal Performances in Ethiopia



Source: Own computation from the NBE (2010/11) data

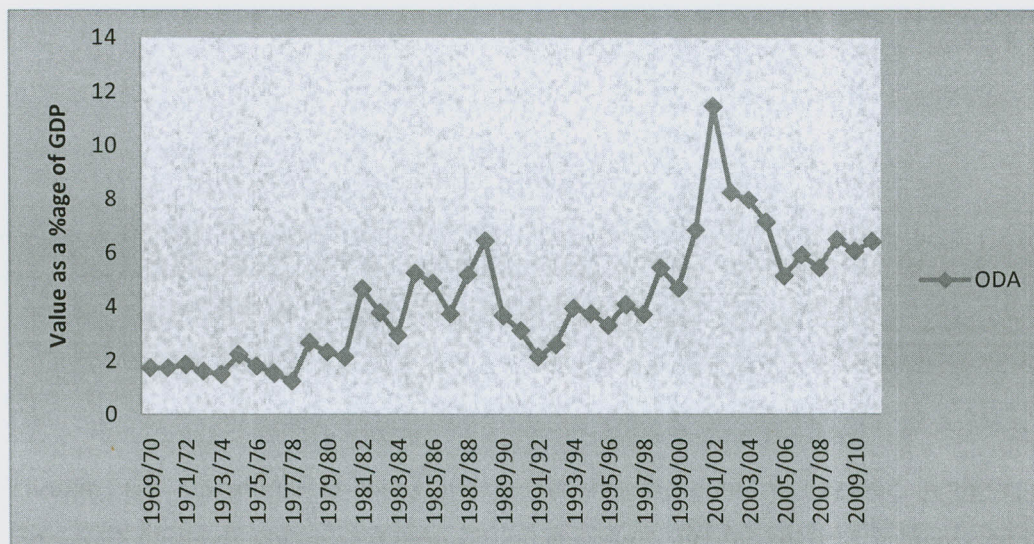
3.5 Foreign Aid and Development in Ethiopia

Foreign aid plays a crucial role in supporting the economic development of the LDCs like Ethiopia. Among others, it can be put in to use in the economy where there exists a resource gap. The presence of a resource gap (saving-investment, fiscal and foreign exchange gap) forces the country to look outward for foreign capital in order to fill either of the gaps which are perceived to be the binding constraint for economic growth and to expand the level of investment beyond the domestic capacity.

In Ethiopia, an inflow of external resources such as loans and grants has started in 1950s, the year in which the relationship between the United States and Ethiopia reached a higher level. For instance pre 1975, about 75% of the required total investment during series of five year development plan period (1957-1973) was covered by external capital. Thus the magnitude of loans and grants that Ethiopia received in the years preceding the revolution was not even small. But due to the existing political economic system it has never contributed to the economic progress and was characterized by trifling development objectives. Similarly, during the post revolution period too, 37 percent of total investment expenditure of the annual campaign of 1979-1983 was financed by foreign aid (Dejene, 1989).

Though, the magnitude of loans and grants that the country received in these years has increased continuously, in real term over the period 1991/92-2010/11 it increased by 26.8%, to reach nearly 158,727.3 million Birr in 2010/11(MoFED, 2011).

Figure 3.6: Share of ODA as a Percentage of GDP in Ethiopia.



Source: Own computation from MoFED (2010/11) data

The magnitude of aid flow to Ethiopia varies depending on nature and characteristics of the political system, the economic system that the regime follows, and the relationship with donor countries and institutions. During the socialist period, Ethiopia had been receiving development assistance from Eastern Block donors particularly from the Soviet Union and East Germany, as well as from Western bilateral and multilateral donors to some extent. During the Derg regime (1974/75-1990/91) the country received Birr 1.1 billion on average terms per year and during the same period the average share of aid (ODA) to GDP was 4.8.

Comparatively the total flow of foreign aid has increased under the current economic system due to changes in policies which meet the interests of donors, and adoption of a market-oriented economic system being the major one. Since the policy change by the present regime the magnitude of aid inflows both loan and grant aspect has increased continuously. In this period (1991/92-2010/11) the average annual flow of aid has reached to Birr 10.4 billion and its share in the GDP also rose to 9.2 percent.

Despite the huge flow many claim that aid to Ethiopia is ineffective in bringing about the desired changes like poverty reduction. Recognizing the role of aid in the last decade (since

the introduction of market economy), while there have been some improvements and successes particularly in improving the social indicators, aid to Ethiopia has the least success story compared to other African countries such as Ghana and Uganda. While few poor countries manage to achieve long run-growth much in excess of 2% per capita per annum, and some do not grow at all. Hence, Ethiopia's growth of about 0.7% per capita over the last half century is typical of the poorest fifth countries (World Bank, 2001).

In one of the empirical investigation on aid, growth and poverty in Ethiopia (Sintayoh, 2006) using the data of 1980 to 2002 also shows the weak relationship between aid and economic growth in Ethiopia, that while loan failed to show the positive relationship, grant has a positive contribution as relatively significant level (10%), which pose a question on the effect of total aid on Ethiopia's growth.

But this does not imply that aid is totally wasted (or, aid is ineffective at all) because there are some positive change in the social indicators like enhancing access to education and health services.

Aid flowing to Ethiopia since its beginning has two major and different forms. These are the foreign loan and grant components together forming ODA. For example, for the period of 194/75-1990/91,i.e, the Derg regime, almost both type of aid were flowing proportionately. Specifically, from about 11,185 million birr of the gross aid inflow around 5375.5 million birr (48.1%) was the grant component while about 5,809.6 million birr (51.9%) was the loan's share. With increase in demand for investible resource, for the period of 1991/92-2010/11,i.e, the current regime, the volume step-up to 158, 72.3 million birr (Abeba, 2002). During this period, the share of grant component as a percentage of the aggregate aid inflow was about 57.25% while the remaining ,i.e, the loan component covers about 42.5% (MoFED,2011).

CHAPTER FOUR

MODEL SPECIFICATION AND METHODOLOGY

This section constitutes three parts. The first part of the chapter specifies an appropriate model used to analyze the impact of foreign aid on economic growth of Ethiopia. In doing so after the aid-growth model is specified, brief description of variables with their hypothesized sign is stated. Then, the second part presents the sources of data on variables used in construction of the model. Finally the chapter winds up by explaining the estimation methods used for the study at hand.

4.1 Functional Relationship and Model Specification

Different types of studies were undertaken in order to understand the impact of foreign aid on economic growth in developing countries. And different variables and methods were used to analyse it. Some studies focused on the impact of foreign aid on saving and investment while some other focused on the impact of foreign aid on economic growth and on different sectors of the economy. As it is difficult to analyse the impacts of foreign aid on all sectors and variables in a single paper, the major objective of this paper is analyse the impact of foreign aid on economic growth of Ethiopia after the growth model is specified. The growth equation specified on the basis of the theoretical propositions reviewed in the literature helps to examine the impact of foreign aid on economic growth.

In line with this, the standard neoclassical growth model predicts that labour and capital inputs are able to explain the bulk of economic growth patterns in a given country, there is still scope to account for the role of other explanatory variables in deriving output changes. Such factors may be considered on the basis of further theoretical foundations as well as country-specific characteristics. Among such factors, the recent literature on growth has centered on foreign aid, measured as ODA as a percentage of *GDP*, total net private capital flows as percentage of *GDP*, trade as a percentage of *GDP* to account for the degree of openness of the economy, budget deficit, inflation etc, as possible growth enhancing variables. Stated alternately, observing from theory the possible growth promoting roles of foreign aid, this study and its data analysis is modeled in an aggregate production function

(APF) framework. The standard *APF* model has been extensively used in econometric studies to estimate the impacts of foreign aid on growth in many developing countries. The APF assumes that, along with “conventional inputs” of labour and capital used in the neoclassical production function, “unconventional inputs” like foreign aid and trade openness may be included in the model to capture their contribution to economic growth. The APF model has been used by Feder (1983), Fosu (1990).

The factors of production and the production technology that determine the level of output in an economy can be summarized as:

$$Y_t = A_t LAB_t^{B_1} INV_t^{B_2} e^{\varepsilon_t} \text{-----} (4.1)$$

Where Y_t denotes the aggregate production of the economy (real *GDP*) at time t and A_t, L_t and INV_t , denotes the amount of total factor productivity (*TFP*), labour stock and capital stock respectively. Assuming constant technology, any increase in the amount of labour and/or capital will increase the level of output in the economy. In this case, ‘ A ’ captures the *TFP* of growth in output not accounted for by increase in labour and capital. Since this study seeks to investigate the impacts of aid inflows on economic growth through changes in *TFP*, we assume therefore that *TFP* is a function of foreign aid inflows and other factors. Thus, it is assumed that;

$$A_t = f(AID_t, SQAID_t, AP_t)$$

$$= AID_t^{\beta_3} SQAID_t^{\beta_4} AP_t^{\beta_5} \text{-----} (4.2)$$

Where; AID = ODA as a percentage *GDP*; $SQAID$ = Square of ODA to *GDP* and AP = the interactive term of aid and policy.

By substituting (4.2) into (4.1), we obtain;

$$Y_t = LAB_t^{B_1} INV_t^{B_2} AID_t^{\beta_3} SQAID_t^{\beta_4} AP_t^{\beta_5} e^{\varepsilon_t} \text{-----} (4.3)$$

Based on the Harrod-Domar model investment is identified as the main variable that determine growth. However, including aid and investment in the same equation is going to result in bias estimation because it results in double counting since some part of investment is financed by aid. Therefore, based on Gomanee et al (2001), in order to overcome such problems this paper includes the investment level that is not financed by aid.

According to Wondwosen (2003) part of investment not contained in aid can be determined in two different ways. The first way is determining the net amount of loan and grant in the government expenditure. This is done to obtain government investment. Then, adding government investment with private investment yields total investment not financed by aid. But, there is a suspicion that the method neglects part of government investment found in recurrent expenditure. The second way is called the residual regressor method. This is done by regressing investment on aid variable. Finally, by using the residual from the regression result, part of investment not financed by aid is built. Yohannes (2011) also explained this.

Consequently, part of investment not financed by aid is derived as follows. Thus the level of investment financed by foreign aid equation has the form:

$$INV = \delta_0 + \delta_1 AID \text{ ----- (4.4)}$$

The non-aid financed investment (INV_{NA}) is thus given as:

$$INV_{NA} = INV - 0.11AID \text{ ----- (4.5)}$$

Where, INV_{NA} = level of investment not financed by aid, INV = total level of investment, and AID = foreign aid.

In addition to the aid variable, the growth equation further includes aid interacted with policy index variable. This helps to examine whether the aid-growth relationship is conditional on good policy environment or not. Although a number of studies agreed on the contribution of good policy in enhancing growth, consensus is not reached as to whether the growth impact of aid is conditional on the quality of the policy environment or not. The policy index is formed using the technique performed by Burnside and Dollar (1997, 2000). They developed the policy index out of a regression result used in growth equation. Thus, the growth model is comprised of budget surplus, openness to trade and inflation that capture fiscal, trade and monetary policies respectively. Then the policy index is derived using the coefficients obtained from the regression result.

Accordingly, the policy index is constructed by the following equations:

$$P_t = -0.0156BD_t + 0.063INF_t + 0.0296OPEN_t \text{ ----- (4.6)}^5$$

⁵ More detail can be found from the appendix E

Where, P_t = policy index, BD = budget deficit as a ratio of GDP , INF = inflation rate and $OPEN$ = openness to trade.

From (4.3), the specific operational model for real GDP growth for Ethiopia in an estimable econometric form is:

$$LRGDP_t = \beta_0 + B_1LLAB_t + \beta_2LINV_{NA_t} + \beta_3LAID_t + \beta_4LSQAID_t + \beta_5LAP_t + \varepsilon_t \quad (4.7)$$

Where;

$LRGDP_t, LLAB_t, LINV_{NA_t}, LAID_t, LAP_t$ are the logs of output, labor, investment, aid, square aid and aid interacted with policy variables respectively and ε_t is white noise error term. The nature of the model is given in logarithmic form to make the analysis and interpretation of the explanatory variables easier in terms of percentage, growth rate and elasticities.

A few words must be articulated regarding the intuitive sign for each independent variable as follows:

Increase in labour input (LAB) is measured here as the growth of labor force aged (15-64) and is expected to increase in real GDP . All things remaining constant, the higher the labour force the higher the supply of labour and hence output. Therefore, the coefficient of labour is expected to be positive ($B_1 > 0$).

Theoretically capital measured by gross domestic capital formation as a percentage of GDP is expected to exert a positive impact on the rate of growth of real GDP . Consequently, the study expects the coefficient of capital (INV) to be positive ($\beta_2 > 0$) on a priori and theoretical grounds, thus the higher the rate of investment, the higher the rate of real GDP growth, all things being equal.

Similarly, foreign aid (AID) should generally be expected to exert a positive effect on real output, as it is considered as an inflow of foreign capital to complement domestic capital. It is therefore expected that an increase in AID inflow will lead to an increase in aggregate output and hence its rate of growth. Thus coefficient of AID is expected to be positive ($\beta_3 > 0$).

The flow of foreign aid to recipient country becomes effective up to some point and then its effect on economic growth declines as the flow of aid increases. And this is due to the absorptive capacity constraint. In order to capture this relationship, a square aid (*SQAID*) term is added up to the growth model (Feeny and McGillivray (2008). We expect that this variable will be negatively related to growth (i.e. $\beta_4 < 0$).

The interactive term of aid and macroeconomic policy ($\frac{Aid}{GDP} * Policy$) captures whether aid is conditional on good policy environment or not. Policy variable is a composite of trade policy, inflation and budget deficit (Burnside and Dollar, 1997). The interaction term is expected to affect economic growth positively and significantly (i.e. $\beta_5 > 0$).

4.2 Sources of Data

As the achievement of any econometric analysis ultimately depends on the availability and accuracy of data, it is, therefore essential to discuss about the source and nature of data. Regarding the type of data, the study used a sufficient length of secondary data ranging from 1969/70-2010/11. Therefore, such data will be collected from different sources. The major data sources for the problem under investigation were publications of National Bank of Ethiopia (NBE), Ministry of Finance and Economic Development (MoFED) and Statistical data base of Ethiopian Economic Association (EEA) and African Development Indicator (ADI).

4.3 Method of Data Analysis and Estimation Techniques

The data collected were analyzed quantitatively. The study went through the analysis of the time series property of the data (test of the unit root on each variable), test of cointegration to assess long run relationship of economic growth and its determinants, particularly foreign aid and vector error correction model (VECM) was used to estimate the short dynamics of the growth equation. All estimations were carried out using econometric software packages. Here, PC Give 10 and Eviews 6 were used for econometric analysis.



4.3.1 Unit Root Test

A stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed. If a time series is not stationary in the sense just defined, it is called a nonstationary time series. In other words, a nonstationary time series will have a time varying mean or a time varying variance or both (Gujarati, 2004).

In general, if a (nonstationary) time series has to be differenced d times to make it stationary, that time series is said to be integrated of order d . A time series Y_t integrated of order d is denoted as $Y_t \sim I(d)$. If a time series Y_t is stationary to begin with (i.e. it does not require any differencing), it is said to be integrated of order zero, denoted by $Y_t \sim I(0)$. Most economic time series are generally $I(1)$; that is, they generally become stationary after taking their first differences (Gujarati, 2004).

A study on the stationarity of variables is relevant for the reason that it incorporates important behavior for these variables and making analysis with nonstationary variables may result in spurious correlation. A stationary time series is superior or more important than a nonstationary in economic analysis as it makes easier the study of the behavior of variables in the long run (Gujarati, 2004).

Stationarity test will be done on all time series properties of data to avoid possible spurious regression result by employing the unit root test by Augmented Dickey- Fuller (ADF) and the Phillips Perron (PP) test.

If it is assumed that the error term, u_t , is uncorrelated, the DF test may be used. But in case the u_t are correlated, Dickey and Fuller have developed a test, known as the Augmented Dickey-Fuller (ADF) test. The ADF test is used in this study as most tests of the DF type have low power; that is, they tend to accept the null of unit root more frequently than is warranted.

The ADF unit root test requires the estimation of the following regression:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m (\alpha_i \Delta Y_{t-i}) + \varepsilon_t \text{----- (4.8)}$$

Where ε_t is a pure white noise error term and $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$, etc are consecutive lagged differences augmented, β_1 is intercept, β_2 is trend coefficient, t is time or trend variable, m the number of lag terms chosen.

The hypotheses of this test will be:

$H_0 : \delta = 0$, i.e., there is a unit root – the time series is non-stationary.

$H_1 : \delta < 0$, i.e., there is no unit root – the time series is stationary.

If the computed absolute value of the t statistic exceeds the ADF critical values, we reject the hypothesis that $\delta = 0$, in which case the time series is stationary and vice versa.

Phillips and Perron, on the other hand, proposed a nonparametric method of controlling for serial correlation when testing for a unit root. The PP method estimates the non-augmented DF test equation and modifies the t-ratio of the α coefficient so that serial correlation does not affect the asymptotic distribution of the test statistic. A test of unit root using the Phillips-Perron approach does not require a lag length determination (Waheed et al, 2006).

The test regression for the PP tests is given by the following equation (Peter C.B. Phillips (1998):

$$\Delta Y_t = c + \alpha Y_{t-1} + u_t \text{----- (4.9)}$$

Where u_t is $I(0)$ and may be heteroskedastic. The PP tests correct for any serial correlation and heteroskedasticity in the errors u_t of the test regression by directly modifying the test statistics. These tests are known as Phillips $Z\alpha$ and Zt tests. The Z -tests allow for a wide class of time series with heterogeneously and serially correlated errors.

4.3.2 Johansen Cointegration Test

There are two possibilities to deal with nonstationary variables in a given model after the stationarity test. One is, to difference the series so as to obtain stationary variables and if so, then continue with the analysis. This is used only for the analysis of a short run relationship.

If not, the second is, to test if the linear combination of the nonstationary variables is stationary by using cointegration test. If they are cointegrated, then proceed the analysis with nonstationary variables.

According to Engle and Granger (1987), for X_t and Y_t both $I(1)$ to be cointegrated there should exist α such that $Y_t - \alpha X_t$ is $I(0)$ (i.e. $Y_t - \alpha X_t$ is stationary). (X_t, Y_t) is denoted as $CI(1, 1)$. Granger noted (cited in Gujarati 2004) that “A test for cointegration can be thought as a pre-test to avoid ‘spurious regression’ situations”. A regression of one nonstationary variable over another nonstationary variable may yield a stationary series and if so, it is known as cointegrating regression and the slope parameter in such a regression is known as cointegrating parameter. The concept of cointegration can be extended to a regression model containing k regressors. In this case, one will have $k-1$ cointegrating parameters.

Johansen method of cointegration applies the maximum likelihood procedure to determine the presence of cointegrating vectors in a vector autoregressive system. Johansen’s methodology is given by the following vector autoregressive (VAR) of order p form:

$$Y_t = \mu + A_1 Y_{t-1} + \dots + A_p Y_{t-p} + \varepsilon_t \quad (4.10)$$

Where Y_t is an $n \times 1$ vector of variables that are integrated of order one [$I(1)$], μ is a vector of constant, ε_t is an $n \times 1$ vector and $A_1, A_2 \dots A_p$ are $P \times P$ matrices of estimable parameters.

In the original work of Johansen and Juselius (1990), the model incorporates a vector of nonstochastic variables (D_t) orthogonal to the constant term such as seasonal dummies, ‘dummy type’ variables and/or stochastic ‘weekly exogenous’ variables. Thus, the model can also be given as:

$$Y_t = \mu + A_1 Y_{t-1} + \dots + A_p Y_{t-p} + \phi D_t + \varepsilon_t \quad (4.11)$$

In general, economic time series are non-stationary processes and the above VAR model is expressed in its first differenced form given as follows.

$$\Delta Y_t = \pi Y_{t-1} + \sum_{i=0}^{p-1} \Gamma_i \Delta Y_{t-1} + \mu + \phi D_t + \varepsilon_t \quad (4.12)$$

Where $\pi = \sum_{i=1}^p [A_i - I]$ and $\Gamma_i = -\sum_{j=i+1}^p [A_j]$

Γ and Π represent short run adjustment and long run relationship among the Y_t variables respectively. The rank of Π shows the number of linear combinations of the Y_t variables that are stationary.

4.3.3 Vector Error Correction Model (VECM)

If two variables are not cointegrated or proved to have no long run relationship, the testing procedure will stop there and one will not go for the construction of an error correction model. But if they are cointegrated or proved to have a long run relationship one needs to go for an error correction mechanism. The error correction mechanism (ECM) is a mechanism used to correct any short run deviation of the variables from their long run equilibrium.

If two variables Y and X are cointegrated, then the long term or equilibrium relationship that exists between the two can be expressed as ECM (Gujarati 2004). This means one shall go for the construction of an error correction model if and only if the two variables are cointegrated. The ECM can be given by:

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 u_{t-1} + \varepsilon_t \text{ --- (4.13)}$$

Where Δ denotes the first difference operator, ε_t is a random error term, and $u_{t-1} = (Y_{t-1} - \beta_1 - \beta_2 X_{t-1})$, that is, the one-period lagged value of the error term from the cointegrating regression.

This ECM equation states that ΔY_t depends on ΔX_t and also on the equilibrium error term. If the latter [error term] is nonzero, the model is out of equilibrium. Suppose ΔX_t is zero and u_{t-1} is positive. This means Y_{t-1} is too high [above] to be in equilibrium. Since α_2 is expected to be negative, the term $\alpha_2 u_{t-1}$ is negative and, therefore, ΔY_t will be negative to restore the equilibrium. That is, if Y_t is above its equilibrium value, it will start falling in the next period to correct the equilibrium error; hence the name ECM. By the same token, if u_{t-1} is negative (i.e., Y_t is below its equilibrium value), $\alpha_2 u_{t-1}$ will be positive, which will cause ΔY_t to be positive, leading Y_t to rise in period t . The absolute value of α_2 determines how quickly the equilibrium is restored (Gujarati 2004).

CHAPTER FIVE

ESTIMATION AND DISCUSSION OF RESULTS

Based on the priorly described methods of estimation, this section explores the estimation and interpretation of results. Accordingly, after the test of unit root is done for all variables in the model; test for cointegration is followed to assess the long run relationship among the variables entering the growth model. Finally, the dynamic short run equation is estimated.

5.1 Unit Root Test

Before any meaningful regression is performed with the time series variables, it is essential to test the existence of unit roots in the variables and hence to establish their order of integration. The variables used in the analysis need to be stationary and should be cointegrated in order to deduce a meaningful relationship from the regression.

Working with such non stationary variables direct to spurious regression (seemingly related variables) results, from which further inference is no more meaningless. In order to avoid problems of spurious correlation normally associated with the inclusion of non-stationary series in regression models, appropriate tests of stationarity on variables of interest should be employed. Two types of formal tests are conducted to examine that whether the data series is stationary or not. These tests are the conventional Augmented Dickey-Fuller test (ADF) and the Phillips-Perron test (PP). These two tests allow for three options of output in conducting the tests; without intercept and trend, with only intercept and with both intercept and trend. The null hypothesis for the test claims that the data series under investigation has unit root. Conversely, the alternative hypothesis claims that the series is stationary. In addition, the result of the test for the variables at level and at their first difference is presented in Table 5.1 below⁶.

⁶ All the tests are conducted using the Eviews 6

Table 5.1: The Result for the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) Unit Root Tests at Level and First Difference.

<i>Variables</i>	<i>Specification</i>	<i>ADF Unit Root Test</i>					<i>PP Unit Root Test</i>				<i>Order of Integration</i>
		<i>ADF test statistic</i>		<i>1% critical Value</i>	<i>5% critical value</i>	<i>P-value</i>	<i>PP test statistic</i>	<i>1% critical Value</i>	<i>5% Critical Value</i>	<i>P- value</i>	
		<i>test statistic</i>	<i>Lag length</i>								
LRGDP	Without C and T	1.875	3	-2.627	-1.949	0.983	3.945	-2.623	-1.949	0.999	I(1)
	With C	3.970	5	-3.627	-2.945	1.000	5.641	-3.600	-2.935	1.000	
	With C and T	3.205	7	-4.253	-3.548	1.000	1.755	-4.198	-3.524	1.000	
DLRDGP	Without C and T	-1.122	2	-2.627	-1.949	0.233	-3.717	-2.624	-1.949	0.0005**	
	With C	-2.085	2	-3.616	-2.941	0.251	-4.841	-3.606	-2.937	0.0003**	
	With C and T	-6.562	1	-4.212	-3.259	0.000**	-5.935	-4.205	-3.527	0.0001**	
LLAB	Without C and T	1.675	1	-2.624	-1.949	0.975	1.943	-2.623	-1.949	0.986	I(1)
	With C	0.577	1	-3.606	-2.937	0.987	-0.988	-3.601	-2.935	0.748	
	With C and T	-0.859	1	-4.205	-3.527	0.951	-2.445	-4.199	-3.524	0.353	
DLLAB	Without C and T	-8.779	0	-2.624	-1.949	0.000**	-8.863	-2.624	-1.949	0.000**	
	With C	-9.131	0	-3.606	-2.937	0.000**	-9.703	-3.605	-2.937	0.000**	
	With C and T	-9.289	0	-4.205	-3.527	0.000**	-10.232	-4.205	-3.526	0.000**	
LINVNA	Without C and T	0.583	2	-2.626	-1.949	0.838	0.915	-2.623	-1.949	0.901	I(1)
	With C	-0.683	2	-3.610	-2.939	0.839	--0.605	-3.601	-2.935	0.858	
	With C and T	-2.946	2	-4.212	-3.529	0.160	-2.418	-4.199	-3.524	0.365	

DLINVNA	Without C and T	-3.535	1	-2.626	-1.949	0.0008**	-8.657	-2.624	-1.949	0.000**	
	With C	-3.586	1	-3.610	-2.939	0.0107*	-8.617	-3.605	-2.937	0.000**	
	With C and T	-3.713	1	-4.212	-3.529	0.0332*	-8.627	-4.205	-3.527	0.000**	
LAID	Without C and T	0.339	3	-2.627	-1.949	0.778	0.219	-2.623	-1.949	0.745	I(1)
	With C	-1.602	3	-3.616	-2.841	0.472	-1.743	-3.601	-2.935	0.4025	
	With C and T	-2.718	3	-4.219	-3.533	0.236	-3.465	-4.198	-3.524	0.057	
DLAID	Without C and T	-3.493	2	-2.627	-1.949	0.0009**	-8.154	-2.624	-1.949	0.000**	
	With C	-3.623	2	-3.616	-2.941	0.0098**	-7.891	-3.606	-2.937	0.000**	
	With C and T	-3.370	3	-4.227	-3.536	0.0710	-7.794	-4.205	-3.527	0.000**	
LSQAID	Without C and T	1.850	3	-2.627	-1.949	0.983	2.113	-2.623	-1.949	0.9906	I(1)
	With C	-0.240	3	-3.612	-2.941	0.924	-0.168	-3.601	-2.935	0.935	
	With C and T	-2.641	3	-4.219	-3.533	0.266	-3.816	-4.199	-3.524	0.026	
DLSQAID	Without C and T	-2.946	2	-2.627	-1.949	0.0043**	-7.529	-2.624	-1.949	0.000**	
	With C	-3.909	2	-3.616	-2.941	0.0046**	-8.097	-3.606	-2.937	0.000**	
	With C and T	-3.870	2	-4.212	-3.533	0.0233*	-8.017	-4.205	-3.527	0.000**	
LAP	Without C and T	-0.326	0	-2.622	-1.949	0.562	-0.0362	-2.623	-1.949	0.665	I(1)
	With C	-1.182	0	-3.601	-2.935	0.673	-1.085	-3.601	-2.935	0.713	
	With C and T	-2.164	3	-4.21	-3.53	0.495	-2.927	-4.199	-3.524	0.165	
DLAP	Without C and T	-3.429	2	-2.627	-1.949	0.0011**	-7.553	-2.624	-1.949	0.000**	
	With C	-3.939	2	-3.616	-2.941	0.0043**	-7.659	-3.606	-2.937	0.000**	
	With C and T	-3.893	2	-4.219	-3.533	0.0221*	-7.557	-4.205	-3.527	0.000**	

** and ** indicates the rejection of the null hypothesis (unit root) at 5% and 1% respectively. Where C and T are constant and T trend respectively.*

From the results shown in Table 5.1, both the ADF (adjusted for lag length by Akaike information criteria) and the PP class of tests show that LRGDP is non-stationary in levels for the three specifications given i.e without constant and trend, with constant and with constant and trend. This is because the null hypothesis of unit root is not rejected at the 1% and 5% level of significances.

However, when the first difference of LRGDP is taken, both the ADF and PP class of tests indicate stationarity of LRGDP at the 1% and 5% level of significance. This is when constant and trend is included for the ADF test and three specifications are included for the PP test. The tests also revealed that LLAB, LINVNA, LAID, LSQAID and LAP are all non-stationary at levels. These series however became stationary when differenced once. This is because the null hypothesis of unit root is rejected at the 1% and 5% level of significance for both the ADF and PP class of test when the series are differenced once. The test result is also confirmed by the graphical representation of plot of variables at level and their first differences. Accordingly, plot of the variables (in levels) shows that all the variables are not stationary. Alternatively, the variables in first difference suggest the presence of stationarity.⁷ Harris (1995:15) noted "... a data series is said to be stationary if its error term has zero mean, constant variance, and the covariance between any two-time periods depends only on the distance or lag between the two periods and not on the actual time at which it is computed."

In general, the ADF and the PP tests from Table 5.1 above provide identical results for all variables. According to these tests, all variables are integrated of the same order (i.e they are all integrated of order one, I (1)). Thus, the determination of cointegrating relationships doesn't suffer from mixed order of integration and hence cointegration analysis is reasonable in carrying out the specified growth model estimation in the following section.

⁷ See the detail from Appendix A (I and II)

5.2 Lag Length Selection and Estimation of Long Run Growth Model

5.2.1 Lag Length Selection

Cointegration test is usually preceded by a test of optimal (appropriate) lag length selection as the result of the test is affected by the number of lags included in the VAR model. There are many tests that can be used to choose appropriate lag length. These are the Log Likelihood (LL), the Akaike information criteria (AIC), the Schwarz information criteria (SIC) and the Hannan-Quinn information criteria (HIC). The optimal lag length for this study is determined by using the Akaike Information Criteria (AIC) as this method has been proven in most empirical papers to be superior to other tests. According to the Akaike Information Criteria, the VAR estimate with the lowest AIC in absolute value is the most efficient one. In addition, the optimal lag length that is obtained from the AIC is also confirmed by the VAR estimates considering successive lags. Accordingly, the optimal lag length used in the growth equation is two and VAR (2) is appropriate to carry the cointegration test.

Table 5.2: VAR Lag Order Selection Criteria

VAR Estimates	Information Criteria				Lag Length
	LL	AIC	HQ	SC	
VAR(1)	274.1317	-11.3235	-10.6843	-9.95813	1
VAR(2)	303.075	-11.2537*	-10.0630	-7.96041	2*
VAR(3)	343.807	-11.7850	-10.0403	-6.92226	3
VAR(4)	421.627	-14.2962	-11.9963	-7.83203	4
VAR(5)	572	-20.9160	-18.0611	-12.8179	5

**indicates the lag order selected by the criteria used in this study*

5.2.2 Estimation of Long Run Growth Model

In section 5.1, the unit root tests show that all the variables are nonstationary at level. Theories state that econometric analysis with nonstationary variables makes no sense. The only exception is if their linear combination results in a stationary series. The test of cointegration in this section tests for existence of such a relationship among the nonstationary variables considered in this study.

Once all the variables entered the growth equation are integrated of similar order (I (1)) as seen from the above Table 5.1, the next step is to check for cointegration. To test the number of cointegrating relationships among variables real GDP, active labor force, non-aid financed investment, aid, square aid and aid interacted policy index Johansen cointegration test is considered. To determine the number of cointegrating vectors two test statistics called the maximum eigenvalue (λ_{\max}) and trace statistics (λ_{trace}) are computed.

For k -endogenous variables each with a single unit root, there is a possibility to find from zero to $k-1$ linearly independent cointegrating relations. Two types of test statistics are used to determine the rank of the model in this study; namely the trace test and the maximum eigen/likelihood ratio test. The trace test (λ_{trace}) tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of k cointegrating vectors, where k is the number of endogenous variables, for $r=0,1,2,\dots,k-1$. The maximum eigen-value test, on the other hand, tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of $r+1$ cointegrating vectors. Both the trace statistics and the maximum eigen/likelihood ratio test results in one cointegrating equations at 1% level of significance for this study. The trace test shows that the null hypothesis of $r=0$ cointegrating relation is rejected and the alternative $r \geq 0$ cointegrating equations is accepted. This means that there is one cointegrating equations because the null hypothesis of $r \leq 1$ could not be rejected in the next step. The maximum eigen/likelihood ratio test confirms the same result. It shows that the null hypothesis of $r=0$ cointegrating relation is rejected in favour of the alternative $r=1$.

Thus, both the trace and the maximal eigen value test conclude that there is one cointegrating vector among the variables and there is only one eigen value significant at 1% level and this outcome determines that the rank of the cointegration is unity. This means among the variables real GDP, active labor force, non-aid financed investment, aid, square aid and aid interacted policy index there is one long run relationships. The test statistics are summarized in Table 5.3.

Table 5.3: Results of the Johansen Cointegration Test for Growth Equation

Null Hypothesis	Alternative Hypothesis	Eigen Value	Statistic	5% Critical value	Prob.	Hypothesized No. CE(s)
Trace test (λ_{trace})						
$r = 0$	$r \geq 0$	0.781498	119.7301	95.75366	[0.0004]**	None *
$r \leq 1$	$r \geq 1$	0.464099	60.41257	69.81889	0.2229	At most 1
$r \leq 2$	$r \geq 2$	0.362538	36.08416	47.85613	0.3921	At most 2
$r \leq 3$	$r \geq 3$	0.227833	18.52397	29.79707	0.5275	At most 3
$r \leq 4$	$r \geq 4$	0.162767	8.440351	15.49471	0.4196	At most 4
$r \leq 5$	$r \geq 5$	0.038024	1.511868	3.841466	0.2189	At most 5
Max Eigenvalue test (λ_{max})						
$r = 0$	$r = 1$	0.781498	59.31751	40.07757	[0.0001]**	None *
$r = 1$	$r = 2$	0.464099	24.32841	33.87687	0.4318	At most 1
$r = 2$	$r = 3$	0.464099	17.56019	27.58434	0.4318	At most 2
$r = 3$	$r = 4$	0.227833	10.08362	21.13162	0.7368	At most 3
$r = 4$	$r = 5$	0.162767	6.928483	14.26460	0.4976	At most 4
$r = 5$	$r = 6$	0.038024	1.511868	3.841466	0.2189	At most 5

Where (**) means rejection of the null hypothesis at the 1% and r denotes the rank of the long-run matrix. It identifies the number of cointegrating vectors

The presence of one cointegration is further supported by the cointegration graphics of the test⁸. As can be observed from the visual inspection of the cointegrating graphics, among the six cointegration relations shown, the first vector corresponding to real GDP seems to be stationary compared to the others. Thus, we can conclude that there is only one cointegrating vector linking real GDP to the variables used in this study.

Hence, the existence of unique cointegrating vector implies that there is only one relevant linear combination of variables, represented by the first row of beta (β) and the first column of alpha (α) matrices that are important for further analysis. The following table reports result of alpha and beta matrices of growth equation.

Table 5.4: Standardized Beta (β') Coefficients

LRGDP	LLAB	LINVNA	L AID	LSQAID	LAP
1.0000	-3.1507	-0.25689	0.35779	-0.15231	-0.055289
0.35118	1.0000	0.015953	0.53551	-0.21221	-0.028107
-0.81122	9.4622	1.0000	-0.10897	-0.043252	-0.069549
0.49076	8.9085	-0.98553	1.0000	0.52183	0.63488
0.034538	-17.896	0.15600	0.47632	1.0000	-1.3607
1.4913	-9.4185	-0.28147	0.13790	-0.55576	1.0000

Table 5.5: Standardized Alpha (α) Coefficients

LRGDP	-0.51053	-0.064862	0.062129	0.037339	0.0031895	0.016904
LLAB	0.14353	-0.030886	0.029679	-0.011604	0.0054765	0.013010
LINVNA	-0.93683	-2.4976	-0.13948	0.090769	-0.0074565	-0.011820
L AID	0.92005	-2.3107	0.27707	-0.17715	-0.10657	0.017341
LSQAID	0.100178	-4.5367	0.73674	-0.28439	-0.20105	0.041508
LAP	0.15334	-3.2116	0.31406	-0.43313	-0.072217	-0.081997

⁸ See Appendix C for detail

Since the existence of only a unique cointegrating vector is statistically supported in the Johansen's cointegration test, only the first row of β and the first column of α in the Table 5.4 and 5.5 respectively are happen to be the relevant entries.

The standardized β eigenvector (normalization is done with respect to LRGDP) and the corresponding standardized α (feed back 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. These coefficients are given as follows.

Standardized β eigenvectors

LRGDP	LLAB	LINVNA	LAID	LSQAID	LAP
1.0000	-3.1507	-0.25689	0.35779	-0.15231	-0.055289

Standardized α eigenvectors

LRGDP	LLAB	LINVNA	LAID	LSQAID	LAP
-0.51053	0.14353	-0.93683	0.92005	0.100178	0.15334

The values of α obtained from the cointegration show the speed of adjustment of the long run parameters towards the steady state and the deviation from the equilibrium.

For instance, α coefficient of domestic investment (LINVNA) is negative indicating that its speed of adjustment towards equilibrium. That is the speed of adjustment of LINVNA adjusts itself to the long run equilibrium by 0.94 percent. However the α coefficients of LLAB, LAID, LSQAID and LAP are positive indicating that the extent to which those variables deviate from the long run steady state path after a certain shock.

To identify the variables that are endogenously determined and conditional on other variables in the VAR, the test for weak exogeneity is conducted. This requires imposing zero restriction on the relevant α coefficient (the first column of α coefficient matrix). The results, using the likelihood ratio test (the Chi-square statistics) and the associated probability value reveals that the null hypothesis of weak exogeneity is only rejected for growth of real GDP (LRGDP). The rest of the variables are found statistically to be

weakly exogenous. Table 5.6 below confirms that only the dependant variable (LRGDP) rejects the null at 1% while all the explanatory variables did not reject. Therefore, other than real GDP all the explanatory variables i.e. LLAB, LINVNA, LAID, LSQAID and LAP, are not endogenous to the system. Thus it is valid to condition on the weakly exogenous variables. This enables us to analyze a single long run equation for real GDP conditional on the variables which are not endogenously determined in the model.

Table 5.6: Test of Weak Exogeneity (Test for Zero Restriction of α Coefficients)

Variable	α Coefficient	LR test of restrictions: Chi ² (1)	P value
LRGDP	-0.51053	9.9442	[0.0016]**
LLAB	0.14353	2.8396	[0.0920]
LINVNA	-0.93683	1.8934	[0.1688]
LAID	0.92005	0.78909	[0.3744]
LSQAID	0.100178	1.3631	[0.2430]
LAP	0.15334	0.013304	[0.9802]

Once the long run relationship is defined, the next task is to formulate test of significance on the long run parameters. This test can be obtained by imposing zero restriction on long run β coefficients, which is termed as exclusion test. It helps to determine which are relevant or statistically significant in the cointegrating vector. The result of the test along with their respective probability values are reported on Table 5.7 below.

Table 5.7: Test of Zero Restriction on the Long – Run β Parameter (Significance of Long Run Coefficients) for Growth equation.

Variable	β Coefficient	LR test of restrictions: Chi ² (1)	P value
LLAB	-3.1507	17.970	[0.0000]**
LINVNA	-0.25689	18.031	[0.0000]**
L AID	0.35779	7.2395	[0.0071]**
LSQAID	-0.15231	7.6307	[0.0057]**
LAP	-0.055289	5.0734	[0.0243]*

** and * denotes rejection of the null hypothesis at 1% and 5% significance level respectively.

As explained from the table, the long – run results show that all explanatory variables are found to be significantly different from zero. That is, the result rejects the null hypothesis (β coefficients are jointly insignificant) at 1% and 5% level of significance. The result further indicates that all explanatory variables have significant effect on the growth equation. The final long run growth equation is given in Table 5.8 below.

Table 5.8: Results of the Final Long Run Growth Equation

Variable	LLAB	LINVNA	L AID	LSQAID	LAP
Coefficient	-3.1507	-0.25689	0.35779	-0.15231	-0.055289
P value	[0.0000]**	[0.0000]**	[0.0071]**	[0.0057]**	[0.0243]*

From table 5.8 above, the long run growth equation is presented thus:

$$LRGDP = 3.15LLAB + 0.26LINVNA - 0.36LAID + 0.15LSQAID + 0.06LAP$$

P_{value} [0.0000] ** [0.0000] ** [0.0071] ** [0.0057] ** [0.0243] *

-----(5.1)

** (*) means significant at 1% and 5% respectively.

System Diagnostic Tests

Vector AR 1-2 test:	F(2,25) = 2.7718 [0.0818]
Vector Normality test:	Chi ² (2) = 0.32013 [0.8521]
Vector hetero test:	F(20,6) = 0.22679 [0.9946]
RESET test:	F(1,26) = 0.029834 [0.8642]

As shown in the above equation, the long run result shows that all explanatory variables are significant in affecting growth at conventional level of significance as can be seen from p value. Moreover, the variables from the long run equation are with their expected sign.

The result of the system diagnostic test confirms the adequacy of the model⁹. That is, the null of no serial correlation, homoscedasticity and normality are not rejected at any conventional significant level. Finally, the RESET test also confirmed that there is no functional misspecification problem. Therefore the growth equation is reasonably acceptable.

The adequacy of model and stability of the parameters in the long run is tested by the plot of the recursive estimates of non-zero eigenvalues. The plots of the recursive graphics that bounds within the 95% critical values are shown in Appendix D (II). As can be seen

⁹ The full result of the diagnostic test can be seen from appendix B

from the graphs, all the vectors corresponding to each variable are stable. Thus, the null hypothesis of overall parameter consistency from the VAR cannot be rejected based on the 1-step recursive residuals (1-step residuals $\pm 2^{\text{nd}}$ SE).

In line with the standard growth theory, the regression result shows that, both labor force and domestic investment (independent of aid) variables produced significant and positive influence on growth. The result implies that (LLAB and LINVNA) variables play major role in inducing growth. Referring to the result, a one percent increment in the labor force ratio results in increasing the real GDP of a country by 3.15 percent and this result is significant at conventional level of significance. The long run elasticity of LRGDP with respect to LINVNA is 0.26, implying one percent increase in investment produces 0.26 percent increment in output. The result coincides with the findings of Abenet (2005) for the case of Ethiopia, Were (2001) for the case of Kenya and Iyoha (1999) for the case of SSA countries.

The results also suggest that the impact of foreign aid on growth appears to be perverse when entered alone; a significant negative effect is obtained whereas we would have expected a positive coefficient a priori. Furthermore, the poor performance of aid in the long run may be attributable to the form with which aid comes into the country. Donor conditionality sometimes affects the efficient allocation of the loans and thus leads to poor impacts of aid on growth. Therefore a substantial amount of aid inflows into the country over the years under consideration came in the form of loans which become liability in the long run as the debt must be serviced. Moreover, the debilitating effect of aid on growth may be due to the fungibility of aid where aid was probably used for consumption purpose rather than raising investment. This result is consistent with several studies in developing countries: Griffin and Enos (1970) and Voivodas (1973). In Ethiopia, the result is consistent with Abeba (2002) that the insignificant effect of foreign assistance on saving rate and, the positive effect on government consumption, and the 'Dutch Disease' impact are the responsible factors for the negative impacts of external assistance on the economic growth of the Ethiopian economy. Similarly, Wondossen (2003) obtained that aid (without policy interaction) resulted in insignificant negative value. This supports the argument that aid does not necessarily promote growth [see

Burnside and Dollar (1997, 2000), Dollar and Easterly (1999) among others]. Therefore, it is important to note that not only factors such as the amount and type of financial aid impact the effectiveness of available funds but also the appropriate use of these funds by the receiving country plays a vital role.

Unlike the theoretical expectation the squared aid term, that was used to detect for the presence of capacity constraint, has significant effect on economic growth. The result suggests that there is no capacity constraint in absorbing foreign aid at any level. In other words, the argument that foreign aid tends to have diminishing returns beyond some threshold level do not operate in the Ethiopian situation in the study period considered. Furthermore, the finding may point the huge capital requirement to meet the wide spread development need of the country and the importance of foreign aid flow in order to promote growth. Lensink and White (1999) find some evidence for negative returns to aid at high levels of aid inflows. However, they added that the results are sensitive to the countries considered as well as the exact specification. However, the finding may call for further research to be investigated since countries with low level of human capital and poor institutions are expected to have a capacity constraint in absorbing excessive capital from abroad.

On the other hand aid interacted with policy variable produced positive and significant result. The result supports the argument of Burnside and Dollar (1997, 2000) that macroeconomic policy is an important determinant of aid effectiveness. Ram (2004) also argued that recipient country's policies has key role in the effectiveness of foreign aid. This is, however, contrary to the empirical findings of Hansen and Tarp (2001) and Dalgaard and Hansen (2000). The result, in general highlights the role of policy in inducing growth through efficiency in resource allocation. This result is consistent with Wondossen (2003).

5.3 The Short Run Dynamic Modelling (Vector Error Correction Model)

Having obtained the long run model and estimated coefficients, the next step is to estimate Vector Error Correction Model (VECM), which captures both the long run and short run relationship.

The change in the variables represent variation in the short run, while the coefficients obtained for the error correction term represents the speed of adjustment towards the long run relationship. A VECM was estimated starting with the general over parameterized model. Then the VECM is subjected to a systematic reduction and testing process until a robust parsimonious model is obtained. In each round, all statistically insignificant regressors were dropped until further model reduction was rejected by the likelihood ratio test.

In modelling short-run dynamics, all weakly exogenous variables which are considered in the long run are entered in to the right hand side of the model by differencing once. The main reason for this is due to the fact that there will be high level of correlation between current and lagged values of a variable, which will therefore result in problems of multicollinearity¹⁰. In addition, ECT, which is derived from the long run coefficients, enters in to the model by lagging one year. The rationality for lagging a year is to show how the time path matter to correct errors. According to Hendry and Juselius (2002), economic agents taking all available information at period $t - 1$, they rationally undertake actions at period t , which helps to minimize errors.

A procedure adopted for estimating the single equation Error Correction Model (ECM) is the Hendry's approach of general to specific modelling. 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

¹⁰ Multicollinearity is a situation where there is high R^2 but imprecise parameter estimates and low t -values, even though the model may be correctly specified.

significance, economic interpretation and diagnostic validity is obtained after step- by step elimination of insignificant variables from the estimate, the parsimonious Error Correction Model (ECM) for equation is summarized in Table 5.9 below.

The existence of stationarity and cointegration permits to develop the error correction model for growth. Thus, the growth equation is formulated as:

$$\Delta LR GDP = \sum_{i=1}^k \Delta R GDP + \sum_{i=0}^k \Delta L LAB + \sum_{i=0}^k \Delta L I N V N A + \sum_{i=0}^k \Delta L A I D + \sum_{i=0}^k \Delta L S Q A I D + \sum_{i=0}^K \Delta L A P + E C T_{-1} \quad (5.2)$$

Where k represents lag length and ECT₋₁ denotes the error correction term.

Following the above specification the dynamic equation for growth function is reported as follows.

Table 5.9: Short Run Dynamics Result for Growth Equation (Dependent Variable DLRGDP)

Variable	Coefficient	Standard Error	t-value	t-prob	Part. R ²
Constant	-0.00922362	0.01226	-0.752	0.458	0.0198
DLLAB_1	0.942540	0.3396	2.78	0.010	0.2158
DLINVNA_1	0.0962246	0.04488	2.14	0.041	0.1410
DLAID	-0.436843	0.1897	-2.30	0.029	0.1592
DLAID_1	-0.766443	0.2390	-3.21	0.003	0.2686
DLAID_2	0.510404	0.2163	2.36	0.025	0.1659
DLSQAID	0.259180	0.09024	2.87	0.008	0.2276
DLSQAID_1	0.402298	0.1206	3.34	0.002	0.2845
DLSQAID_2	0.228709	0.1065	-2.15	0.041	0.1414
DLAP	-0.0723287	0.03401	-2.13	0.042	0.1391
ECT_1	-0.651132	0.2221	-2.93	0.007	0.2349
R ² = 0.709065 F(10,28) = 6.824 [0.000]** DW =1.87					
Diagnostic Tests					
AR 1-2 test:		F(2,26) = 1.0755 [0.3558]			
ARCH 1-1 test:		F(1,26) = 0.016111 [0.9000]			
Normality test:		Chi ² (2) = 4.1056 [0.1284]			
Hetero test:		F(20,7) = 0.31627 [0.9797]			
RESET test:		F(1,27) = 2.8142 [0.1050]			

The estimated results are reported as follows:

Table 5.9 reports that the estimated coefficients are significant with the theoretical expected sign. The overall fit of the model is acceptable¹¹. Goodness of fit of the model (R²) shows, 70.9 percent of a variation in the dependent variable (DRGDP) is explained by the combined effects of all the determinants of real GDP in the short-run i.e., by the variation in the explanatory variables included in the model. The F statistics rejects the

¹¹ The stability of the model can also be seen from the plot of recursive graphs (see Appendix D(III))

null hypothesis that all the coefficients in the model are jointly insignificant. The Durbin Watson (DW) test also results suggests that there is no autocorrelation problem. Moreover, the various diagnostic tests performed do not detect any problem about the regression analysis. That is, the test does not reject the null of white noise error terms suggesting no problem of error autocorrelation. In addition, the test for autoregressive conditional heteroscedasticity (ARCH) points that no ARCH structure in the error term is detected. Failure to reject the null of no ARCH indicates the existence of constant variance. The Jacque Bera test for normality cannot reject the null hypothesis of normality. It points out that the error term is normally distributed. Finally, the Ramsey test for functional form misspecification accepts the regression specification of the dynamic model.

The result shows that the short run changes in real GDP growth is affected positively and significantly by the one period lagged labor force and investment. A current and one period lagged aid affects the change in the real GDP growth negatively and significantly. But, contrary to the long run relationship, a two period lagged change in aid affects the change in real GDP positively and significantly. Further aid interacted with policy appear to have negative impact on real GDP presumably because aid financed projects usually have long gestation period whose growth impact might not be seen in the short run even with good policy environment.

The lagged error correction term (ECT₋₁) included in the model to capture the long run dynamics between the cointegrating series is correctly signed (negative). This coefficient indicates a speed of adjustment 65.11 percent from actual growth in the previous year to equilibrium rate of economic growth. This implies that in one year the real gross domestic product adjusts itself to the equilibrium by 65.11% and the complete adjustment will take about one and half years.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS

The chapter presents summary of conclusion, policy implication and further research where the study intended to examine the impact of foreign aid on economic growth of Ethiopia. The first part goes through a brief summary of conclusion of the study. The second one points out a sort of policy implications forwarded based on the conclusion of the study. Finally some issue of further research is stated.

6.1 Conclusion

Most developing countries, like Ethiopia, are characterized by low level of domestic saving and hence shortage of capital to undertake development programs. This in turn necessitates the country to rely on external finance from developed countries, which is something one cannot afford to ignore. However, there has been a great debate on the contribution of this foreign assistance to the economic growth. As a result, the core objective of this study is to look at the impact of foreign aid on economic growth of Ethiopia using annual time series data from 1969/70 to 2010/11.

In this study, based standard neoclassical growth model, the equations for growth have been specified. The standard *APF* model has been used in econometric studies to estimate the impacts of foreign aid on growth which assumes that along with “conventional inputs” of labour and capital used in the neoclassical production function, “unconventional inputs” like foreign aid is included in the model to capture their contribution to economic growth. The estimation is made by using the Johanson maximum likelihood estimation method. Multivariate cointegration technique is used for the analysis of the long run relation whereas VECM analysis is used to assess the short run relationships and its linkage with the long run equilibrium path. However, before looking to their cointegration relationship, each variables were tested for their time series property using ADF and PP test of stationary and all variables are identified that they are

cointegrated of order one, $I(1)$. The test for the number of cointegrating vectors; λ_{trace} and λ_{max} test statistics were employed and the result shows that the null hypothesis of zero cointegrating vectors is rejected in favour of one cointegration relationship.

In accordance with the objective of the study aid growth relationship was tested. The result showed that all explanatory variables are not with expected sign. Labor force and investment independent of aid have a positive contribution on the real GDP both in the short and long run which confirms that the two variables are the core determinants of economic growth of Ethiopia. On the other hand, aid squared variable has significant and positive impact on growth showing absence of absorptive capacity constraint of the economy. The long run estimated equation of economic growth reveals that aid entered alone has significant and negative impact on growth both in the short and long run. However when aid is interacted with policy it has a positive and significant impact on growth in the long run showing that good macroeconomic environment favors the effectiveness of foreign aid in supporting the growth performance of the country and its negative impact in the short run indicate that most of foreign aid have been used to finance investment projects that have long gestation periods.

6.2 Policy Implications

In the context of recommendations based on the empirical conclusions the following plausible policy implications are drawn by the researcher:

It has been seen that labor force and domestic investment contributes positively to economic growth in the long run and short run .This shows that these variables remain as the key factor that can foster economic growth in Ethiopia. Thus, the country should built up some strategy around labor force and domestic saving leading to domestic investment and much better focus on these internal factors than external factors to boost its economic growth.

The Ethiopian economy is characterized by the prevailing resource gaps¹². Therefore, foreign aid can be used to finance these gaps and enhance economic growth if it is supplemented by good monetary, fiscal and trade policies. Empirical evidence obtained in this study is an indication that aid flows to Ethiopia will be effective conditional on the stable macroeconomic environment. The government of the country should therefore better pursue economic policies that at least reveal low inflation rate, productive budgetary balance and good trade policies.

The overall result shows that the government is required to set a sound macroeconomic policy environment which stimulates domestic saving that is adequate enough to finance investment and close the saving investment gap in the long run and reliance on future aid and borrowing should be diminished and a country's growth must be sustained without aid.

6.3 Further Research

It is obvious that Ethiopia's ability to raise investment remains heavily reliant on the stability of foreign capital inflows and adequate reforms in the state institutions. However, the analysis carried out in this study did not elaborate on ways to strengthen state institutional capability to ensure that the country could achieve sustainable economic growth. Particularly, issues of maintaining the external viability are often related to adopting a prudent macroeconomic policy, attracting foreign aid and foreign direct investment and access to international trade. These are some very complex issues still to be evaluated. How to advance the capacity and capability of the state and institutions to improve the macroeconomic environment deserves further study.

Although the main contribution of this study is to analyze the potential effects of foreign aid on economic growth in Ethiopia, the channel through which aid affects economic growth is beyond the scope of this paper and further empirical analysis is required to establish the transmission mechanism of aid effect on growth. Further, the aid-

¹² The detail derivation of two gap model for Ethiopia can be seen from Appendix F

growth model developed in this study is in the aggregate form. It would be more interesting if the impact of aid on economic growth can be disaggregated in at least three major sectors: (i) the agricultural sector, (ii) the industrial sector and (iii) the services sector. By doing this, the channels through which aid may affect economic growth could be highlighted.

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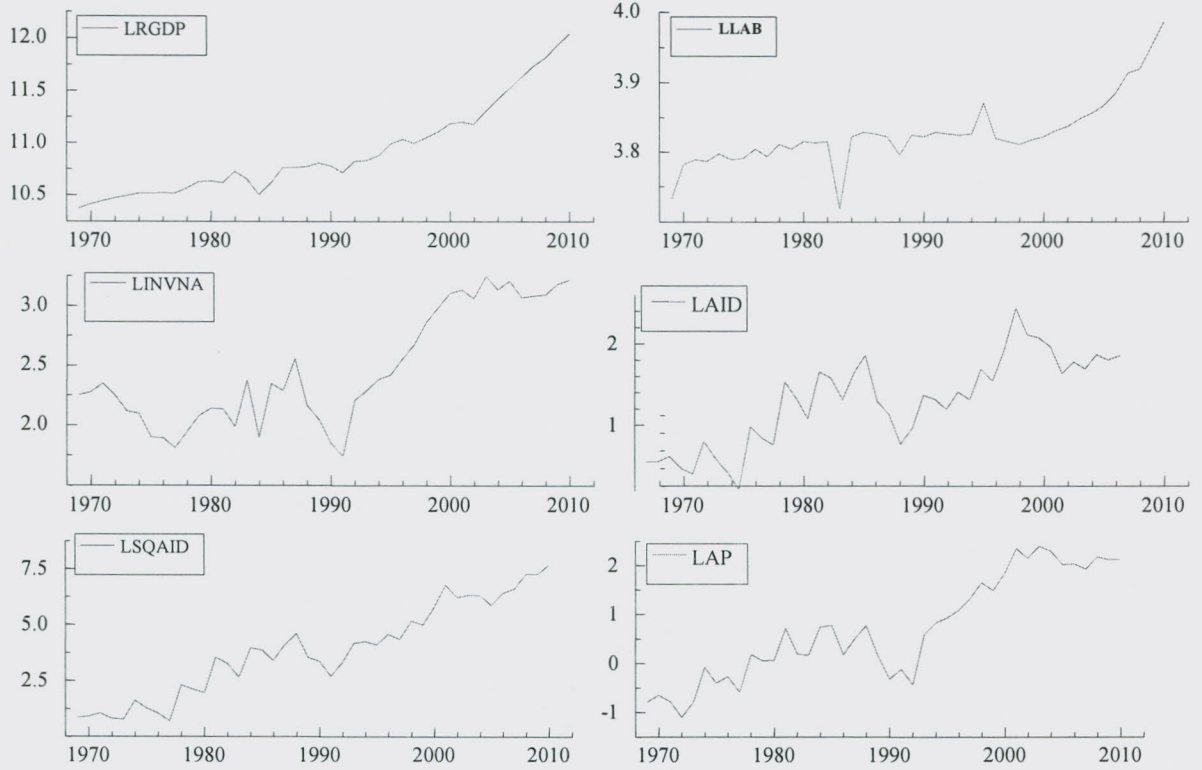
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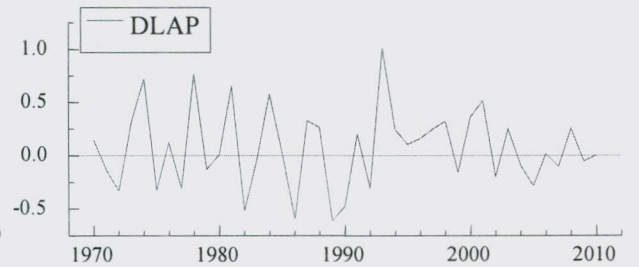
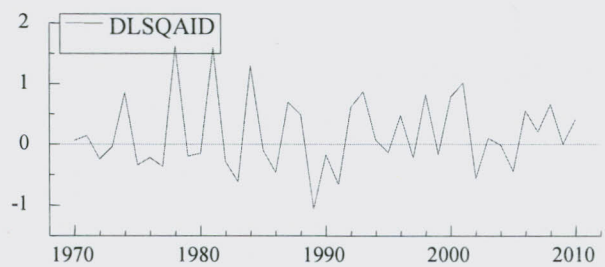
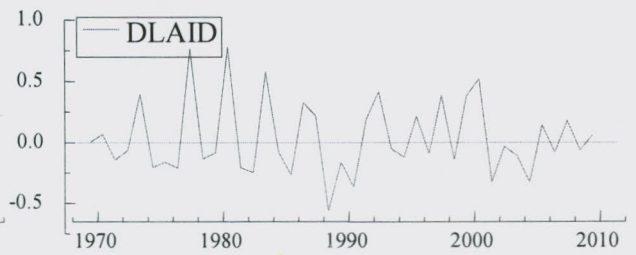
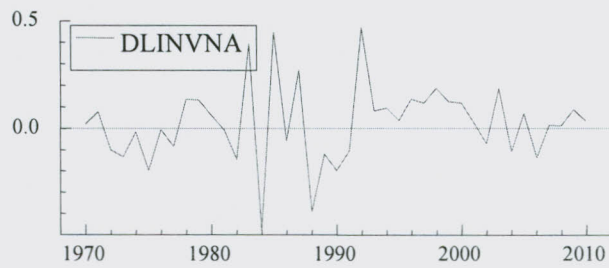
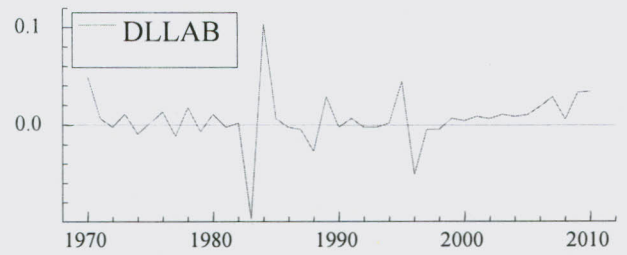
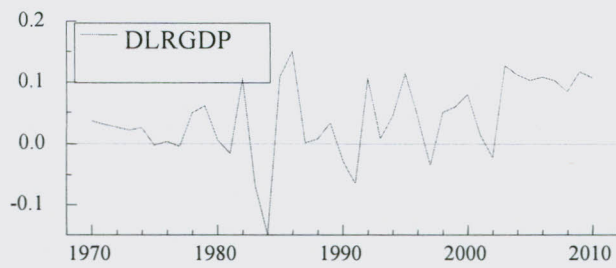
APPENDICES

Appendix A: Plot of Variables Used in the Study

I. Graph of All Variables at Level



II. Graph of All Variables at Their First Difference



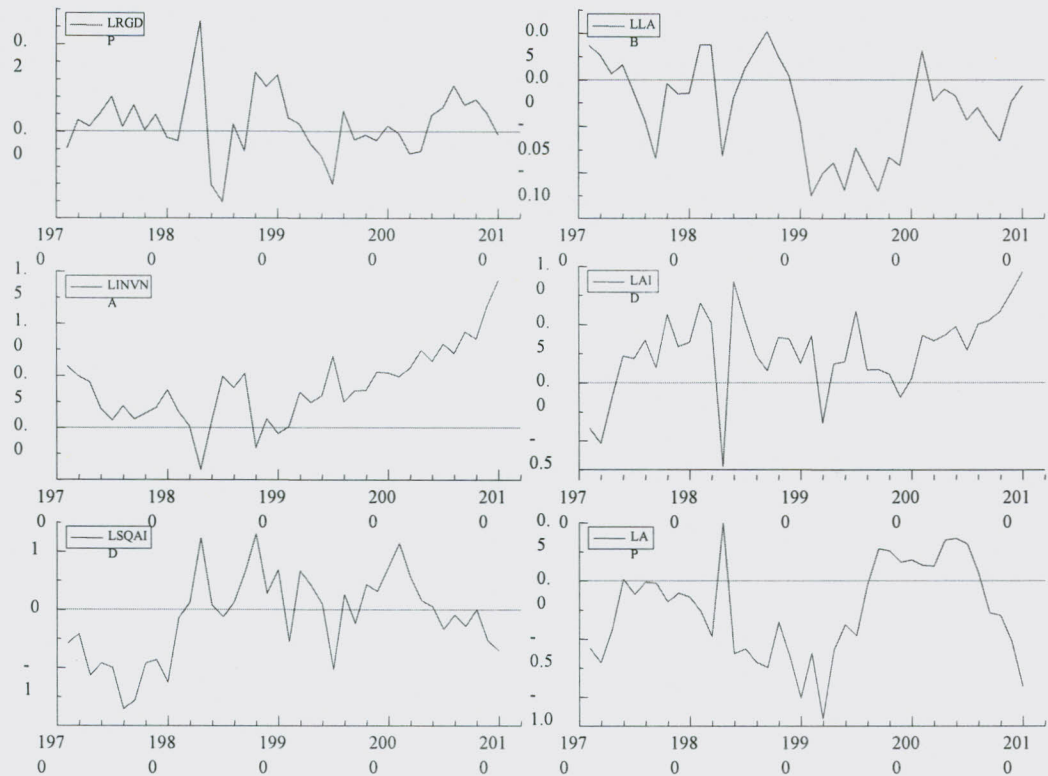
Appendix B: Diagnostic Tests for Growth Equation

LRGDP	: AR 1-2 test:	$F(2,25) = 2.4448 [0.1072]$
LLAB	: AR 1-2 test:	$F(2,25) = 1.8136 [0.1839]$
LINVNA	: AR 1-2 test:	$F(2,25) = 1.3850 [0.2689]$
LAIID	: AR 1-2 test:	$F(2,25) = 1.9461 [0.1639]$
LSQAID	: AR 1-2 test:	$F(2,25) = 1.8134 [0.1839]$
LAP	: AR 1-2 test:	$F(2,25) = 0.72092 [0.4961]$
LRGDP	: Normality test:	$\text{Chi}^2(2) = 1.3709 [0.5039]$
LLAB	: Normality test:	$\text{Chi}^2(2) = 11.191 [0.0037]**$
LINVNA	: Normality test:	$\text{Chi}^2(2) = 3.9481 [0.1389]$
LAIID	: Normality test:	$\text{Chi}^2(2) = 3.9729 [0.1372]$
LSQAID	: Normality test:	$\text{Chi}^2(2) = 3.4498 [0.1782]$
LAP	: Normality test:	$\text{Chi}^2(2) = 0.57003 [0.7520]$
LRGDP	: ARCH 1-1 test:	$F(1,25) = 0.083256 [0.7753]$
LLAB	: ARCH 1-1 test:	$F(1,25) = 0.087950 [0.7692]$
LINVNA	: ARCH 1-1 test:	$F(1,25) = 0.13446 [0.7169]$
LAIID	: ARCH 1-1 test:	$F(1,25) = 0.031256 [0.8611]$
LSQAID	: ARCH 1-1 test:	$F(1,25) = 0.0023839 [0.9614]$
LAP	: ARCH 1-1 test:	$F(1,25) = 0.54810 [0.4660]$
LRGDP	: hetero test:	$F(24,2) = 0.12759 [0.9976]$
LLAB	: hetero test:	$F(24,2) = 0.061518 [1.0000]$
LINVNA	: hetero test:	$F(24,2) = 0.21895 [0.9791]$
LAIID	: hetero test:	$F(24,2) = 0.11822 [0.9983]$
LSQAID	: hetero test:	$F(24,2) = 0.12498 [0.9978]$
LAP	: hetero test:	$F(24,2) = 0.073298 [0.9999]$

MULTIVARIATE DIAGNOSTIC TESTS

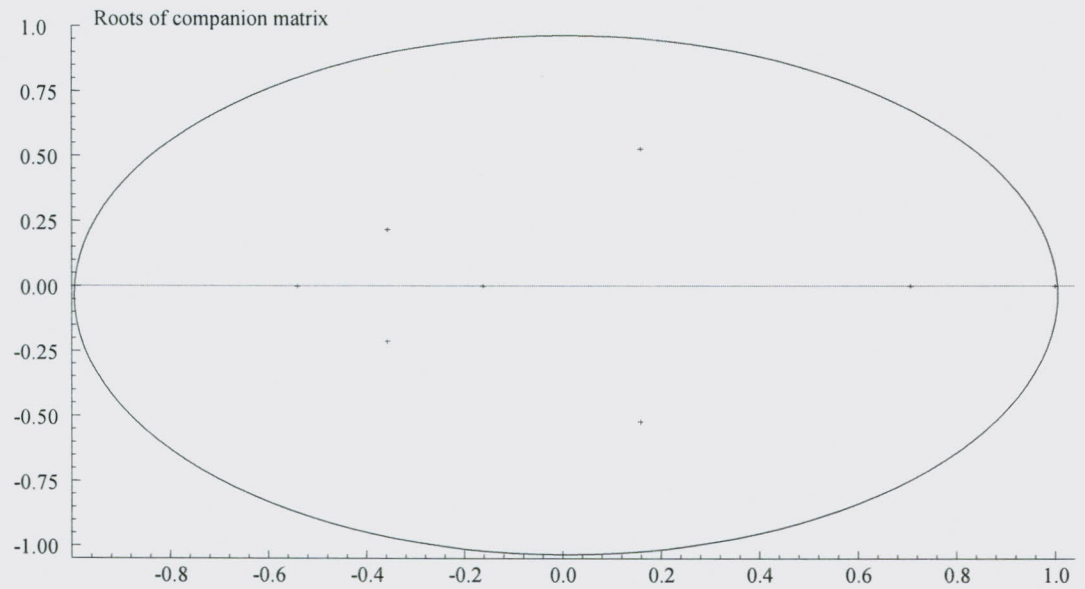
Vector AR 1-2 test:	$F(72,60) = 1.4898 [0.0566]$
Vector Normality test:	$\text{Chi}^2(12) = 16.876 [0.1543]$
Vector hetero test:	$\text{Chi}^2(504) = 501.56 [0.5223]$

Appendix C: Cointegration Graphics

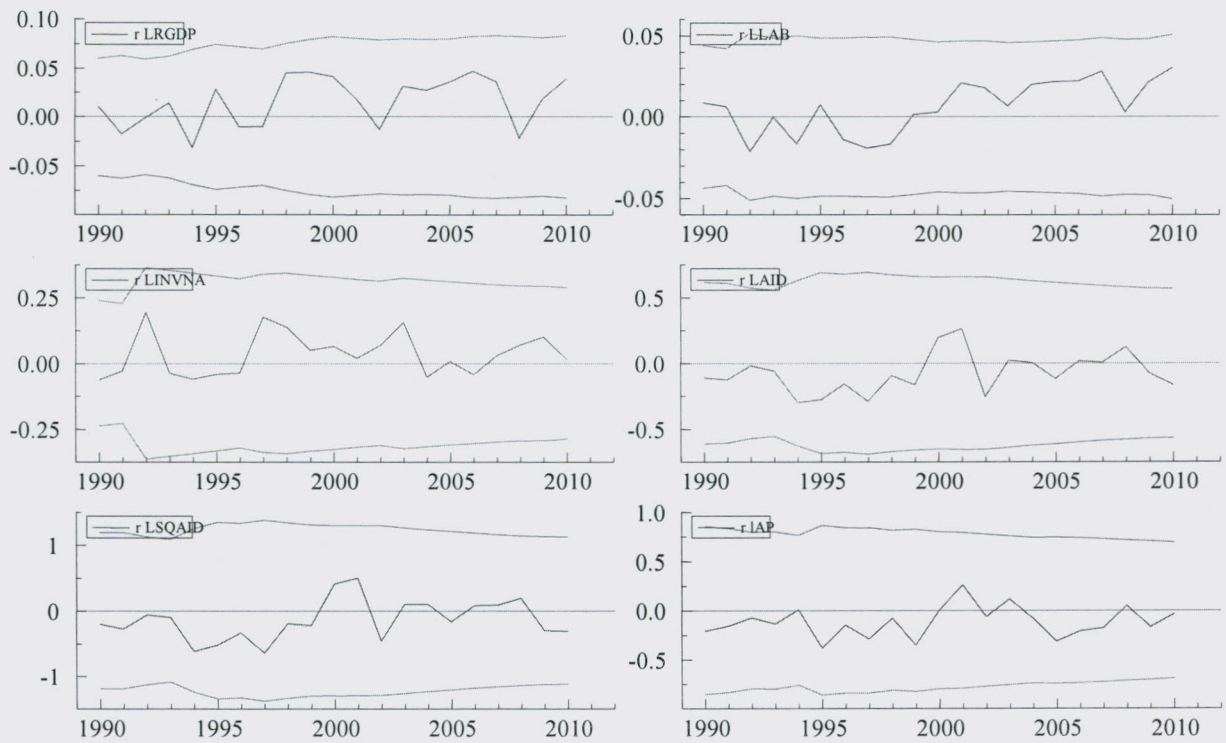


Appendix D: Stability Tests

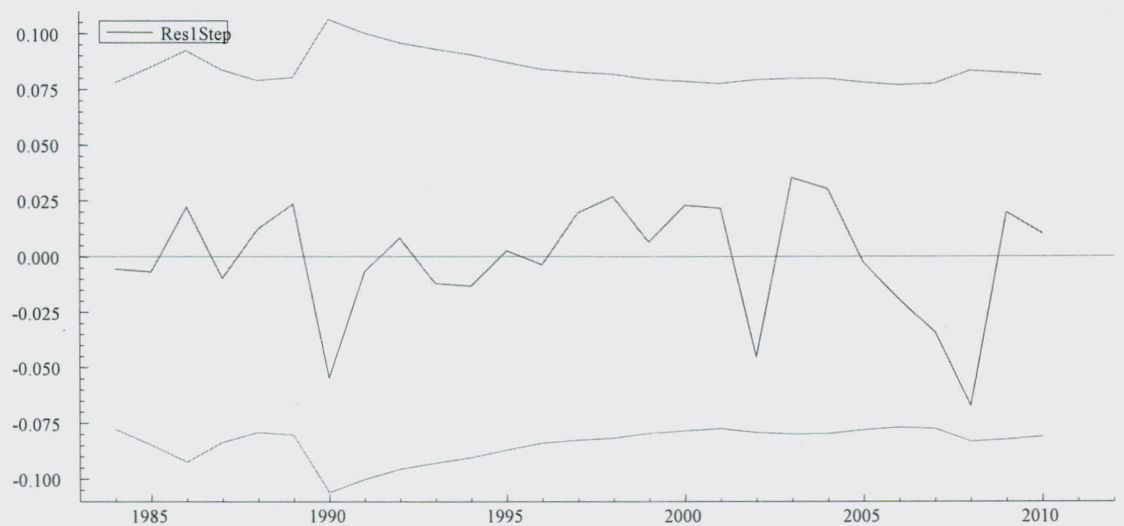
I. VAR Stability Test



II. Long run model stability (1-step residuals $\pm 2^{\text{nd}}$ SE)
(Plot of recursive graphs)



III. Short run model stability (1-step residuals $\pm 2^{\text{nd}}$ SE)
(Plot of recursive graph)



Appendix E: Derivation of Policy Variable

To construct the policy index, the first step is developing growth equation where budget deficit, openness to trade and monetary policy (Approximated by inflation of the country) are the explanatory variables. The result obtained from the growth regression reported below.

$$LRGDP_t = 10.23 - 0.0156BD_t + 0.063INF_t + 0.0296OPEN_t$$

By taking the coefficients of the policy variables, the policy index corresponding to each period is constructed as follows.

$$Pt = -0.0156BD_t + 0.063INF_t + 0.0296OPEN_t$$

Appendix F: Derivation of two gap model for Ethiopia

To derive a two gap model for Ethiopia, a simple growth model specified along the Harrod-Domar line is estimated using the Ethiopian data. The Harrod-Domar equation is given by

$$g = \left(\frac{1}{k}\right) \frac{I}{Y} = \frac{\Delta Y}{Y} = \left(\frac{1}{k}\right) \frac{\Delta K}{Y} \text{----- (1)}$$

Where: g is growth rate, k is incremental capital output ratio (ICOR) and I/Y is the investment (I) GDP (Y) ratio. Based on the projection of I/Y it is straight forward to project GDP.

According to the two gap model, capital is the key constraint to growth. In the context of such discussion equation (1) may be written into:

$$Y_{t+1} - Y_t = \frac{1}{k} I_t \text{----- (2)}$$

Since,

$$Y_{t+1} = (1 + g)Y_t \text{----- (3)}$$

Then,

$$Y_{t+1} - Y_t = gY_t \text{-----} (4)$$

If the target rate of growth is specified as 'g', then it will be straight forward to estimate the desired level of investment (I*) required. This is given by

$$I^*_t = gkY_t \text{-----} (5)$$

The desired level of saving (S*) and imports (M*) are given by the following equations,

$$S^*_t = \alpha_0 + \alpha_1 Y_t \text{-----} (6)$$

$$M^*_t = \beta_0 + \beta_1 Y_t \text{-----} (7)$$

The level of exports are also given by,

$$X_t = (1 + \varepsilon)X_{t-1} \text{-----} (8)$$

Where: ε is an exogenously given value of export growth rate.

Based on equation (5) to (8) it is possible to compute the ex ante saving ($I^* - S^*$) and trade ($M^* - X^*$) gaps.

In this version 'of the two gap' model the desired level of investment (and hence the target growth rate) is always met. This requires, however, that external finance (aid, A) need to bridge the larger of the two gaps,

$$A = \max \{I^* - S^*, M^* - X^*\} \text{-----} (9)$$

It is also easy to compute the ex post level of the two gaps by computing saving and imports as,

$$S_t = I_t - A_t \text{-----} (10)$$

$$M_t = X_t + A_t \text{-----} (11)$$

Declaration

I, the undersigned, declare that this Msc. thesis is my original work, has not been presented for a degree in this or any other University and that all sources of materials used for the thesis have been fully acknowledged.

Student Name Kitessa Delessa
Signature [Signature]
Name of the Institution Jimma University
Date of submission 31/07/2012

This thesis has been submitted for examination with my approval as a University advisor

Name and signature of the first advisor

Alamirach Kelach [Signature]

Name and signature of the second advisor

Hassen Abda [Signature]



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