
# Foreign Aid and Economic Growth in Ethiopia

# (A cointegration analysis)

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**LIST OF ABRIVATIONS**

ADF-Augmented Dickey Fuller test

AIC- Akaike information criteria

CSA- Central statistics Authority

DAC - Development assistance committee

ECM - Error Correction Model

FA- Foreign Aid

FDI- Foreign Direct Investment

GDF- Global Development Finance

GDI- Global Development Indicators

LDCs - Less developed countries

ICOR -Incremental Capital Output Ratio

IFIs- International Financial Institutions

IMF – International monetary fund

MoFED- Ministry of finance and economic development

NBE- National Bank of Ethiopia

ODA- Official development assistance

OECD-Organization for Economic Cooperation and Development

SB- Schwartz-Bayesian criteria

VAR - Vector Autoregressive

WB - World Bank

# ABSTRACT

Most studies about the relationship of foreign aid and economic growth are usually cross country studies which often found inconclusive or mixed results. On the other hand, there is very little in the empirical literature which looks on a single country time series data and mostly on focused Sub-Saharan Africa. This paper deviates from the mainstream empirical literature by investigating the aid-growth relationship on Ethiopia. Using a growth equation inspired from an outward-oriented neoclassical production function and cointegration methodology this paper finds the existence of a long term relationship between foreign aid and economic growth for Ethiopia. This paper found that foreign aid has a negative effect on economic growth in the short run and becomes positive in the long run. Using Granger Causality technique this study also found that there is Evidence to support the presence of unidirectional causality of foreign aid to economic growth for Ethiopia.

# Chapter 1.Introduction

## 1.1 Background

The tradition of giving foreign aid to developing or aid-needing country began after World War II. Initially aid was given to the war-devastated countries to rebuild the economies. Then in the early 1950s, the United States and the Soviet Union began distributing aid to strengthen the military capability of their allies and spread their political ideologies. Since the end of the Cold War, in 1989, most aid has been targeted to promote economic growth and improve public well-being in the developing and underdeveloped countries (Foreign Aid, 2008).More aid is now channeled through international financial institutions (IFIs) such as IMF,World Bank,and OECD. Today, an important objective of aid is to promote the economic development and welfare of recipient countries; it is usually measured by its impact on economic growth. In recent years, economists and policy makers have debated whether aid has any positive effect on economic growth. The late Milton Friedman and development economist like Peter Bauer, for example have argued that aid does not a have positive impact on economic growth, and in some cases it might even ruin the countries that aid is given to. According to Bauer, "Development aid is ... not necessary to rescue poor societies from a vicious circle of poverty. Indeed it is far more likely to keep them in that state. It promotes dependence on others. It encourages the idea that emergence from poverty depends on external donations rather than on people's own efforts, motivation, arrangements and institutions" (Bauer, 1976).

In Ethiopia foreign aid has been started around 1950s, during the imperial era, 60-70 percent public sector investment programmes commend themselves to aid givers.(Imperial Ethiopian Government,1968) ,i.e., major part of the public sector investment program was covered by the

capital inflow in the form of aid. During the period (1952-1974) Ethiopia obtained 1,021.60 million Birr grant and 626 million Birr foreign loan, totally 1,647.60 million capital inflows in the form of aid.

During post 1974, Dreg formulated a Ten Year Perspective Economic plan (1985-1994) with an unrealistic expectation of receiving foreign aid to finance more than half of planned investment (World Bank 1987). During the period (1975-1991) the country obtained Birr 5,526.87 million grants and Birr 5,658.30 million foreign loans.

In post 1991 period there exists significant increase in grants and loans, mainly due to the economic policy of EPRDF, significant amount of loans and grants is obtained for stabilization, rehabilitation, reform and sector development programs, and a number of donors have joined the support program. In addition to grants and loans foreign resources in the form of Foreign Direct Investment (FDI) was welcoming to raise the aggregate investment and hence growth.

The main objective of the donors in providing aid is to fill the saving-investment gap, the foreign exchange gap and the fiscal gap and thus help the country to achieve economic growth and poverty reduction. It is donors expectation that if foreign aid (FA) is used properly ,it can increase the savings and reduce foreign exchange constraints and thus increase investment and economic growth .In addition the availability of foreign exchange will increase the importation capital goods necessary for investment .foreign aid also supports the budget thus filling the fiscal gap and increases the capacity of the government to meet its development and recurrent expenditure ,although donors interest is to support development expenditures.

According to Jifar (2002) in the early days, development assistance was seen as a positive Agent for change and development. Because, the capital market in many developing countries are thought to be almost nonexistent and incapable of assisting the growth process. Immediately

after independence there was new optimism about the effect of aid on the recipient country. Gradually this optimism of aid financed government led projects were questioned and evidenced by the decline of centrally planned economies in the late 1980s.

Generally, in all three regimes, Ethiopia has been receiving substantial amount of foreign aid in order to fill resource-gaps so as to achieve desired economic objectives.

## 1.2 Statement of the problem

Ethiopia has been receiving foreign aid (FA) for many decades since the early 1950s, but it still ranks among the top poorest countries of the world. The record of Ethiopia is even far lower than the average Sub Saharan Africa (SSA) countries that are also termed as poor by the world standard. For instance, the period 2012, GNP per capita of Ethiopia is $410 substantially lower than the regional average (World Bank, 2013). Similarly, the performance of Ethiopia in improving domestic saving and investment is behind the average SSA.

Growth theories suggest that economic growth emanates from expansion in investment (capital formation activity) whose various financing components are domestic saving and foreign sources (notably aid and foreign capital inflows). However, the performance of Ethiopia in improving the level of investment through domestic sources and private capital inflow is far from adequate. This made the importance of foreign aid indisputable to the well-being of the economy. Similar scenario also holds for most of Africa countries. But, a number of empirical studies argue that the role of aid in promoting the development potential of Africa remained unsuccessful. For instance, between 1970 to 1997, the real per capital GDP of Sub Sahara Africa has been 0.6%, despite huge flow of aid to the region (Gomane, Girma and Morrisey, 2001). Such results, however, cannot imply that aid does not work at all. Hansen and Tarp (2000) underlined that

there is no theoretical and empirical support to conclude against the possibility of aid in supporting growth.

The traditional analysis on aid effectiveness focuses on the growth impact of aid through its influence on investment. This relationship was primarily initiated by Harrod-Domar theory. The model assumes the presence of positive relationship between aid and investment, and between investment and growth. As Dollar and Easterly (1999) argued, this type of considerations do not necessarily hold. This is because the growth impact of aid is very much complex that requires assessing its effect in a wider macroeconomic setting. For instance, inflow of aid may free up domestic resources intended for investment to be allocated into less productive ventures. Moreover, inflow of foreign aid beyond the absorptive capacity of the economy has the potential to induce undesirable influence through increasing inflation rate (Nyoni, 1997)

According to Ababa (2002) lack of capital is one of the main problem for the sluggish growth of the country's economy. Perhaps capital is believed to be the major scarce factor in developing countries in general and in Ethiopia in particular. Thus, capital formation in those economies is important to increase production and productivity. Basically, capital formation is determined by the saving rate but developing economies have faced by low level of income and hence low level of saving rate. Therefore, this low level of saving rate and the required rise in capital stock (or investment) create a resource gap. To fill this gap, least developed countries have looked for resource inflows or foreign assistance.

External financial assistance (foreign aid) is believed to be the way to the growth for such developing countries. According to Bacha (1990), one of the way to finance such resource gaps in the developing countries in general and in Ethiopia is through external financial assistance

(foreign aid). However there is high debate on foreign aid and that its impact on the growth of the coutry.

As most of the aid-growth study is dominated by cross country regression analysis, country specific studies are relatively few in number and studies on the area are also not the exception in Ethiopia. A study by Wondwesen (2003) on the impact of foreign aid on growth on annual data covering the period 1962/63 to 2000/01 found that aid has significant contribution to investment both in the short run and long run. Aid is found to be ineffective in enhancing growth. However, when aid is interacted with policy, the growth impact of aid appeared significant. His finding is in line with the argument of Burnside and Dollar (1997) i.e. aid effectiveness is conditional on good policy environment. The result cast doubt since the country is known for its weak macroeconomic policy environment.

Some of the questions need explanation on the link between foreign aid and economic growth, in Ethiopia are:-

• Does Ethiopia use foreign aid to avoid the bottlenecks of economic growth?

• Do foreign aid positively affect economic growth in Ethiopia?

• Is there a causal relationship between foreign aid economic growths in Ethiopia?

Such and similar questions are not as easy as to pose them to provide answers. Generally, this paper tries to explain whether foreign aid has a positive and significant impact on economic growth, in Ethiopia i.e., whether it has significantly helped the country in financing the saving-investment gap, raising the aggregate investment and accelerating economic growth.

## 1.3 Objectives of the Study

In a broad stroke this paper examines the links between foreign aid and economic growth in Ethiopia. Specifically this paper will:

a. Describe the trends in foreign aid (as represented by ODA) flows to Ethiopia

b. Investigate whether there exists long-run relationship between foreign aid and economic growth in Ethiopia; and

C. Examine whether there is causality between foreign aid and economic growth Ethiopi

## 1.4 Significance of the Study

Previous studies have tried to assess the effectiveness of foreign aid at the micro and macro level. One branch of the literature attempts to measure the contribution of foreign aid to the growth of developing countries. The micro results are clear and encouraging: foreign aid is beneficial to economic growth. However, the macro results are inconclusive: the impact of foreign aid on growth may be positive, negative, or even non-existent, in statistical terms. On the other hand literatures about foreign aid and how it affects growth usually focuses on a single country or a cross country study. In both cases findings are usually mixed.

This paper seeks to do a macro-level analysis on the impact of foreign aid on economic growth for Ethiopia. There have been few literatures that analyzed the link between economic growth and foreign aid using single time series data for these countries. In addition, there is virtually none in the empirical literature that used cointegration analysis to investigate the effects of foreign aid on economic growth for this country. As such, the contribution of this paper is to fill these gaps in the literature. Moreover what makes this paper different from the others is that it uses more recent data and captures the behavior of the data.

## 1.5 Data and methodology

For the purpose of investigate the relationship between foreign aid and the economic growth secondary data source, from 1960 to 2013, is used. The major data sources for the problem under investigation are publications of National Bank of Ethiopia (NBE), Ministry of Finance and Economic Development (MoFED) and Central statistics Authority (CSA) of Ethiopia. Besides, World Bank's Global Development Finance (GDF) and Global Development Indicators (GDI) databases were used. In this study four models have specified and estimated by using Vector Autoregressive (VAR) model. This paper also uses the cointegration test as an econometric method to assess whether or not there is a long term relationship between foreign aid and economic growth. This paper also sought to investigate the causality relationship between foreign aid (as represented by ODA) and economic growth.Furthermore,the study has used exploratory data analysis using statistical tables and graphs on explanatory variables.

## 1.6 Hypothesis of the study

Based on empirical literature on the relationship between aid and economic growth in Developing countries, the writer propose the following relationships to hold true in the analysis.

a) There is a negative and insignificant impact of foreign aid on Growth the long run;

b) There is positive and significant contribution of Foreign aid on the economic growth of the nations in the short run; and

c) There exists a causal relationship between foreign aid and economic growth for Ethiopia

## 1.7 Scope and Limitations

This paper looks at the effect of Official Development Assistance (ODA) to economic growth in Ethiopia. As used in this study and following the definition of the Development Assistance Committee (DAC), ODA is the total aid from bilateral or multilateral sources flowing to a

particular country. Because of limited availability of data to cover all time periods this study looked at time series data for Ethiopia starting from 1960 up to 2013.

One of the limitations of this paper is that it excluded the effect of investments in the growth equation. In earlier studies by Papanek (1973), Burnside and Dollar (2000), and Yohannes(2011) and wondwossen (2003), investments were included in explaining the economic growth for countries in their study. The motivation behind including investments is that it is part of capital when output is decomposed in a standard neoclassical production function. This paper also failed to include this because of limited availability for data for Foreign Direct Investments (FDIs) across all periods.

## 1.8 **Organization of the Paper**

The paper is structured as follows. The following section (section two) summarizes in brief Theoretical and empirical literature reviews are presented. Section three presents the research methodology used to investigate the relationship of foreign aid and economic growth. Section four present the results of the VAR estimation and associated tests to determine the impact of foreign aid on economic growth to Ethiopia. Finally section five concludes and provides policy recommendations.

# Chapter 2

# THEORETICAL AND EMPIRICAL STUDIES ON FOREIGN AID AND ECONOMIC GROWTH

## 2.1 Introduction

This chapter starts by defining aid and presents a review of the literature on aid and economic growth where by some of the theoretical and empirical debates are presented and discussed. Some studies show a negative impact of FA on economic growth while others observe a positive impact. For example Chenery and Strout (1966) support FA with the view that it is important to fill the saving gap and the trade gap in developing countries, increasing their investment capacity and thus growth. On the other hand Paul Mosley (1987) observed that there was a little correlation between aid flows and economic growth rates.

Moreover, major theoretical and empirical models justifying the importance of FA are presented and discussed. Among these models are the Harrod-Domar model, and the neo classical(solow) growth model. The standard neoclassical model is analyzed in detail as it will specifically be used for data analysis in chapter four of this study. In addition, I provide a review of the findings of the major time series studies including the recent dimension into the relationship between aid and growth.

## 2.2 Definition of Foreign Aid

Foreign aid takes many forms. The most important in terms of its size and influence is official aid. The definition of official development assistance (ODA) is provided by the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD). ODA is calculated as the sum of grants and loans to aid recipients that: (a) are undertaken by the official sector of the donor country; (b) have as the main objective the promotion of economic development

and welfare in recipient countries; and (c) are on concessional[1] financial terms (i.e., with a grant element equal to at least 25 per cent of the total). In addition to these financial flows, technical co-operation costs are included in ODA; but grants, loans and credits for military purposes are excluded[2]. Transfer payments to private individuals, donations from the public, commercial loans and foreign direct investment (FDI) are not counted. Moreover, while it is common to treat ODA and foreign aid as the same thing, this is misleading. Assistance funded by non-governmental organizations (NGOs), which are foreign aid but not ODA, has grown very significantly in the last 25 years and now equals about one-third of official assistance.

The above definition indicates that foreign aid is not always a free resource transfer and often arrives with economic and political conditions. In many cases, official donors require that recipient countries pursue reforms or policies that the donors feel should promote economic growth or development, and aid may also be tied which reduces its effectiveness. With respect to the multilateral development finance institutions, such as the IMF and World Bank, these requirements are often known as stabilization and structural adjustment conditions. However, as discussed below, these conditions have been the source of much controversy. Some scholars have argued that the very policy reforms suggested by these institutions have been counterproductive and caused economic and social decline rather than growth.

[1] Concessionality is measured by the grant element of the aid, where this is the grant equivalent of the aid expressed as a percentage of its face value. Grant equivalent is the face value of the aid minus the present value of repayment. DAC define as concessional any aid having a grant element of over 25%, using a 10% discount rate.

[2] Foreign aid in the Ethiopia context , unless otherwise specified, follows the DAC definitions

## 2.3 Theories of Foreign Aid and Economic Growth

There are various factors which determine economic growth of a country. They include the quality of labor force, resources (natural and financial), capital, technology and the institutional setting of economic activities. Early economic growth theories in the 1950s and 1960s stressed that the basic problem for many developing countries was precisely capital formation in achieving economic growth. Thus these theories were in the view that development assistance was important for these countries to fill the finance gap and technology gap. More popularly, these gaps were known as saving gap and the trade gap. The sub-sections that follow are looking at some of the theories explained in the literature.

### 2.3.1 Harrod-Domar Model

The Harrod-Domar model, points out that output depends on the investment rate and the productivity of that investment. In an open economy, investment is financed by savings which is a sum of domestic and foreign savings. This model explains economic growth in terms of a savings ratio and Capital-output coefficient. The model (as cited in Easterly W, 2003: 31) is expressed as follows,

$g = (I/Y) /\mu$ …….. (2.1) and

$I/Y= A/Y + S/Y$ ……. (2.2)

where I is required investments, Y is output; g is target GDP growth, A is aid, S is domestic saving and $\mu$ the incremental capital-output ratio (ICOR).

The ICOR gives how many units of additional capital are required to yield a unit of additional output, thus the ICOR is the ratio of investment ratio to the growth rate. The incremental capital-output ratio (ICOR) is thought to range between 2 and 5(ibid). A high ICOR is often taken as a

measure of poor quality of investment. Using the idea of ICOR, the Harrod-Domar model was the base for the first national development plans in Less Developed Countries (LDC) (de Silver, 1984). This made possible to estimate the capital investments and aid needs for a given target rate of growth as it provided the simple framework used for quantitave planning techniques.

However, the stable linear relationship between investment and growth over the short to medium term is doubtful. For example, the endogenous growth models of growth stresses the multitude of inputs besides physical capital such as technology, human capital, intermediate new goods, organizational capital, social capital and institutional design. Despite this argument, savings, especially domestic savings play a major role in providing resources for investment and thus boosting growth. Thus for developing countries to minimize their dependence on FA, they need to increase their saving propensities which will increase funds required for investments.

### 2.3.2 **The Neo-classical (solow) growth model**

Throughout economic literature the standard model for studying the interaction between foreign aid, economic growth and more recently policies, is the Neoclassical model (Solow Model). However, recent developments in the understanding of growth theory have lead economists into questioning the suitability of this model, spurring the emergence of new growth theories, most notably the Endogenous growth model.

The Solow model studies the growth path of economies by assuming a neoclassical production function which combines 2 factors to produce output: capital and labour. Both factors are perfectly substitutable[3] and exhibit diminishing returns to scale[4]:

$$Y_{(t)} = K_{(t)}^{\alpha} (A_{(t)}L_{(t)})^{1-\alpha} \qquad (2.1)$$

[3] Morrissey, O (2001) pp.6
[4] Ray, D (2001) pp.6535

where $0<\alpha<1$

Output is denoted by Y, K is capital, L equals labour and A is technology. The assumption of diminishing returns implies that each additional investment project produces a smaller return until the point where the next project is not profitable[5]. When no profit exists there are no incentives to invest and no capital is accumulated. The neoclassical model describes how an economy will eventually converge to a steady state where the growth rate of per capita output is constant in the long run. The growth rate of the economy is determined by the growth of the labour force and the savings rate which are taken as exogenous. The per capita savings rate is defined as:

$$S_i = I_i / Y_i \qquad (2.2)$$

This equation represents the connection between savings and investment which are the driving force behind growth in the Solow Model. Household's savings are lent to investor via banks.These investors can then use the funds to expand production, or replace machinery, with cause capital to accumulate. The capital movement equation[6] takes the following shape:

$$(1+ n)\, k(t + 1) = (1+ \delta)k(t) + Sy(t) \qquad (2.3)$$

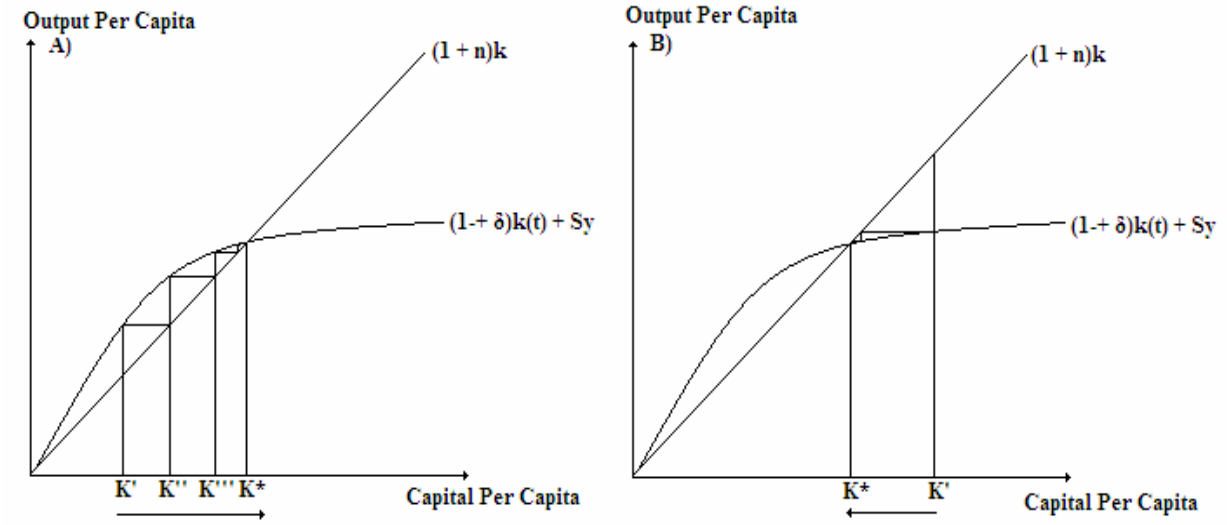
where $0< \delta<1$

$(1+ \delta)$ represents the level of capital depreciation, k(t) denotes the level of capital at time t. Sy(t) indicates the fraction of income which is saved, and combining all the components on the right hand side of the equation explains how much capital is available in the next time period i.e. k(t+1). Capital tomorrow depends on the existing capital today minus depreciation plus the fraction of income which is invested. It is assumed that the population grows at a constant rate n, which has a negative effect on capital in the next period. As the population grows, capital is

[5] Concessional Budget Office (1994) pp.10
[6] Ray, D (2001) pp.64

dispersed over a larger number of people causing capital per capita to fall. The evolution of growth in the Solow model can be seen in figure 1:

Figure 3.1: Dynamics of the Solow Model




Source: Ray, D (1998) "Development Economic."

At point k' in panel A, the stock of capital is greater than the growth of population [(1+ δ)k(t) + Sy(t) > (1+ n) k(t + 1)] which results in higher capital per capita and a movement from k' to k''. This increase in capita per capita caused a decrease in the capital-output ratio due to diminishing returns to capital. This means capital will continue to increase at a decreasing rate until point k* which is known as the steady state. At this point capital accumulation equals population growth. Panel B shows a situation where growth in the population outstrips accumulation in capital causing the economy to converge back to the steady state (K' to K*). In the long run diminishing returns imply that the economy will always converge back to a point with a constant growth rate. The neoclassical model implies that foreign aid stimulates growth via higher investment levels.[7] The marginal propensity to save is very high in developing countries, but the problem is that average propensity to save is low. This is because the developing world suffers from the

[7] Boone (1996) argued that aid raised consumption over investment

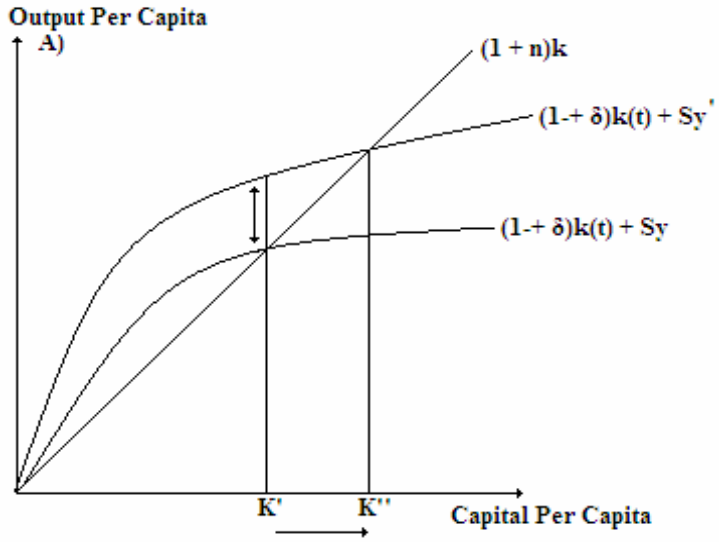
savings gap and/or the foreign exchange gap. The savings gap stems from a vicious circle in which poor countries initially start with low growth levels which correspond to low income levels.The average propensity to save is low because any income is immediately consumed via basic commodities. Lack of saving prevents capital accumulation which further restricts growth. However, foreign aid can be used to bridge this gap by relaxing the budget constraints faced by individuals.

Often, developing countries cannot domestically produce all the capital needed for growth. They have to import from more advanced nations, however, they lack the foreign exchange needed to buy the foreign goods. Foreign aid can eliminate this 'foreign exchange' gap by providing the necessary currency. Consequently investment can occur and growth can increase.

Figure 3.2 illustrates how greater savings due to foreign aid, increase economic growth (albeit at a decreasing rate), with higher saving levels shifting the $(1+ \delta)k + Sy$ curve upwards. Remaining at point K' means that capital has accumulated faster than population therefore capital per capita increases, causing a gradual movement to a new steady state, K''. Increasing the amount of capital per worker will cause productivity levels to increase which will ultimately raise GDP.

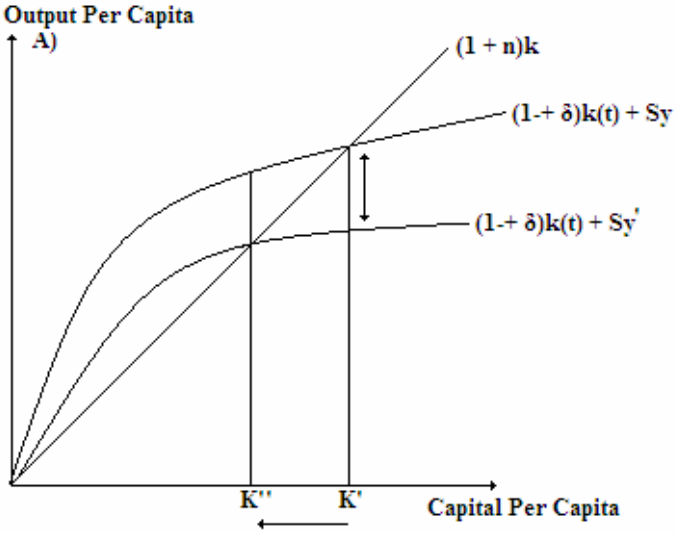
To represent the growth path in the presence of distortionary government policy, consider the introduction of a tax. This tax will cause people to save less which shifts the $(1+ \delta)k + Sy$ curve downwards as less capital is accumulated. Remaining at K' means that the population is growing faster than capital accumulation. Gradually capital per capita falls, and the economy moves to K''.

Figure 3.2: Solow Model with Foreign Aid




Source: Ray, D (1998). "Economic Development."

Figure 3.3: Solow Model with Policy Distortion (Tax)




Source: Ray, D (1998). "Economic Development."

However, the Solow Model is hindered by 2 limitations: firstly the inability to explain long term growth. Secondly, the assumption of diminishing marginal returns. The first limitation is that the Solow Model only describes changes in the level of growth in the long run, whilst the rate of growth cannot be changed. Figure 3.4, panel A, shows that an increase in the rate of savings only increases the level of growth and not the rate. This is because the new growth path remains

parallel to the original. However, as shown in section B of panel A, as the economy moves onto a new growth path, growth increase temporarily during the transition period, but in the long run the growth rate is constant.

The Solow Model can be augmented with technological progress which means the economy can move onto a new growth path which experiences an increasing growth rate, shown in panel B of figure 3.4. However, this technology is taken as exogenous[8] and the model fails to explain the sources of the technology. This reliance on exogenous factors without explanation of the source is perhaps the models most serious limitation. This means that an economy cannot experience long term growth without technological progress which just falls from heaven with no explanation.

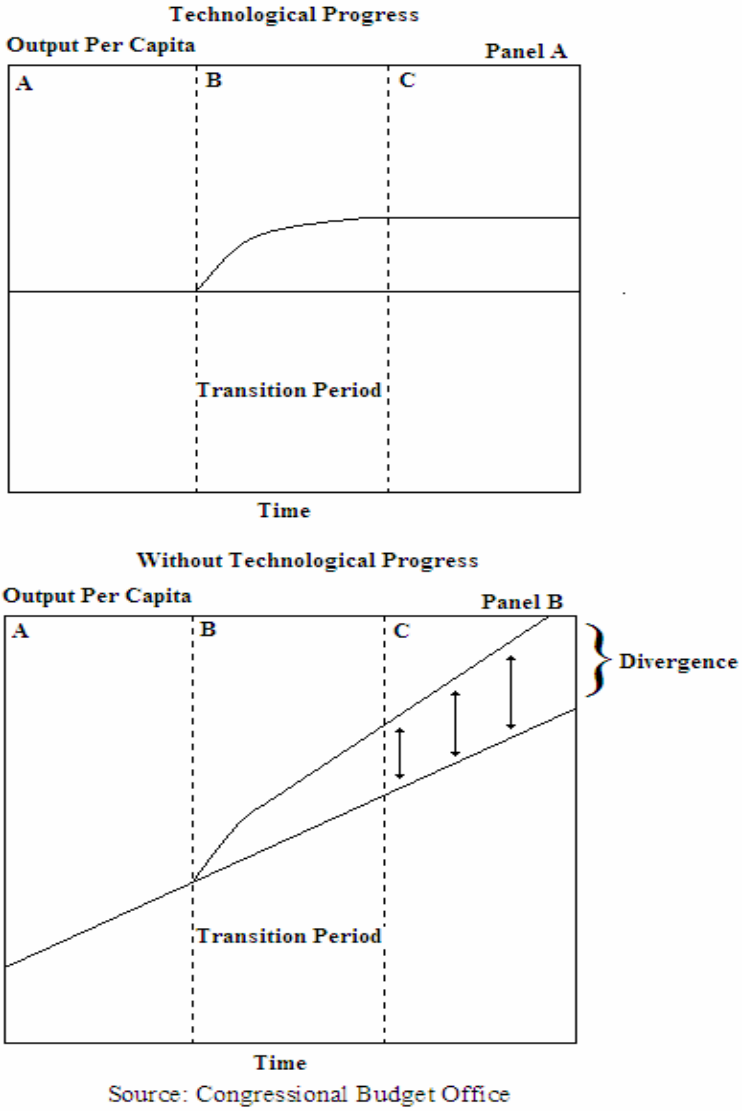
To overcome the limited long term effects of the Solow Model; human capital is introduced into the theory. Human capital is not subject to diminishing returns[9] allowing growth to occur continuously at a rate of human capital accumulation. This addition into the growth theory changes very little, with foreign aid and policy distortions having the same impact in the short run. However, this endogenous model does drop the assumption of diminishing returns which allows for unbounded long term growth. This is because non diminishing returns to capital mean that the returns on investment projects will never equal the cost (depreciation) which allows for a profit on each subsequent investment. This endogenous model, inspired by Romer (1986), suggests equilibrium can be reached where continuous long term growth exists. This means that foreign aid will increase growth well into the long run.

[8] Neoclassical model theory taken from: Mankiw, Romer and Weil (1992). "A Contribution tothe Empirics of Economic Growth." pp.4

[9] See Romer, P. (1986) pp.15

Romer states that growth is closely related to the level of human capital. Firms directly benefit from knowledge accumulation due to new innovations and designs that allow for greater productivity. Increase foreign aid leads to greater accumulation of human capital via increase education and widespread Research and Development. Additional human capital causes a higher rate of technological progress, via new innovations. Higher technological progress increases output per capita allowing for unbounded long run growth.

Figure 3.4: The Effects of an Increase in the Savings Rate in the Neoclassical Model of Economic Growth, with and without Technological Progress.




Source: Congressional Budget Office

## 2.4 EMPIRICAL EVIDENCE ON THE LINKS BETWEEN AID AND ECONOMIC GROWTH

The objective in this section is not to undertake a comprehensive review of the literature rather; the survey is made extensive enough to demonstrate the inconclusive nature of existing empirical evidence, and to justify the need for yet another empirical study on the same subject. There seems to be extensive empirical work examining the links between aid and growth. As earlier mentioned, the results from these various studies are mixed (while some suggest a negative relationship, some others suggest a positive association). Under this section of the study, I provide a review of the findings of the major time series studies including the recent dimension into the relationship between aid and growth.

### 2.4.1 Time Series Studies

The aid-growth literature is dominated by cross-country studies of growth regression and has also been criticized for methodological short comings. Studies of the relationship between aid and growth of the area produce mixed results. However, country studies also failed to produce any conclusive results. The objective of this section is to examine the possible relationship between aid and growth in time series country-specific growth regression. Unlike the cross-country growth regressions which mix a number of heterogeneous countries with different economic policy environment, institutional setup, natural resource endowment, and so on together, this section analyses the impact of foreign aid on economic growth in the context of a single country.

After more than thirty five years of development assistance, and spending over one trillion dollars for foreign aid, more than one billion people live on less than $US 1 per day(World Bank,1998). This casts doubt about the effectiveness of aid. Early development economists attributed problems of growth to lack of capital (or low saving) and foreign exchange constraints. In that context foreign aid has been considered vital for breaking the vicious circle of poverty and low growth.

Mallik(2007) argued the significant negative effect of foreign aid on economic growth in sub-Saharan African(SSA) countries. He pointed that for most SSA countries the more foreign aid they have received, the more aid dependent they have become. As growth faltered despite massive aid flows, foreign aid has bound them into a debt trap. Mallik(2007) examined the effectiveness of foreign aid on economic growth using a cointegration analysis for the period 1965-2005 in the six poorest highly aid dependent African countries: Central African Republic, Malawi, Mali, Niger, Sierra Leone and Togo. He used the following variables in the study: real gross domestic product, aid as percentage of GDP, investment as a share of GDP and openness. The study made a distinction between the long-run and short-run impact of foreign aid on economic growth using country specific data by applying cointegration technique and error correction (ECM) method. The empirical result, estimated for each country, shows that in the five out of the six countries, foreign aid has a significant negative long run effect on economic growth, the only exception was Togo. Foreign has a long run positive impact on growth in Togo. Given that the six selected countries have common characteristics like low income and low human capital, the effectiveness of aid in Togo may be associated to the favorable macroeconomic policy environment. In the short run aid has no significant effect on economic growth per capita for most of the countries except for Niger. The negative effect of foreign aid indicated the long-term deleterious effect of international aid on living standard in these countries. However, the negative impact of aid may not show the reality of aid ineffectiveness in those countries but rather the short comings in the model specification. The problem is that aid and investment are used together as explanatory variables which lead to the problem of double counting as part of foreign aid is used to finance investment (see Girma, Gomanee and Morrissey, 2005).

However, other studies support for the effectiveness of foreign aid in promoting growth. Jayaraman and Choong(2006) analyzed the effectiveness of foreign aid in Fiji using a multivariate cointegration method for the period 1970-2002. They have specified per capita growth using per capita aid and per

capita aid squared among other variables. The cointegration result show that aid contributes positively to growth and is subject to diminishing returns. Contribution of aid to growth is accompanied by diminishing returns of aid to growth and indicates that benefits from aid increase with initial flows but after achieving a certain level, its positive impact begin to decline. As a result the country would actually be better off with less aid due to limited absorptive capacity. They have calculated the break-even point (threshold level) below which aid is effective and ineffective otherwise. Accordingly the turning point of per capita aid is $74.17 Fijian dollar. This means that if Fiji's foreign aid reaches about $74.17, contribution of aid will crawl to zero; and if aid exceeds this value, there would be a negative impact of aid on economic growth, as the law of diminishing returns would operate.

They have further examined the effectiveness of foreign aid by using the interaction term between per capita aid and the ratio of wages and salaries to total expenditure. This is to identify whether aid effectiveness is conditional on controlled government consumption or not. The result showed that aid is effective when government consumption is under control. However, such interaction term should not be taken as a good measure for aid effectiveness. For instance, the government may use aid fund to pay salaries of teachers and health workers, which are part of enhancing human capital and as a result should not be treated as a wasted aid fund.

Another study investigating the impact of foreign aid and fiscal policy on growth using a disaggregated aid was conducted for Kenya and it produces a mixed result. This is indeed a new approach as the majority of the literature did not attempt to disaggregate official development assistance into its loan and grant component. M'amanja, Lyold and Morrissey (2005) examined the effect of fiscal variables (government expenditure and revenue) and aid on growth using annual time series data for Kenya over the period 1964-2002. They have applied and estimated a multivariate cointegration (VAR) and vector error correction models (VECM) to establish both the short- and long-run relationships between foreign aid, fiscal variables and growth of per capita income. Two

measures of aid were used; external grants and loan, and both yield different results. Aid loans were found to have a negative impact on long run growth whilst grants have a positive one. The result supported a case for aid effectiveness (especially if the aid is given in the form of grants) and associated with fiscal discipline.

But the result is ambiguous to conclude as the outcome is unknown if an aggregate measure of aid had been used in the study. Further the negative impact of loan can be taken as a signal for the negative effect of debt servicing on investment (crowding out investment) and growth of per capita GDP because the loans received from donors have its debt servicing component. The fiscal variables are pro-growth in the long run. They have found that government spending have a positive long run influence on growth and did not find any evidence that taxes retard growth. The overall result pointed the mixed impact of aid on growth.

Battarai(2005) examined the effectiveness of foreign aid and its link with savings, investment and per capita growth in Nepal using a time series data for the period 1970-2002, and employs cointegration and error correction mechanism as the estimation procedure and method of analysis. The result found supported for the effectiveness of aid as aid has a positive and significant relationship with per capita real GDP, savings and investment in the long run.

However, fiscal response analysis indicated that more aid is spent on non-development expenditure than development expenditure and that aid did not have a negative effect on domestic revenue collection. The study also showed that aid effectiveness is conditional on a good macroeconomic policy environment, that is, one characterized by a stable macroeconomy, openness to trade and a liberalized financial sector.

Furthermore the study analyzed effectiveness of aid by its source: bilateral and multilateral, anddisaggregated by type: loan and grant component. The result revealed that bilateral and multilateral aid is equally effective in the long run. Off course, both could not have a different

effect unless there are differences in the conditionality tied with the aid, in the interest rate charged and volatility of aid flow. However, lending by multilateral lending institutions is at a concessional rate with a maturity periods of longer period unlike the bilateral sources which may be a bit higher. Similar to the case in Kenya, grants has a strong positive association with real per capita GDP in the long run than loans aid in Nepal.

The short run relationship, however, did not support the long run positive association between aid and per capita real GDP. In the short run aid was found to be negatively integrated with growth, both in its aggregated and disaggregated forms. Given the long run result, this may indicate the lack of absorptive capacity in the short run. Even though the study failed to separate investment financed by aid from not, it indicated that investment is the main (even though it is not the only possible way) transmission mechanism that aid can impact on growth. The other important finding was that aid supplements domestic saving and did not serve as a substitute for domestic resource. Moreover investment is more responsive to domestic saving than foreign aid.

### 2.4.2 Empirical studies of Aid and Growth in Ethiopia

As Ethiopia's economy is characterized by a massive inflow of foreign capital (most specifically foreign aid), it is imperative to review studies conducted on similar area. However, the available studies are quite few in number.

Mesfin(2007) examined the fiscal impact of foreign aid(disaggregated in to loan and grant) and its overall relationships with economic growth in Ethiopia covering over the period 1960/61 to 2004/05. He analyzed the data applying a vector autoregressive modeling mechanism. The result obtained shows that the inflow of foreign aid has a strong positive relationship with growth in the long run. The result further indicated that the positive association between foreign aid and economic growth is attributed to the incremental effect that aid has on government expenditure

i.e. the transmission mechanism of foreign aid to growth is through the channel of government expenditure. The study also showed that foreign aid has a negative impact on tax revenue but it improves the fiscal position (closing the fiscal gap) unlike government expenditure. Generally, Mesfin's (2007) study show that increases in foreign aid result in higher government expenditure, and has significant positive long term impact on economic growth.

However, the study failed to identify foreign aid financed government expenditure from not. As a result, all the effect may be attributed to aid while the case may be not. He also included both government expenditure and foreign aid in the determination of the growth model.This may resulted in problem of double counting as part of aid finances government expenditure especially through public investment. Despite the mentioned problems, the study indicated that there exists a role for aid effectiveness in Ethiopia in the long run.

Tolessa(2001) examined the relationship between foreign aid(in disaggregated form: loan and grant), domestic savings, investment and economic growth for the period 1964/65 to 1998/99 using Johansen's maximum likelihood estimation procedure. He specified and estimated three equations: saving, investment and growth equations. The result obtained from the investment equation showed that both foreign loan and domestic saving promote domestic capital formation. However, the study found that the grant element of foreign aid has negligible effect on domestic capital formation.

The result obtained from the growth equation also showed that saving and loan have a positive impact on growth while grant has an adverse effect on growth of per capita income. Tolessa also included an index of policy variables to see whether aid effectiveness is conditional on good policy environment. The finding showed that policy affects growth significantly and negatively.

However, the model used in the study is poorly specified. The main weakness of the specification is that the problem associated with double counting: for instance, he used loan and grant as explanatory variables both in the saving, and investment equation, and more over he used saving as an explanatory variable in the investment equation. Therefore, the result obtained may not reflect the true relationship between the variables and it may produce a biased result.

Another study by Wondwesen(2003) analyzing the impact of foreign aid on growth on annual data covering the period 1962/63 to 2000/01 applying Johansen's maximum likelihood technique found that aid has significant contribution to investment both in the short run and long run. Aid is found to be ineffective in enhancing 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 attention should be focused on improving the existing macroeconomic policy environment for an inflow of aid to be used effectively. The study is better than the other study at least in two aspects; the first reason is that he tried to incorporate recent advances in the aid-growth link literature, and the second one is that the models are specified in a good manner.

There have been few literatures that analyzed the link between economic growth and foreign aid using single time series data for Ethiopia. In addition, there is virtually none in the empirical literature that used cointegration analysis to investigate the effects of foreign aid on economic growth for Ethiopia. As such, the contribution of this paper is to fill these gaps in the literature. Moreover what makes this paper different from the others is that it uses more recent data and captures the behaviour of the data after the World financial crisis.

I now proceed in section 3, to present the methodology adopted for the empirical study, then also present and discuss the results.

# Chapter Three

# Methodology

This part presents the research methodology used to investigate the relationship of foreign aid and economic growth. This part is organized as follows. Section 3.1 provides a discussion on the deriving the relationship between foreign aid and economic growth, using a neoclassical production function. Section 3.2 presents the procedure to test for stationarity of the data. Section 3.3 shows the procedure by Johansen (1988) and Johansen and Juselius (1990) to find a cointegrating relationship between the variables. A discussion on the procedure to test for causality is presented in Section 3.4. Finally, the source and description of the data used in this paper is presented in Section 3.5.

## 3.1 The Idea

Consider a generalized neoclassical aggregate production function augmented with exports and follows the Inada conditions[10]

$$Y_t=A_tF(K_t,N_t ,X_t) \quad (1)$$

where for each time $t$, Yt is the aggregate output, $K_t$ is capital inputs, $N_t$ is population, $A_t$ is Total Factor Productivity (TFP) and $X_t$ are exports. The production function in (1) follows the standard outward orientation or export-led growth model originally proposed by Ballasa (1978). To introduce ODA, this paper follows Burke and Ahmadi-Esfahani (2006) by assuming that capital can be decomposed into savings and foreign aid. The so-called "savings gap" is the idea behind disaggregating capital into savings and foreign aid. According to Chenery and Strout

[10] The Inada conditions are assumptions about the shape of a production function (Inada, 1963). The six conditions are: (a) the value of the function at 0 is 0; (b) the function is continuously differentiable; (c) the function is strictly increasing in its arguments; (d) the second derivative of the function is decreasing (thus the function is concave); (e) the limit of the derivative towards 0 is positive infinity; (f) the limit of the derivative towards positive infinity is 0.

(1966) foreign aid can supplement domestic savings which could be directed to investment. Therefore, with foreign aid and savings, (1) and can be rewritten as

$$Y_t=A_tF(S_t,ODA_t,N_t,X_t) \quad (2)$$

Where $S_t$ are gross domestic savings and $ODA_t$ is Official Development Assistance (ODA).

A production function which follows the specification in (2) can be decomposed to determine the contribution of each variable to economic growth. Suppose an economy can be described by a Hicks-neutral Cobb-Douglas production function of the form

$$Y_t=A_t(S_t^{\alpha}ODA_t^{\beta}N_t^{\delta}X_t^{\gamma}) \quad (3)$$

where $A_t$ is stochastic. Taking the natural logarithms of both sides of (3) one can have the following result

$$\log Y_t=\alpha\log(S_t)+\beta\log(ODA_t)+\delta\log N_t+\gamma\log X_t+\log A_t \quad (4)$$

There are four deterministic sources of economic growth in (4) – savings, foreign aid, population and exports – and a stochastic source which comes from TFP. Of interest in this paper is the sign of the parameter $\beta$ which is the marginal effect of foreign aid to economic growth. Since all variables are expressed in terms of natural logarithms then the coefficients can be interpreted as elasticities and the variables are expressed in growth terms.

If the five variables in equation (4) are cointegrated then one can find an expression that defines the long run relationship between natural logarithm of GDP and the other four variables, although this has to be tested formally. Guided by the specification proposed by Mallik (2008) and Moreira (2003), the model can be generally expressed in terms of a long-run or cointegrating relationship given by

$$F(Y_t,S_t,ODA_t,N_t,X_t)=0 \quad (5)$$

Where $Y_t$ is the natural logarithm of GDP, $S_t$ is the natural logarithm of gross domestic savings, $ODA_t$ is the natural logarithm of foreign aid, $N_t$ is the natural logarithm of population, and $X_t$ is the natural logarithm of exports.

## 3.2 Tests for Stationary Series

It is common practice in cointegration analysis to test all the time series variables for stationarity. The idea is that all of the variables to be used in the cointegration analysis have the same order of integration. Therefore, an Augmented Dickey-Fuller unit root test on each of the five variables ($y_t$, $s_t$, $oda_t$, $n_t$, and $x_t$) was conducted. This paper used three test specifications the Augmented Dickey-Fuller unit root test. These specifications are presented below:

$$\Delta z_t = \gamma z_{t-1} + \delta \sum_{i=1}^{p} \Delta zT - P + \varepsilon_t \quad (6)$$

$$\Delta z_t = \beta_0 + \gamma z_{t-1} + \delta \sum_{i=1}^{p} \Delta zT - P + \varepsilon_t \quad (7)$$

$$\Delta z_t = \beta_0 + \beta_1 t + \gamma z_{t-1} + \delta \sum_{i=1}^{p} \Delta zT - P + \varepsilon \quad (8)$$

In the three expressions $zt=ytst\ odatntxt$ is the expression for the five variables of interest in this study. The expression in (6) is the test equation without an intercept, (7) is the equation with intercept and (8) is the ADF test equation with trend and intercept. Of interest is the estimated coefficient $\gamma$ in (6), (7) and (8). From $\gamma$ one can calculate the ADF test statistic ($\tau$)

$$\tau = \hat{\gamma} / se(\hat{\gamma}) \quad (9)$$

where $\hat{\gamma}$ is the estimate from (5-7) and $se(\hat{\gamma})$ is the estimated standard error. If the absolute value of (9) is greater than the absolute value of the MacKinnon critical value at the chosen level of significance, the variable is stationary. Otherwise the series is non-stationary.

### *3.3 Johansen"s Cointegration Technique*

In this paper the cointegration test proposed by Johansen (1988) and Johansen and Juselius (1990) was used as an econometric method to assess whether or not there is a long term relationship between foreign aid and economic growth. For simplicity, consider an unrestricted order one Vector Autoregression (VAR) system of the five variables of interest

$$y_t = a_{11}y_{t-1}+a_{12}s_{t-1}+a_{13}oda_{t-1}+a_{14}n_{t-1}+a_{15}x_{t-1}+a_{10}+\varepsilon_{yt}$$

$$s_t = a_{21}y_{t-1}+a_{22}s_{t-1}+a_{23}oda_{t-1}+a_{24}n_{t-1}+a_{25}x_{t-1}+a_{20}+\varepsilon_{st}$$

$$oda_t = a_{31}y_{t-1}+a_{32}s_{t-1}+a_{33}oda_{t-1}+a_{34}n_{t-1}+a_{35}\,x_{t-1}+a_{30}+\varepsilon_{odat} \quad (10)$$

$$n_t = a_{41}\,y_{t-1}+a_{42}s_{t-1}+a_{43}oda_{t-1}+a_{44}n_{t-1}+a_{45}x_{t-1}+a_{40}+\varepsilon_{nt}$$

$$x_t= a_{51}y_{t-1}+a_{52}s_{t-1}+a_{53}oda_{t-1}+a_{54}n_{t-1}+a_{55}x_{t-1}+a_{50}+\varepsilon_{xt}$$

The system in (10) can be compactly written as

$$Z_t=Z_{t-1}\mathrm{A}_1+\mathrm{A}_0+\varepsilon_t \quad (11)$$

Where $\mathrm{A}_1 = \begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} & a_{15} \\ a_{21} & a_{22} & a_{23} & a_{24} & a_{25} \\ a_{31} & a_{32} & a_{33} & a_{34} & a_{35} \\ a_{41} & a_{42} & a_{43} & a_{44} & a_{45} \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} \end{bmatrix}$ is a 5×5 matrix of coefficients, $Z_t = \begin{bmatrix} y_t \\ S_t \\ Oda_t \\ n_t \\ x_t \end{bmatrix}$ is the vector of for the five variables of interest, $\mathrm{A}_0= \begin{bmatrix} a_{10} \\ a_{20} \\ a_{30} \\ a_{40} \\ a_{50} \end{bmatrix}$ is the constant term and $\varepsilon_t= \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{st} \\ \varepsilon_{odat} \\ \varepsilon_{nt} \\ \varepsilon_{xt} \end{bmatrix}$ is the vector of error terms. In general, the unrestricted VAR system can be expressed in order of lag $p$ terms and can be expressed as

$$Z_t=\mathrm{A}_0+ Z_{t-1}\mathrm{A}_1+Z_{t-2}\mathrm{A}_2+\cdots+Z_{t-p}\mathrm{A}_p+\varepsilon_t \quad (12)$$

where the lag order can be determined by the model which minimizes the Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criterion (SBIC).Suppose the appropriate lag order has been found then the expression in (12) can be rewritten in its Vector Error Correction (VEC) form

$$\Delta Z_t = A0 + Z_{t-1}\Pi + Z_{t-1}\Gamma 1 + \Delta Z_{t-2}\Gamma_2 + \cdots + \Delta Z_{t-p+1}\Gamma_{p-1} + \varepsilon_t \quad (13)$$

where $\Gamma i = -\sum_{j=i+1}^{p} Aj$ and $\Pi = \sum_{j=1}^{p} Aj$. Johansen (1988) showed that the coefficient matrix $\Pi$ conveys the information concerning the long run relationship between the $Z_t$ variables. The rank of the matrix $\Pi$ indicates the number of cointegrating relationships existing between the variables in $Z_t$[11]. Johansen"s (1988) cointegration test only can be used to determine the number of cointegration vectors if the variables are non-stationary and are integrated of the same order.

### 3.3.1 Trace Test Statistic

Johansen and Juselius (1990) suggested two test statistics to determine the number of cointegration vectors. The first test is Trace Test. It tests the null hypothesis, in which the number of distinct cointegrating vectors is less than or equal to $r$, against a general unrestricted alternative that the rank of $\Pi = r+1$. The trace statistic test is calculated as follows:

$$\lambda_{trace} = -T \sum_{i=r+1}^{p} \ln(1 - \lambda i) \quad (14)$$

As discussed in Johansen and Juselius (1990) if k $\Pi$ has zero rank, $r=0$, then the variables are not cointegrated, which means all elements of $Z_t$ have unit roots and first differencing could be employed. If $\Pi$ is full rank, $r=p_*$, all elements are stationary in level. If the rank is $0<r<p_*$ then there will exist $r$ possible stationary linear combinations among the elements of $Z_t$. When $r<p_*$ it implies that $\Pi = \Lambda\Sigma_T$ , where $\Lambda$ is a matrix of cointegrating vectors and $\Sigma$ is a matrix of speed of adjustment parameters representing the speed of error-correction mechanism (both are $p \times r$ matrices). Testing for the number of cointegration relationships and obtaining estimates of $\Lambda$ and $\Sigma$ are done with the Johansen maximum likelihood procedure and Johansen's trace statistic.

where $\lambda_i$ is the smallest value eigenvectors $(p-r)$ and $T$ is the number of observations. It is important to note that estimations were done in EVIEWS 7.0 software .

### 3.3.2 Maximum Eigenvalue Test Statistic

The second test is the Maximum Eigenvalue Test which is calculated according to the following expression

$$\lambda_{max} = -T\ln(1-\lambda_{r+1}) \quad (15)$$

where $\lambda_{r+1}$is an estimated eigenvalue. The null hypothesis is $r$ cointegrating vectors, against the alternative of $r$+1 cointegrating vectors. Similar to the Trace Test, the critical values for the Maximum Eigenvalue Test were derived from MacKinnon, Haug and Michelis (1999) and not those tabulated in Johansen and Juselius (1990).

## 3.4. Granger Causality Procedure

This paper also sought to investigate the causality between foreign aid (as represented by ODA) and economic growth. Empirically, the existence of causality can be determined using the Granger Causality technique. According to Granger (1969), say between log($Y_t$) and foreign aid (ODA), ODA granger causes Y if current values of Y can be better predicted using the lagged values of ODA and Y. This two variable approach can be expressed in equation form

$$\log(Y_t) = \sum_{j=1}^{k} \alpha_j \log(Y_{t-j}) + \sum_{j=1}^{k} \beta_j \log(ODA_{t-j}) + \upsilon_t \quad (16)$$

$$\log(ODA_t) = \sum_{j=1}^{k} \delta_j \log(Y_{t-j}) + \sum_{j=1}^{k} \gamma_j \log(ODA_{t-j}) + \eta_t \quad (17)$$

The direction of causality depends on the position of the variables in the equation. In equation (16), the direction of the hypothesized causality is as follows: ODA granger causes Y. In equation (17), the direction of the hypothesized causality is as follows: Y granger causes ODA. According to Maddala

(2001), ODA fails to granger cause Y (as in equation 16) if $\beta_j$ is statistically equal to zero. On the other hand, Y fails to granger cause ODA (as in equation 17) if $\delta_j$ is statistically equal to zero.

## 3.5 The Data

The data used in this paper were sourced from the World Bank's Global Development Finance (GDF),Global Development Indicators (GDI) databases, and Ministry of Finance and Economic Development (MoFED). The data included in this paper and their definitions are as follows:

(a) Official Development Assistance (ODA) is the sum of Development Assistance Committee (DAC) or donor member country flows and Net Financial Flows (NFF) those coming from multilateral sources like the World Bank (WB), United Nations Development Program (UNDP) and International Monetary Fund (IMF). This data is measured in nominal terms, constant Birr values.

(b) DAC is the sum of flows coming from donor countries. Donor countries include Australia, Austria, Belgium, Canada, Denmark, European Union, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States. This data is measured in nominal terms, constant Birr values.

(c) NFF include concessional flows from WB, International Development Association (IDA), IMF, and African Development Bank (ADB). This data is measured in nominal terms, constant Birr values.

(d) Population growth is used to proxy labour inputs in the neoclassical production function. This data is measured in percentage terms.

(e) Gross Domestic Savings (GDS) is income that is not consumed by immediately buying goods and services is saved. This is measured in nominal terms, Constant Birr values.

(f) Gross Domestic Product (GDP) is measured in nominal terms, Constant Birr values.

(G) Export is the value of all goods and other market services provided to the rest of the world, measured in nominal terms constant Birr values

# CHAPTER FOUR

# RESULTS AND DISCUSSIONS

## 4.1 Introduction

As already discussed in chapter two, there has been continuous debate on whether FA contributes to economic growth or not through its influence on domestic savings and investment (or gross capital formation). The aim of this chapter is to present the empirical results of the model analyzed and to discuss the results obtained when the data for Ethiopia were applied (for the period 1961 to 2012).

This part examines the link between foreign aid and economic growth in Ethiopia. This part is divided in three sections. Section 4.1 Describes and examines the trends in foreign aid flows to Ethiopia and attempts to show the link between flow of aid and the major economic variables considered. Section 4.2 present the results of the VAR estimation and associated tests to determine the impact of foreign aid on economic growth to Ethiopia. The last section, 4.3, shows the results of the Granger Causality test.

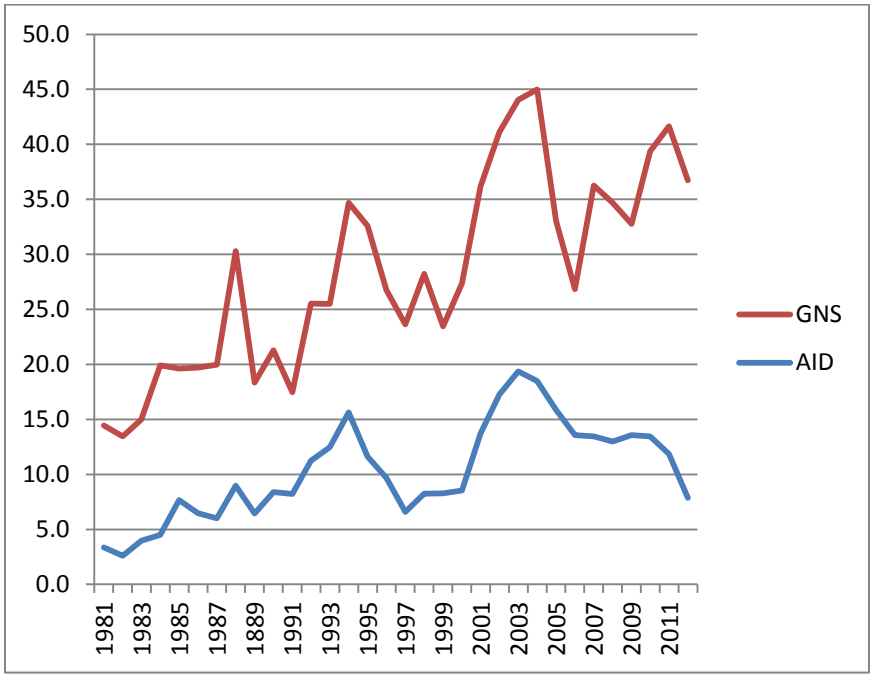
## 4.2 Description of the trends of the Major Variables considered

The study has analyzed data for the period from 1981 to 2012 to investigate the impact of foreign aid, exports growth, and the Gross national savings and debt service on GDP growth(Appendix 3). The dependent variable was GDP growth (annual percentage growth) considered as a variable to measure economic growth. The independent variables were foreign aid (as a percentage of Gross National Income (GNI), Gross national savings (percentage of GNI), exports of goods and services (annual percentage growth) and total debt service (percentage of GNI). These variables were chosen as they play a major role in explaining GDP growth in Ethiopia context.

### 4.2.1 Trends in Aid Flows and Gross National Savings

There has been a rising trend in foreign aid inflows to the country reached its peak in early 1990s and early 2000s (Figure1).Increased trend in aid flow discontinued in mid 1990s and early 1980s reached its trough point during the years of Ethio- Eritrea war (1996-2000). Since 1985, the period for the onset of the devastating famine of the 1980s, there had not been that much fluctuation in the aid flow from the bilateral donors during the study period. The exception was that there was a jump in aid flow from bilateral donors in 2003[12]. The surge in aid inflow for 2003 could possibly be in the form of emergency aid and food aid to respond to the 2002 drought. In 2002, there was shortage of rain during the two harvest seasons (the Belg and the Meher). Furthermore, aid levels were increased given the commitment by donors in year 2000 to achieve the objectives of the Millennium Development Goals (MDGs) in 2015 whereby donors agreed to increase FA to poor countries in order to fight poverty.

**Fig. 4.1 Trends in aid flows and Gross national savings**




[12] Graph for the bilateral and multilateral aid flow overtime is not presented in the paper to save space

Source: World Bank,WDI (2013)

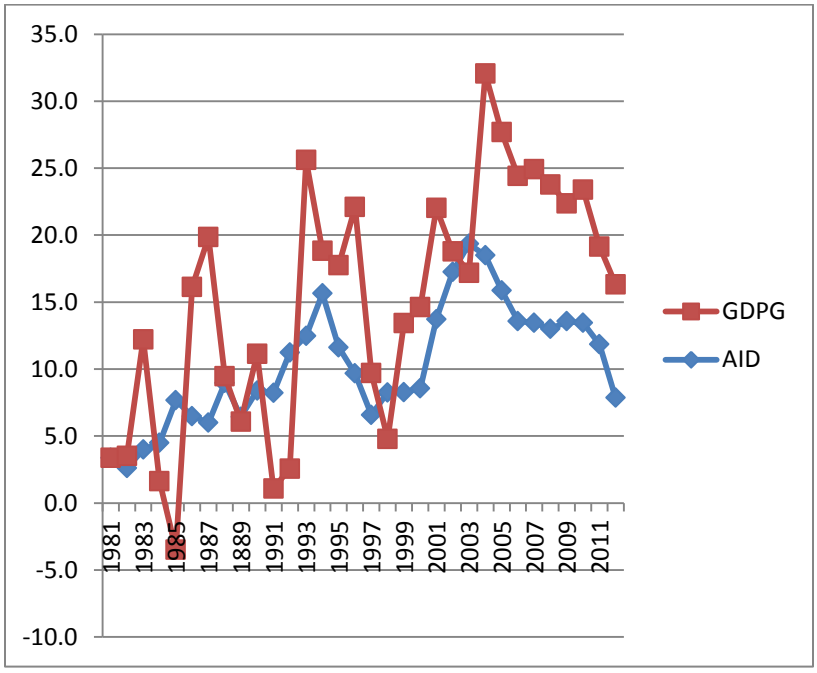
Key:
AID = aid (% of Gross National Income (GNI))
GNS =Gross National Savings (% of GNI)

On the other hand, the Gross national savings have remained below 30 percent for the period 1981-2000(figure 4.1). This may be attributed to low export performance (as fig 4.3 indicates) due to severe drought which hit the country in 1980s and border conflict with Eritrea (1997-2000). Because the country's export revenues are from the primary products particularly agricultural products that is why the exports fell sharply in that period. Furthermore, declining national savings implies that there is an increase in government consumption. Also this may result from increased debt service especially from 1993 to 1998. However an increase in aid levels from 2001 up to 2010, the gross national savings become above 20 percent implying that the country has shown much progress in increasing national saving (particularly the private sector). The graphs in figure 4.1 show that there is a clear pattern between FA and the Gross national savings, hence implying that FA has a significant impact on augmenting national savings

### 4.2.2 Trends in Aid Flows and GDP Growth

The graphs on fig.4.2 show a positive relationship between GDP growth and foreign aid inflows. This observation is supported by the empirical results in chapter four, which reveal a positive relationship between GDP growth and foreign aid. This may be attributed to the existing political-economic system it hardly contributed to economic progress and poor which increases the GNP per capita (one of the indicators used to measure poverty level). Furthermore, it can be attributed to the explanation that less FA in Ethiopia is used for consumption and more is used for development expenditures.

**Fig. 4.2 Trends in aid flows and GDP growth**




Source: World Bank, World Development Indicators 2013

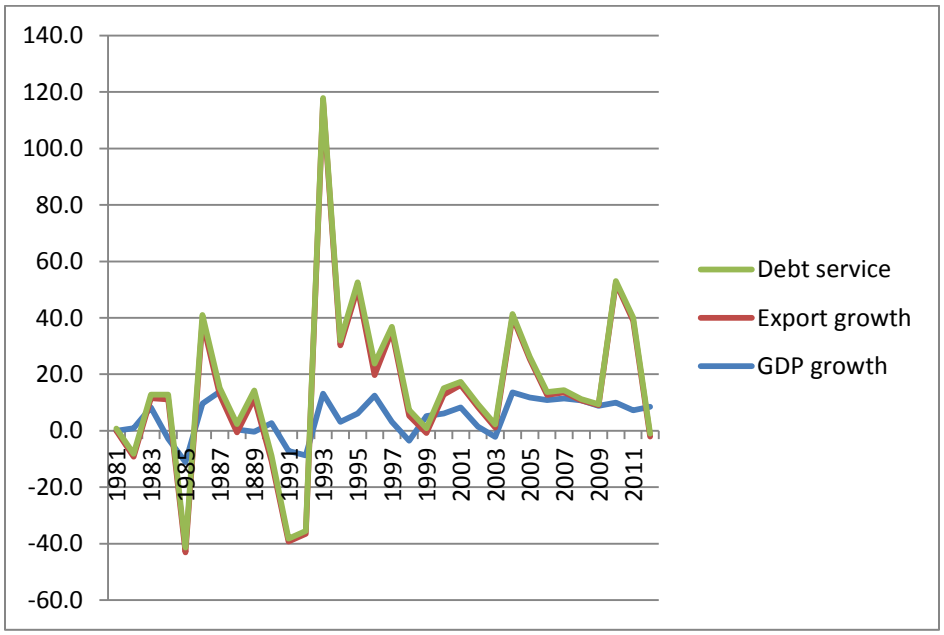
Definition of variables
AID = aid (% of Gross National Income)
GDPG= Gross Domestic Product (annual %)

The GDP growth rates were declining from the mid-1980s to early 1990s. The major factor for the decline in the specified period was the war with Eritrea where the majority of donors were uncomfortable with the war. As the graph illustrates, the overall trend was one of steady decline in aid levels from 1996/97 to 2000/01. Over this period, aid to Ethiopia was cut by half. From 2001 onwards, however, aid flow increased significantly and by 2003/04 the total amount received was 19.3 percent of the GDP which is nearly three times of the aid received in 1996/ 97.Despite the huge flow many claim that aid to Ethiopia is ineffective in bringing about the desired changes like poverty reduction. But this does not imply that aid is totally wasted (or, aid is ineffective at all) because there are some improvements in the social indicators like enhancing access to education and health services.

### 4.2.3 Trends in GDP Growth, Debt Service and Export Growth

There was a declining trend in GDP growth in the early 1990s and it increased steadily from 1997 (fig. 4.3). The declining trend was due to the reasons explained in the preceding subsections including the decline in FA inflows in the early 1990s. The increase in GDP growth from the late 1990s may be attributed to the macroeconomic reforms which were implemented particularly under the Economic Reform Programme taken by the EPRDF.

**Fig. 4.3 GDP growth, debt service and export growth**




Source: World Bank, World Development Indicators 2013.

Key:
GDP growth= GDP growth (annual %)
Debt service = total debt service (% of GNI)
Export growth= exports of goods and service (annual % growth)

The debt service increased from the early 1990s to the mid-1990s, among other things due to the implementation of the Structural Adjustment Programmes (SAPs). Among the requirements of the SAPs was the need to reduce government consumption and increase the debt service. The decline in Debt service from the mid-1990s was attributed to the implementation of the Highly Indebted Poor Countries (HIPC) initiative in 1996. Other factors include debt cancellation and debt rescheduling.

From fig 4.3 shows there is a positive relationship between GDP growth and total debt service. The reason is that, when fewer resources are used for debt service, very large resources are left for investments hence resulting in high GDP growth rate. Furthermore, debt relief released more resources for government investments particularly in infrastructure and social services particularly health and education thus increasing GDP growth.

However, the exports of goods and services have been fluctuating for the period under study with a maximum of 103.7% annual growth in 1993 and a minimum negative growth of -31.9 in 1985. There was an average increasing trend in the early 1990s and mid 1990s due to the macroeconomic reforms which were taking place during that period especially the macro-economic stabilization policies. In mid 1980s and early 1990s there was a sharp decline in the export growth, due to the acute drought and Ethio- Eritrean Border conflict which affected severely the agricultural exports. Furthermore, the export growth has remained low even in the early 2000s because some of the privatized companies were not performing at the expected levels thus contributing very little to export growth.

## 4.3 Cointegration Analysis

### 4.3.1 Stationarity Tests

The requirement before one can proceed in conducting cointegration analysis is to find out if the data are non-stationary in levels or integrated of the same order. The Augmented Dickey-Fuller (ADF) test was conducted to test the stationary of the logarithm of GDP, real savings, ODA, exports and population for Ethiopia. Table 4.2 presents the summary of the ADF test for the data for Ethiopia from 1961-2013.

**Table 4.2 Augmented Dickey-Fuller Test Summary**

| variables | No intercept | With intercept | With intercept and trend |
|---|---|---|---|
| Log($Y_t$) | 2.734347* | 2.665178 | -2.839904 |
| Δlog($Y_t$) | -10.14174*** | -11.08230*** | -6.125879*** |
| Log($S_t$) | -0.163210 | -2.505766 | -2.987153 |
| Δ Log($S_t$) | -8.320957 *** | -8.237952 *** | -8.155116 *** |
| Log($ODA_t$) | 3.051448 | 0.419710 | -3.061170 |
| ΔLog($ODA_t$) | -7.528514*** | -7.493773*** | -6.401222*** |
| Log($N_t$) | 0.208408 | -1.645154 | -2.203141 |
| ΔLog($N_t$) | -3.70332 *** | -3.680966 *** | -3.645322 *** |
| Log(Xt) | 3.237940 * | 0.248785 | -2.358306 |
| ΔLog(Xt) | -5.070916 *** | -5.754503 *** | -5.885331 *** |

**Notes**: (a) The asterisks *, **, *** indicates significance at 1%, 5%, and 10% levels respectively;

(b) Lag lengths determined by Schwarz Bayesian Information criteria (maximum lag length was 10 for the "augmented" part of the test equations).

The results from the ADF test equations suggest that some of the variables do not have the same order of integration. The result suggests that using the ADF test equation without an intercept, the data for logarithm of GDP, and Export are stationary and integrated of order zero. However, if one will use the other two test equations – with intercept and trend – all of the five variables were integrated of the same order, that is integrated of order one, and non-stationary. From the

table one can conclude that all variables are non-stationary at level. That is, the test conducted fails to reject the null hypothesis of unit root both with and without trend. However, ADF test shows that their first difference is stationary at conventional 1% and 5% level of significance. So the variables are, integrated of order one (I (1)). Thus, depending on the ADF test equation used, all five variables exhibit a non-stationary process and integrated of order one. The result suggests using the variables in first difference. However, to incorporate the long run relationship among the variables, cointegration test is required.

### 4.3.2 Johansen's Cointegration Test

From the stationarity tests discussed in the previous section it was found that all of the five variables are non-stationary in levels and integrated of the same order. Therefore, with this result, one can proceed in formally testing for cointegration. The cointegration test procedure proposed by Johansen (1988) and Johansen and Juselius (1990) requires that the optimal lag lengths must be found before testing. The optimal lag lengths are found from the unrestricted vector autoregression equation that minimizes the Akaike Information Criteria (AIC) or Schwarz Bayesian Information Criteria (SBIC).

***Table 4.3 Lag Order Selection Criteria***

| **LAG** | **AIC** | **SBIC** |
|---|---|---|
| 0 | -1.609893 | -1.418691 |
| 1 | -8.738539 | -7.591325 |
| 2 | -10.94199 | -8.838769* |
| 3 | -11.73521* | -8.675977 |
| 4 | -11.63583 | 7.620584 |

Therefore, an unrestricted VAR was estimated for various lag lengths (at a maximum of four lags) and the AIC and SBIC were collected. Table 4.3 provides a summary of the AIC and SBIC at different lag lengths. The results from Table 4.3, the optimal lag length are 2 because it is where the SBIC is at its minimum. Moreover, compared to the AIC, the SBIC always is the parsimonious and popularly used in the empirical literature (Mallik, 2008; Ramaddhan and Naseeb, 2008).

After finding the optimal lag length it is now possible to conduct the cointegration test. As shown in Johansen (1995) there are five possibilities for testing, depending on the behaviour of the variable and the structure of the cointegrating equation. The five cases are as follows: (a) the series have no deterministic trend and the cointegrating equation does not have an intercept; (b) the series have no deterministic trend and the cointegrating equation has an intercept; (c) the series have a linear trend but the cointegrating equation has an intercept; (d) both series and the cointegrating equation have linear trends; and (e) the series have quadratic trend and the cointegrating equation has linear trend. Similar to the lag order selection, the criteria to use to find the optimal model is either AIC or SBIC.

***Table 4.4 Trace and Maximum Eigenvalue Tests***

| **Hypotheses** | | **Trace Test** | | | **Hypotheses** | | **Maximum Eigenvalue Test** | | |
|---|---|---|---|---|---|---|---|---|---|
| **Ho** | **Ha** | **Trace** | **Critical Values** | **P Values*** | **Ho** | **Ha** | **Maximum Eigenvalues** | **Critical Values** | **P Values*** |
| $r=0$ | $r\geq 1$ | 114.62 | 69.82 | 0.00 | $r=0$ | $r=1$ | 70.96 | 33.87 | 0.00 |
| $r\leq 1$ | $r\geq 2$ | 43.67 | 47.85 | 0.11 | $r=1$ | $r=2$ | 26.06 | 27.58 | 0.07 |
| $r\leq 2$ | $r\geq 3$ | 17.6 | 26.79 | 0.59 | $r=2$ | $r=3$ | 10.33 | 21.13 | 0.71 |
| $r\leq 3$ | $r\geq 4$ | 0.13 | 15.49 | 0.54 | $r=3$ | $r=4$ | 7.05 | 14.26 | 0.48 |
| $r\leq 4$ | $r=5$ | 0.004 | 3.84 | 0.64 | $r=4$ | $r=5$ | 0.21 | 3.84 | 0.64 |

Note: * P values obtained from MacKinnon, Haug and Michelis (1999)

Appendix 1, provides a summary of the cointegration tests for all five cases. As shown in Appendix 1 and guided by the SBIC, the appropriate case for this data is a linear deterministic trend in the data with intercept and no trend in the cointegrating equation.

Since the structure of the cointegrating equations and the data are identified then one can proceed to the find the trace and maximum eigenvalue statistics, as shown in equations (13) and (14). Table 4.4 provides the trace and maximum eigenvalue test statistics. The λmax and λtrace statistics results show that there is a significant long-run relationship between aid and Economic Growth.That is, the test statistics suggest that there are one cointegrating relations (at 5% level of significance).

### 4.3.3 Long Run Estimates

Since the variables are cointegrated then one can determine the long run estimates for the relationship between foreign aid and economic growth. Table 4.4 presents the normalized cointegrating coefficients using the specification in (3) and guided by the results of the cointegration tests.

It is clear from Table 4.5 that, in the long run, the relationship between economic growth and foreign aid is Positive and significant. The long run estimates for Ethiopia suggest that for every one percentage increase in ODA translates into a rise in GDP by 0.68 percent. Its impact is also significant at 1% level of significant. These results support the earlier findings of Yohannes (2011) and Wondwoson (2003) positive association between foreign aid and economic growth.

***Table 4.5 Cointegrating Equations (Normalized)***

| **log(*ODAt*)** | **log *Nt*** | **Log(*St*)** | **log *Xt*** |
|---|---|---|---|
| -0.6792 | 0.3108 | -0.2218 | 0.3727 |
| (0.0706) | (0.0261) | (0.0519) | (0.1094) |

Notes: (a) The asterisks *, **, *** indicates significance at 1%, 5%, and 10% levels respectively;

(b) Figures in parenthesis are standard errors and constant terms not shown;

The above long run equation from the regression result shows that all of the variables are with their expected sign and all of them are significant determinants of the dependent variable. From the result, Foreign aid is found to be the major determinant of Economic growth in the country. However population and export growth of a country has a negative and highly significant impact on the Economic Growth of the country in the long run.

### 4.3.4 Error Correction Models

Since the five variables were found to be cointegrated, one can proceed to find the Error Correction Model (ECM) which also represents the short run relationship among the variables under study. Table 4.6 presents the ECM. The log changes in the relevant variables represent short run elasticities, while the ECM terms represent the speed of adjustment back to the long run relationship among the variables.

***Table 4.6 Error Correction Model and Short Run Elasticities***

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.196435 | 0.080589 | -2.437494 | 0.0188 |
| C(2) | -0.523523 | 0.139391 | -3.755796 | 0.0005 |
| C(3) | 0.013813 | 0.086819 | 0.159097 | 0.8743 |
| C(4) | -0.029522 | 0.046708 | -0.632047 | 0.5306 |
| C(5) | 0.479988 | 0.151351 | 3.171357 | 0.0027 |
| C(6) | 0.039579 | 0.056587 | 0.699439 | 0.4879 |
| C(7) | 0.012784 | 0.009716 | 1.315720 | 0.1949 |

| | | | |
|---|---|---|---|
| R-squared | 0.405488 | Mean dependent var | 0.019661 |
| Adjusted R-squared | 0.326220 | S.D. dependent var | 0.072511 |
| S.E. of regression | 0.059520 | Akaike info criterion | -2.680358 |

| | | | |
|---|---|---|---|
| Sum squared resid | 0.159419 | Schwarz criterion | -2.417691 |
| Log likelihood | 76.68931 | Hannan-Quinn criter. | -2.579658 |
| F-statistic | 5.115398 | Durbin-Watson stat | 2.070226 |
| Prob(F-statistic) | 0.000444 | | |

***Note;*** ***C(1)- Error Correction for log(Y***t-1)

C(2)- Δ ***log($Y_{t-1}$)***

***$_{C(3)}$*** Δ ***log($S_{t-1}$)***

***C(4)-*** Δ ***log($ODA_{t-1}$)***

***C(5)-*** Δ ***log($_{Nt-1}$)***

***C(6)-*** Δ ***log($X_{t-1}$)***

The lagged error correction term ($ECM_{t-1}$) included in the model to capture the long run dynamics between the co integrating series is negative and between zero and one. The coefficient of this error correction term also implies that in one year the real gross domestic Product adjusts itself by 19%.In other Words, it suggests that Δlog *Y* is corrected by around 19% per annum.

The short run result for the growth equation shows that all variables are with their expected sign. Aid (ODA) has a negative impact on growth like it is expected, however its impact is insignificant in the short run.

The diagnostic test of the short run model for growth shows that there is no problem at all. From The Durbin -Watson test for serial correlation the output confirm no indication of serial auto correlation problem. The Goodness of fit of the model (R^2) shows, 40.5 percent of a variation in the independent variable Log(GDP) is explained by the variation in the explanatory variables included in the model.

## 4.4 Causality Analysis

Table 4.7 presents the results of the Granger Causality Test on log ODA and log GDP for Ethiopia. The interest here is to assess the existence of causal relationship and also determines the direction of causality between the two variables The results show that, log ODA granger causes log GDP at 1% and 5% level of significance, respectively. The empirical result confirms the existence of significant unidirectional causality from Aid to growth. This suggests that among other objectives donors reward (or give more weight to) good Economic performance Status. However, the converse was not statistically significant.

***Table 4.7 Pairwise Granger Causality Tests***

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|---|---|---|
| LOGODA does not Granger Cause LOGGDP | 53 | 14.1790 | 0.0004 |
| LOGGDP does not Granger Cause LOGODA | 53 | 0.19504 | 0.6607 |

# Chapter 5
# CONCLUSION AND POLICY IMPLICATIONS

## 5.1 Conclusion

Most developing countries are characterized by low level of domestic saving which is insufficient to finance the investment, huge level of trade deficit and high level of budget deficit. These problems therefore necessitate the country to depend on external assistance from developed countries and donor organizations. However, there has been a great debate on the contribution of this foreign assistance to the economic growth and how this impact transmitted. Therefore, the main focus of this study is to examine the Relationship between foreign aid and economic growth of Ethiopia using annual time series data from 1960 to 2013. To identify the impact of aid on growth, this paper has investigated the relationship between several variables.

The following are the conclusions of this paper:

(a) The time series property of the variables contained in the equations is addressed through the test for stationarity and the result found that all the variables are stationary after first difference. Therefore, VAR and error correction models are estimated to assess the growth impact of aid. The test for cointegration is performed and the result confirmed the existence of long run relationship among the variables in the model.

(b) For Ethiopia, the effect of foreign aid on economic growth is negative in the short run and becomes positive in the long run. The long run estimated equation of economic growth reveals that aid has significant and positive impact on growth, but negative and insignificant in the short run indicating that most most of the aid has been used to finance investment which has a long gestation period.

(C) There exists a causality of foreign aid to economic growth while a reverse causality was not observed.

D) There is room for further research into the aid-growth relationship, particularly at the country and regional levels. Future researchers could potentially make improvements to the model used here by incorporating more realistic lagging structures, a non-linear functional form and additional explanatory variables, such as a human capital variable.

## 5.2 Policy Implication

The results from this study have very important policy implications which necessitate the following policy recommendations.

The Ethiopia economy is characterized by low level of saving, huge trade deficit and Budget deficit, therefore foreign aid can be used to finance these problems and enhance economic growth if it is supplemented by good monetary, fiscal and trade policies. For Foreign aid to have a significant impact on economic growth in the long run, it has to be invested on the selective and productive investment areas including basic infrastructural development that facilitate the productivity of other sectors of the economy.

There is a need to increase export growth and export diversification as the study has shown that export growth has a positive and significant impact on GDP growth. Increased revenues from exports will enable the country to undertake new investments and to reduce its dependence on foreign aid resources.

There is a need to increase national savings in order to accumulate enough resources for investments. The government needs to make a proper scrutiny on the types of its investments so as to make development expenditures more productive and be able to contribute positively to economic growth.

Finally, since the study has shown that aid in aggregate has a positive impact on GDP growth, there is a need to address the weaknesses which have hindered aid effectiveness in contributing to growth. Some of these weaknesses include aid fungibility, corruption and policy conditionality imposed by donors. The donor community and Ethiopian government need to work in partnership in addressing these weaknesses in order to make aid achieve its intended objective.

# REFERENCES


Abeba S. (2002), *"*Macroeconomic impact of external Assistance in Ethiopia*",* Un publishedM.Sc. thesis, AAU

Bacha E. (1990), "A three gap model of Transfer and the GDP growth rate in Developing Analysis, unpublished M.Sc. thesis, AAU.

Bahttari B.(2005), Effectiveness of Foreign Aid: The case of Nepal , PhD Thesis, University of Western Sydney.

Balassa, B. (1978) "Exports and Economic Growth: Further Evidence" Journal of Development Economics 5: 181–9

Berhanu,A.(1999),Aid And Reform in Ethiopia. Aid Reform in Africa, Project of the World Bank

Boon T. (2000), Saving, investment and capital flows: an empirical study of the Asian

Boone, P (1994), The Impact of Foreign Aid on Savings and Growth: **London School of** A Paper presented on the Third United Nations Conference on LDC's, Brussels

Burke, P. J. & F.Z. Ahmadi-Esfahani (2006), "Aid and Growth: A Study of South East Asia" Journal Of Asian Economics 17: 350-362.

Burnside C. and Dollar D. (1997), "Aid, Policies and Growth", macroeconomics and growth Division policy research department, World Bank.

Chenery, H. B. & Strout, A. M. (1966), "Foreign Assistance and Economic Development" American Economic Review, 56 (4), pp. 679-733.

Concessional Budget Office (1994). "Recent Developments in the Theory of Long Run Growth:A Critical Evaluation."countries", Journal of development economics, 32(2):279-296.

Dawit W. and Yemisrach T. (2001) 'The Impact of Foreign Financing on Economic Performance In Ethiopia'. Paper Presented at the 11th annual Conference on the Et Economy,

Addis Ababa, Ethiopia.

De Silva L (1984) '*Developmental Aid: A guide to facts and Issues'*. Geneva: Third World Forum in cooperation with the United Nations Non-Governmental Liaison Service.

Easterly, W., R. Levine and D. Roodman (2003), New Data, New Doubts: Revisiting 'Aid, Policies and Growth', CGD Working Paper No. 26, June 2003, Centre for Global Development, Washington,

Getnet, A. (2009) 'A Case Study on Aid Effectiveness in Ethiopia: Analysis of the health Sector Aid Architecture. Wolfensohn Center for Development, Working Paper 9

Girma S., Gomanee K., and Morrissey O.(2005), Aid and Growth: Accounting for Transmission Mechanism in Sub-Saharan Africa, *UNU-WIDER*, Research Working Paper No.2005/60.

Griffin K. (1970), "Foreign Capital, Domestic Savings and Economic Development," Bulletin of the Oxford University, Institute of Economics and Statistics, Vol. 32(2): 99-112.

Haile, K. and Alemayehu G. (2000) 'Savings, Foreign Aid and Economic Growth: A review of theory and the existing Evidence', Paper presented at the 10th annual conference on the Ethiopian Economy.

Harris R. (1995), "Using Cointegration Analysis in Econometric Modeling", Prentice Hall/Harvester Wheat Sheaf.

Imperial Ethiopian Government (1962) "Second Five Year development Plan, 1963-1967"

Jayaraman T. and Choong C. (2006), Aid and Economic Growth in Pacific Island Countries: An Empirical study of Aid effectiveness in Fiji, Perspectives on Global Development and Technology, vol.5, issue 4.

M'Amanja D. and Morrissey O. (2003), Fiscal Aggregates, Aid and Growth in Kenya: A Vector Autoregressive Analysis, School of Economics, University of Nottingham.

Malik G.(2008), Foreign Aid and Economic Growth: A cointegration Analysis of the six Poorest African Countries,University of Western Sydney, Economic Analysis and Policy, Vol.33 No.2.

Mankiw, G; Romer, D and Weil, D (1992). "A Contribution to the Empirics of Economic Growth." The *Quarterly Journal of Economics, Vol. 107, No. 2. (May, 1992), pp. 407-437.*

Mesfin G.(2007), Fiscal Aggregates, Aid and Growth in Ethiopia: A Vector Autoregressive

MoFED, (2005), "Bulletin of External Economic Cooperation", Addis Ababa, MOFED.

Mosley, P. (1986) "Aid Effectiveness: The Micro-Macro Paradox" Institute of Development Studies Bulletin 17 (2): 22-27.

Nyoni T. (1997), Foreign Aid and Economic Performance in Tanzania, AERC, Research Paper 61. World Bank (2002), "African development Indicator"

Papanek, G. (1973) "Aid, Foreign Private Investment, Savings, and Growth in Less Developed Countries" The Journal of Political Economy, 81(1): 120-130

Romer, P. (1986), "Increasing Returns and Long Run Growth", *Journal of Political Economy, Vol. 94, pp. 1002-1037.*

The World Bank (1998) "Assessing Aid: A World Bank Policy Research Report" Retrieved from http://www.worldbank.org/aid/pdfs/front.pdf

Tolessa A. (2001), "The Impact of Foreign Aid on Domestic Saving, Investment and Economic growth: The Case of Ethiopia", Unpublished M.Sc. Thesis, AAU

White, H. (1992) "The Macroeconomic Impact of Development Aid: A Critical Survey" Journal of Development Studies 28 (2): 163-240.

Wondwesen T.(2003), An Empirical Investigation of the Aid-Growth Relationship in Ethiopia,Unpublished M.Sc. thesis, AAU.

World Bank. (1999),World Development Report 1999/2000:Knowledge for Development, Washington, DC: The World Bank.

# Appendix 1: Information Criteria and Cointegration Test Summary

## Information criteria by rank and Model:

| Data Trend: | None | None | Linear | Linear | Quadratic |
|---|---|---|---|---|---|
| Rank or No. of CEs | No Intercept No Trend | Intercept No Trend | Intercept No Trend | Intercept Trend | Intercept Trend |
| | **Log Likelihood** | | | | |
| 0 | 331.8419 | 331.8419 | 344.8465 | 344.8465 | 348.1151 |
| 1 | 349.5382 | 353.6676 | 363.4530 | 370.5552 | 373.7086 |
| 2 | 361.3300 | 366.2060 | 375.3022 | 383.3857 | 386.5339 |
| 3 | 368.1026 | 377.9864 | 378.2134 | 390.7586 | 392.6002 |
| 4 | 369.3729 | 379.8143 | 380.0238 | 393.0012 | 394.3252 |
| 5 | 369.5544 | 381.0622 | 381.0622 | 394.3783 | 394.3783 |
| | **Akaike Information** | | | | |
| 0 | -11.05262 | -11.05262 | -11.36653 | -11.36653 | -11.29863 |
| 1 | -11.35444 | -11.47716 | -11.70404 | -11.94334 | -11.91014 |
| 2 | -11.42470 | -11.53749 | -11.77656 | -12.01513 | -12.02094* |
| 3 | -11.29814 | -11.56810 | -11.49856 | -11.87289 | -11.86668 |
| 4 | -10.95580 | -11.20840 | -11.17740 | -11.52946 | -11.54216 |
| 5 | -10.57076 | -10.82597 | -10.82597 | -11.15209 | -11.15209 |
| | **Schwarz Criteria** | | | | |
| 0 | -9.158676 | -9.158676 | -9.283187 | -9.283187 | -9.025896 |
| 1 | -9.081705 | -9.166545 | -9.241908 | -9.443332* | -9.258617 |
| 2 | -8.773179 | -8.810207 | -8.935636 | -9.098448 | -8.990623 |
| 3 | -8.267828 | -8.424144 | -8.278854 | -8.539541 | -8.457572 |
| 4 | -7.546695 | -7.647784 | -7.578906 | -7.779445 | -7.754271 |
| 5 | -6.782869 | -6.848680 | -6.848680 | -6.985408 | -6.985408 |

**Notes:** (a) Model 1 assumes no deterministic trend in the data and no intercept or trend in the cointegrating equation

(b) Model 2 assumes no deterministic trend in the data with intercept and no trend in the cointegrating equation

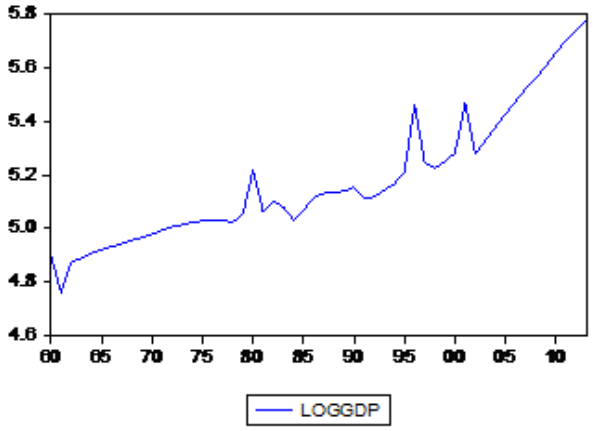
(c) Model 3 assumes a linear deterministic trend in the data and no intercept or trend in the cointegrating equation

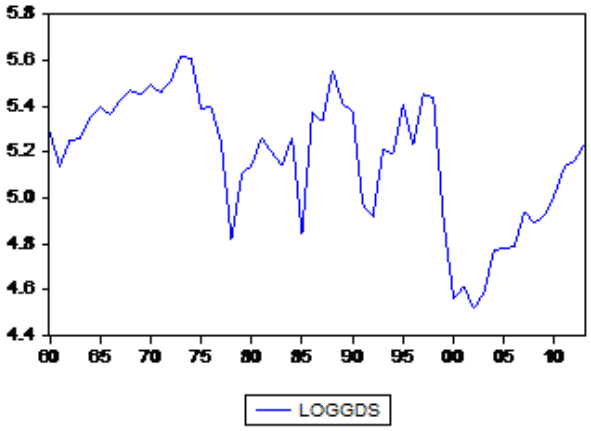
(d) Model 4 assumes a linear deterministic trend in the data with intercept and no trend in the cointegrating equation

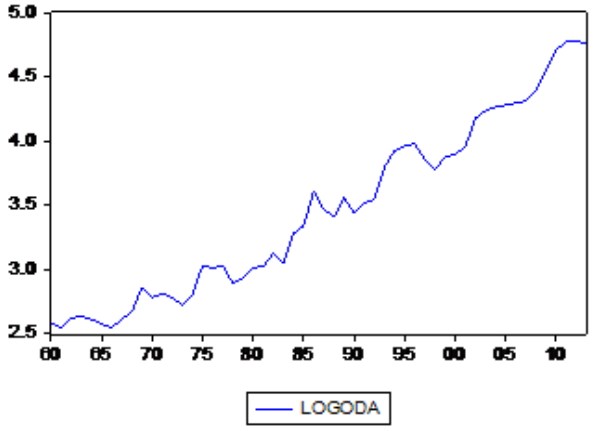
(e) Model 5 assumes a quadratic deterministic trend in the data with intercept and trend in the cointegrating equation

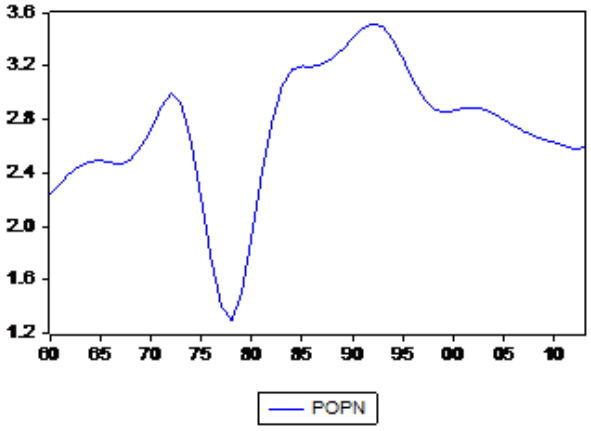
(f) Figures in boxes indicate the minimum information criteria

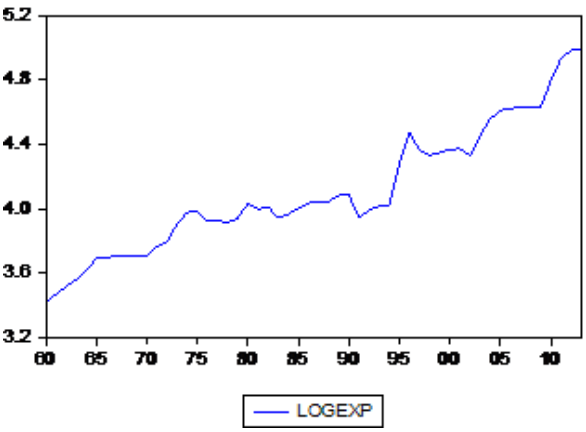
Appendix 2;The data



## Appendix 3: **Selected development indicators for Ethiopia (1981-2012)**

| year | GDPG | AID | NNS | EG | TDS |
|---|---|---|---|---|---|
| 1981 | | 3.4 | 11.1 | na | 0.8 |
| 1982 | 0.9 | 2.6 | 10.9 | -10.1 | 1.0 |
| 1983 | 8.2 | 4.0 | 11.0 | 3.3 | 1.3 |
| 1984 | -2.8 | 4.5 | 15.4 | 14.0 | 1.6 |
| 1985 | -11.1 | 7.7 | 12.0 | -31.9 | 1.7 |
| 1986 | 9.7 | 6.5 | 13.2 | 29.1 | 2.3 |
| 1987 | 13.9 | 6.0 | 14.0 | -1.1 | 2.4 |
| 1988 | 0.5 | 9.0 | 21.3 | -1.0 | 2.9 |
| 1889 | -0.4 | 6.4 | 11.9 | 11.9 | 2.7 |
| 1990 | 2.7 | 8.4 | 12.9 | -13.5 | 2.0 |
| 1991 | -7.1 | 8.2 | 9.2 | -32.1 | 1.0 |
| 1992 | -8.7 | 11.2 | 14.3 | -27.8 | 1.1 |
| 1993 | 13.1 | 12.5 | 13.0 | 103.7 | 1.1 |
| 1994 | 3.2 | 15.6 | 19.0 | 27.1 | 1.7 |
| 1995 | 6.1 | 11.6 | 21.0 | 44.4 | 2.0 |
| 1996 | 12.4 | 9.7 | 17.1 | 7.3 | 4.1 |
| 1997 | 3.1 | 6.6 | 17.0 | 32.3 | 1.5 |
| 1998 | -3.5 | 8.2 | 20.0 | 8.8 | 2.0 |
| 1999 | 5.2 | 8.3 | 15.2 | -5.9 | 1.7 |
| 2000 | 6.1 | 8.5 | 18.8 | 6.7 | 2.3 |
| 2001 | 8.3 | 13.7 | 22.4 | 7.9 | 1.1 |
| 2002 | 1.5 | 17.3 | 23.9 | 6.8 | 1.1 |
| 2003 | -2.2 | 19.3 | 24.7 | 3.3 | 1.1 |
| 2004 | 13.6 | 18.5 | 26.5 | 26.8 | 1.0 |
| 2005 | 11.8 | 15.9 | 17.2 | 13.6 | 0.8 |
| 2006 | 10.8 | 13.6 | 13.2 | 1.9 | 0.9 |
| 2007 | 11.5 | 13.5 | 22.8 | 2.2 | 0.7 |
| 2008 | 10.8 | 13.0 | 21.7 | 0.0 | 0.4 |
| 2009 | 8.8 | 13.6 | 19.2 | 0.2 | 0.4 |
| 2010 | 9.9 | 13.4 | 25.9 | 42.4 | 0.7 |
| 2011 | 7.3 | 11.8 | 29.8 | 31.7 | 1.2 |
| 2012 | 8.5 | 7.9 | 28.9 | -10.5 | 1.0 |

Key:
A= Aid (% of GNI)
GDPG= GDP growth (annual %)
GNS= Gross National savings (% of GN)
EGS= Exports of Goods and Services (annual % growth)
TDS= Total Debt Service (% GNI)
WDI= World Development Indicators

Source: World Bank,WDI (2013)