



**SAINT MARY'S UNIVERSITY SCHOOL OF GRADUATE  
STUDIES**

**THE IMPACT OF FOREIGN CAPITAL INFLOWS ON  
ECONOMIC GROWTH IN ETHIOPIA.**

**BY MERON FIKRE**

**A Thesis Submitted to the School of Graduate Studies of Saint Mary's  
University College in Partial Fulfillment of the Requirement for the Degree  
of Master of art in Developmental Economics.**

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ADDIS ABABA**

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**Approved by the Board of Examiners:**

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## **Statement of Declaration**

I, **Meron Fikre**, hereby declare that this thesis work entitled The Impact Of Foreign Capital Inflow On Economic Growth in Ethiopia, Submitted by me in partial fulfillment of the requirements for the award of the degree of Master of art in Institute of Agriculture and development Studies at Saint Mary's University, through the Department of Developmental Economics, is original work carried out by myself. The matter embodied in this thesis work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief. Where other sources of information have been used, they have been duly acknowledged.

**Name of the student:** Meron Fikre

Signature\_\_\_\_\_

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## **Statement of Certification**

This is to certify that this thesis entitled The Impact Of Foreign Capital Inflow On Economic Growth in Ethiopia, Submitted by me in partial fulfillment requirements for the award of the degree of Master of art in Developmental Economics at Saint Mary's University, done by **Meron Fikre** Id.No. SGS/0501/2008A is a genuine work carried out by her under my guidance. The matter embodied in this project work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief.

**Principal Advisor: Nigussie Sime (PhD)**

Signature \_\_\_\_\_

Date \_\_\_\_\_

## **Endorsement**

I endorse this thesis manuscript to my families, my husband my child and sisters for nursing me with affection and for their wholehearted partnership in the victory of my life.

## **ACKNOWLEDGEMENT**

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## **LIST OF ABBREVIATIONS**

**ADF** -Augmented Dickey Fuller test

**AIC**- Akaike information criteria

**ARCH**- Auto Regressive Conditional Heteroscedasticity

**EG**- Engle – Granger

**FCI**- Foreign Capital Inflow

**GDP**- Gross domestic product

**GNP**- Gross national product

**HQ**- Hannan-Quinn statistics

**LDCs**- Less developed countries

**MoFED**- Ministry of finance and economic development

**NBE**- National Bank of Ethiopia

**ODA**- Official development assistance

**OLS**- Ordinary least square

**SB**- Schwartz-Bayesian criteria

**USD**- United states dollar

**UNDP**- United nations development program

**VAR** -Vector Auto Regressive

**VECM** -Vector Error Correction Model

**WB**- World Bank

## **ABSTRACT**

*This study analyzes the effect of Foreign Capital Inflow (FCI) on the economic growth in Ethiopia for the period 1974 to 2009 E.C. Empirical analysis has been performed by using Johansen Maximum likelihood method. The main result shows that foreign aid has a significant and positive effect on economic growth in the long run as well as in the short run. The net Foreign direct investment has negative impact on economic growth in both long and short run where as In the context of policy recommendations, it is clear that foreign aid contributes positively to economic growth both in the long run and short run. So, Ethiopia should focus on aid for the sake of economic growth. In addition, attention should be given in improving the political environment so as to raise the aggregate investment.*

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Economists always have considered capital as a central element of the process of economic development. The straight forward view of development economists is that capital is essential for growth and its origin does not matter. Based on this view the capital deficit countries heavily resorted to foreign capital as the primary means to achieve rapid economic growth. Unfortunately the growth experience of many of these countries has not been very satisfactory and as a result they accumulated a large external debt and are now facing serious debt service problem.(Asiedu,E.(2002) .The various form of foreign capital inflow such as loans,FDI,grant and portfolio where coming to developing countries to bridge the gap between domestic saving and domestic investment to accelerate growth[Chenery and Strout(1996)].The role of foreign capital inflow has been widely recognized as being a growth factor in the economic development of developing countries. More significantly, it is seen as a means of transferring modern technology and innovation from developed to developing countries. It also enables host countries to achieve investment levels beyond their own domestic saving. Nevertheless, the development impacts of foreign capital inflow in developing countries should not be presumed to be a given, much of the desired outcome depends rather on host country characteristics, industries, motivations for placing an investment, and on all stakeholders involved. Likewise, institutional development such as the rule of law, level of corruption, protection of property rights, the quality of public management and unrestricted government interference are crucial factors that determine technology and know-how transfer from foreign affiliates to domestic firms. Since the early 1990s, Ethiopia has taken significant steps towards liberalization of the economy and of private investment.(Geda,A.(2008)).

According to Nunnenkamp et.al. (2004), recipient countries with a better endowment of human capital are more likely to benefit from foreign capital inflow induced technology transfer, as spillover from foreign affiliate to local enterprise is more likely. This is also known as the host country's absorptive capacity. Likewise, institutional development such as the rule of law, level of corruption, protection of property rights, the quality of public

management and unrestricted government interference are crucial factors that determine technology and know-how transfer from foreign affiliates.(Ali,S andGuo,W.(2005)).

Thirty years ago, all eyes were on Ethiopia “Live Aid” Berhanu,N.(1999) concerts were held in cities around the world to raise funds for the millions of people, mothers and children dying from hunger and disease brought about by extreme poverty. Fast-forward to thirty years later, Ethiopia has experienced rapid economic development and today, has become one of the world’s fastest growing, non-oil producing economies. Berhanu,N.(1999).

In Ethiopia capital inflow has been started around 1950s, during the imperial era, 60-70 percent public sector investment programs 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 1021.60 million Birr grant and 626 million Birr foreign loan, totally 1647.60 million capital inflow in the form of aid. 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. In 1953, the government legislated the marine industry proclamation to encourage registration of ships under Ethiopian law, with complete tax exemption save for a token registration fee and annual tax (Imperial Ethiopian Government (IEG, 1953)).

During post 1974, Derg 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 5526.87 million grant and Birr 5658.30 million foreign loan.

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. Generally, in all three regimes, Ethiopia has been receiving capital inflows in order to fill resource-gaps so as to achieve desired economic objectives.(UNCTAD(2004)).



## **1.2 Statement of the problem**

The ultimate goal of any country is to achieve sustainable economic development. But economy of least developing countries are characterized by balance of payment deficit, because of the general structure of the economy as well as international economic relations. This is because LDCS are dependent on the primary production for their foreign exchange to fill the saving and investment gap requirement. Ethiopia being one of developing countries in the world, so to achieve sustainable growth the country is in need of foreign capital from developed countries. Capital inflow has its own importance in some aspects, it is in question that whether capital inflow assists generally LDCs and particularly that of Ethiopia in accelerating economic growth. Some of the questions need explanation on the impact of capital inflows on economic growth in Ethiopia are:-

- Does Ethiopia use the capital inflows to avoid the bottlenecks of economic growth?
- Do capital inflows positively affect economic growth, savings and investment in Ethiopia?

Such and similar questions are not as easy as to pose them and provide answers. Generally, this paper tries to explain whether capital inflow 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 Objective of the study**

### **1.3.1 General objective**

The general objective of this study is to examine the impact of capital inflow on economic growth in Ethiopia.

### **1.3.2 Specific Objective**

- To examine uses of capital inflows to extent that tend to finance economy gap
- To look whether capital inflow are associated with faster economic growth.
- investigate the relationship between capital inflow and economic growth in Ethiopia.

## **1.4 Research Question**

In this study the research question are as follows;

- What are the factor that affect capital inflow?
- What are the relationship between capital inflow & economic growth?

## **1.5 Hypothesis**

The growth theories suggested, an increase in capital inflows would lead to a faster economic progress, because it is used to fill the resource gap. As capital inflow increase saving and investment increase these lead to higher capital accumulation, higher rate of capital accumulation will lead to faster economic growth that is positive and significant impact is expected.

## **1.6 Significance of the study**

Most of the studies carried out so far in this area have dealt with the impact of foreign capital inflow on economic growth or saving separately both in the developed and less developed countries over the years. Therefore, the study aims to assess the impact of foreign capital inflow on economic growth in Ethiopia. Moreover, the issue of capital inflow is still on

debatable and this paper may give a clue on the relationship between foreign capital inflow and economic growth in detail and use as a source for further investigations on this area.

### **1.7 Scope and Limitation of the Study**

The study would explore the possible ways through which foreign capital affects economic growth. To achieve this objective, the period range from 1974/75 to 2008/09 Ethiopian calendar is chosen. This period is chosen based on availability of data. Although this study attempts to shed on the impact of foreign capital inflow on growth in Ethiopia, yet it suffers from certain limitations. The first problem arises from the problem of data inconsistent by different institutions. Even data arises from the annual reports of the National bank of Ethiopia shows different figures for the same year. The other problem is that, due to the lack of data the foreign portfolio investment variable is excluded and foreign direct investment was used instead as a proxy for foreign private investment.

### **1.8 Organization of the Paper**

The paper is structured as follows. The first chapter summarize in brief the introduction part of foreign capital in Ethiopia. Theoretical and empirical literature reviews are presented in chapter two. Chapter three discusses the model and methodology whereas chapter four presents estimation results. Finally chapter five & six concludes and provides policy recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Theoretical Literature**

##### **2.1.1 Capital and Developing countries**

Reflections on the problems of developing countries led to the identification of insufficient capital stock as the cause of their low income. Among economists who made such prognosis, the most notable are Singer and Nurkse. According to Singer (1949) the less developed countries suffer from “a dominant vicious circle of low production no surplus for economic development – no tools and equipment—low standard of production”. An underdeveloped country is” poor because it is poor”. According to Nurkse (1953), the problem of these countries was that there is small capacity to save resulting from low level of real income. The low level of real income is a reflection low productivity, which in turn is due largely to the lack of capital. The lack of capital is a result of small capacity to save .Assuming that to break out of this vicious circle the country must increase its savings. “The country’s incremental...is the crucial determinant of growth...the general problem is to maximize the marginal saving ratio, that is, the proportion of any increment in income that is saved . Nurkse ,1953 :142) . Evsey Domar, one of the pioneers of growth economics, enunciated that “in under developed countries it is clearly capital rather than labor that is the factor limiting growth (see Domar, 1957).Given the need for larger capital stock and inadequacy of domestic saving to finance investment that would make this possible, it was concluded that domestic saving should be supplemented by foreign resources.

One of the earliest justifications was that since the developing countries did not have the necessary volume of savings, foreign resource inflow could supplement domestic resources to increase investment and thus make possible rate of growth that would be higher than that attainable in its absence. (Ibid)

## **2.1.2 Foreign Capital Inflow In Ethiopia**

Like most least developed countries (LDCs), Ethiopia has been making efforts to improve its investment environment over the years by, for instance, reducing taxes, establishing an Ethiopian investment commission (EIC) to better assist foreign investors and by abolishing FDI-related restrictions. Essentially, the country has established a "one-stop" shop for dealing with investor requests. Furthermore, increased attention has been paid to policy initiatives at the bilateral, regional, and multilateral levels in order to enhance international cooperation and/or integration in matters relating to FDI. The state has adopted new measures and revised old foreign investment legislation, making it progressively more liberal and development-oriented. As a result, the investment environment for FCI and MNCs in Ethiopia has gradually improved over the decades (UNCTAD, 2002; EIA, 2013).

Implementing market oriented development strategies encourages the role of the private sector involvement in the development process (UNCTAD, 2011). The process of liberalization has picked up sharply the past few years. As one indication, the service delivery by the EIC (a government office mandated in promoting investment in Ethiopia) is incredibly efficient and effective. In the past, the issuing of investment licenses took well over three months, now it takes a little over three hours. This is about as clear as a signal as possible that foreign investors are welcome in Ethiopia (UNCTAD, 2004). In Ethiopia, the policy intervention and performance to benefit from FDI received different degrees of attention and recognition by the different regimes Ethiopian economic performance is directly associated to the political and natural shocks the country has faced. The Ethiopian economy's performance can be classified and analyzed through three periods of political regimes in the country, the imperial regimes from 1960-1973, the Derg regime from 1974-1991 and the Ethiopian People Revolutionary Democratic Front (EPRDF) from 1991-present. None of them was able to bring remarkable growth to the country though the current government is making a significant and promising effort.

### **2.1.2.1 The Imperial Period (1960-1973)**

Under this regime, the economy was organized in a market-orientated economic system, although, during this period, coffee, tobacco, petrol, and cement were monopolies held by the state. The imperial regime exerted some effort to promote a modern sector in the economy relying on foreign investment. It enacted an Investment Code praised as “one of Africa’s most liberal”. Under this regime, foreign investment was undertaken in the manufacturing sector for import substitution. The first labor union was organized in 1962 and by the end of the decade; it had more than 50,000 workers signed up (Markakis, 2011).

During this regime, agriculture was the foundation of the export trade, whereas coffee was the leading export, followed by hides and skins. Yet, exports constantly and increasingly fell behind imports, opening a significant deficit gap that became a structural flaw in the country’s economy and remains, to this date, a threat to its stability. From 1963-1973 agriculture was allotted 4.2 percent of the state’s combined ordinary and capital expenditure. However, the promising growth process of the imperial regime was halted by internal power struggles and revolution. Food production declined steadily, while the population was growing at a higher rate, which led to the shocking famines that swept the country during the beginning of 1970s. This brought massive opposition to the imperial regime and resulted in its overthrow and the declaration of Ethiopia as a communist country under the Derg regime (Markakis, 2011).

### **2.1.2.2 The Derg Regime (1974-1991)**

This period marked the introduction of the command system of economic management, with radical Marxism as its confirmed ideology. The regime followed a centralized or a communist economic system. The mainly liberal policies of the pre-1974 imperial regime were replaced by centralized policies that discouraged a market economy and private property. The land reform measure undertaken in 1975 was one of the major policy reforms that took place immediately. Private ownership of land ceased as well as medium and large size enterprises

were nationalized. Likewise, the government nationalized private banks and insurance companies. The economic performance of this regime is characterized by three phases.

The first phase, 1974-78, saw poor economic performance due to the emerging of new policies and the nationalization measures. GDP per capita growth was negative while the average annual growth rate of GDP was 0.3 percent. In the second phase (1978-80), the economy began to recover and the annual growth rate increased to 4.6 percent. During this period, agricultural production increased due to good weather and the economy was characterized by stability.

During the third phase (1980-85), the economy performed badly due to severe drought that affected almost all the regions of the country and especially the Northern part of Ethiopia. Following this period, the economy continually stagnated. The government adopted a long-term plan, the Ten Year Perspective Plan, to tackle the structural problem. The plan aimed at diversifying the country's export sector as well as reducing the share of agricultural production in GDP while increasing the share of industry and foreign exchange earnings. During the target period, real GDP was 6.9 percent per annual, however, as most of the target was not realized, growth remained at about 2 percent and GDP per capita was negative (Geda et al. 2002).

The investment environment in general and FDI in particular were not encouraging during this period, due to political instability, insecurity and the nationalization of major industries, which severely discouraged foreign private investment. In 1983, the government attempted to revive FDI by introducing the Joint Venture Proclamation. The proclamation offered incentives such as a five-year period of income tax relief, import and export duty relief, tariff protection and repatriation of profit and capital. Nevertheless, the proclamation was unsuccessful in attracting foreign investors due to some of the conditions that did not favor foreign investors. For instance, one of the conditions was that in public-private partnerships, the state had to have at minimum a 51 percent share and the manager of such an enterprise was to be an Ethiopian (Haile, 2006).

During 1989, the government revised the 1983 proclamation by allowing majority foreign ownership in many sectors, and provided more protection to investors. However, the prolonged civil war and the political instability at the time further discouraged foreign investment. The political instability and the civil war consequently led to the overthrow of the Derg regime in 1991 by the current regime (EPRDF) (Markakis, 2011).

### **2.1.2.3 The Ethiopian People's Revolutionary Democratic Front (EPRDF)**

The post-1991 period saw a series of reform measures in order to change the command economic system to a free market economy, in order to speed up the integration of the economy into the world economy and to encourage the wider participation of the private sector in the national economy's development process (MOFED, 2010). Some of the stated objectives of the government are improving the country's human capital, infrastructure, reducing macroeconomic imbalances, eliminating structural distortion, as well as poverty alleviation. The current government emphasized on the important role of the private sector, and introduced an export promotion strategy to promote trade liberalization. The specific measures taken to promote the export sector and the participation of the private sector include the following:

- 100% exemption from the payment of customs duties and other taxes levied on imports
  - Investors in agriculture and agro-based industries get tax breaks of up to eight years
  - Investors engaged in manufacturing, generation, transmission and supply of electrical energy, agribusiness, and ICT are exempted from income tax for a period ranging from 1 to 9 years
  - Investors who export at least 60% of their products/services or supply will be exempted from income tax for an additional 2 years
  - No export tax on Ethiopian export products except for semi-processed hides and skins
  - Exemption from custom duties and taxes on imported goods and locally purchased raw materials which are used in the production of export goods
- Increasing the role of the private sector in the economy is one of the main objectives of the current government, hence, the privatization program started in 1994. The Ethiopian Privatization Agency was established in 1994 and has the power to change and duties of transferring ownership from the state to the



private sector (IMF, 1999). Implementing market oriented development strategies encourages private sector involvement in the development process. In order to encourage, promote, and expand private sector investment in the Ethiopian economy, the Ethiopian government has set out some private sector development initiatives. Its program highlights the importance of competitiveness as a key to success for sustained economic development in the country. Some of the important factors mentioned as a basis for competitiveness include a conducive investment climate, which focuses on macroeconomic stability, sound policy and an enabling regulatory framework for private investment as well as strong institutions that run and support the system (EIA, 2013). The new government sought to eliminate the constraints on FDI and to establish an enabling environment for foreign investors.

### **2.1.2 Importance of Foreign Capital Flows**

The purpose of the flow of capital to underdeveloped countries is to accelerate their economic development up to a point where a satisfactory growth rate can be achieved on a self sustaining basis. Capital flows in the form of private investment, foreign investment; foreign aid and private bank lending are the principle ways by which resources can come from rich to poor countries. The transmission of technology, ideas and knowledge are other special types of resource transfer. In discussing about the constraints of economic growth, one should refer to the saving gap and foreign exchange gap of the country. A net capital inflow contributes to the filling of both the gaps. The capital flow of countries increases due to the amount of resources available for capital formation above what can be provided by domestic savings. It also raises the recipient economy's capacity to import goods: capital flow provides foreign exchange and eases the problem of making international payments.

Countries in early stages of development assumed to have a primary need for technical assistance and institution building and only limited need for capital assistance chiefly for infrastructure projects. As the need for capital assistance increases, the need for technical assistance shifts from general to more specific skills. The gradual increase in domestic savings and a growing capacity to attract private and other conventional foreign capital on non-concession ally term will progressively reduce the need for foreign aid.

### **2.1.3 Capital Inflows and Resource Transfer**

For developing economies, the primary benefits of capital inflows are the opportunities to accelerate economic growth and/or to increase current consumption (Bosworth and M. Collins, 1999). The inflows can raise growth rates by supplementing domestic saving and thereby raising the rate of capital accumulation (Ibid). They may also accelerate growth through the transfer of technology and management skills. Alternatively, capital inflows may be used to raise current consumption, potentially reducing saving (Ibid). Indeed, there is a long-standing interest in the extent to which the resource inflows associated with current account deficits are invested or consumed (Ibid). Capital inflows need not be associated with a resource transfer. Indeed, significant shares of the flows to developing countries have been offset by reserve accumulation or capital outflows. (Bosworth and M. Collins, 1999).

### **2.1.4 Why investing in developing countries?**

How and why does a firm become a multinational corporation? Why does a firm go to developing countries and increasing its international involvement? High expected return in developing countries can be the main reason for foreign investors which give incentives to invest in developing countries. This can be extracted from developing countries in different ways. These can be in terms of; low labor cost, level of infrastructure, political stability, abundant of natural resource and others are expressed in detail below;

#### **2.1.4.1 Low Labor Cost**

Country's factor endowment is commonly understood as the amount of land, labor, capital, and entrepreneurship that a country possesses and can exploit for different sectors. The Rybczynski theorem (1955) explained that increasing the level of the labor supply will lead to raise production of the good which uses that factor intensively. In China, foreign investors try to benefit from cheap labor especially where production is labor intensive (Ali & Guo (2005)). In addition to cheap labor, the out-put labor ratio (labor productivity) also determines the inflow of foreign

capital inflow. According to Ministry of Trade and Industry 2013 report; in Ethiopia, the labor force is estimated at 40 million, and labor remains readily available and inexpensive. The cost of labor is very low in Ethiopia with a wage of USD 2 a day for unskilled labor and average monthly salary of USD 90 for a fresh graduate.

#### **2.1.4.2 Natural Resources**

It is the most important determinants of FCI. Dunning (1993) states, the need to secure economic and reliable sources of mineral and primary products for the industrializing nations of Europe and North America, natural resources were the major reason for the expansion of FCI. Berhanu (1999) noted that, countries that have sufficient deposit of minerals can attract foreign investors particularly those involved in exploitation of natural resources. Dunning expressed in his theories of location advantages that, accessibility and low cost of natural resource, adequate infrastructure, political and macroeconomic stability are basic factors that should be fulfilled before engaging in cross border activities. Ethiopia has a favorable climate, comparatively abundant land and labor as well as reasonably good water resources that created ample opportunities for agriculture and flower farming production (Ayelech and Helmsing (2010)). According to Ethiopia and Africa focus report; the country has 122 billion cubic meter surface water, 2.6 billion cubic meter ground water, 12 river basins, 18 natural lakes including the Rift Valley lakes and a potential of 3.7 million hectares irrigable land.

#### **2.1.4.3. Level of Infrastructure**

Infrastructure development has high importance for the expansion of FCI because efficient and adequate infrastructure implies better access to natural resource and potential market. According to Berhanu (1999), availability and reliability of telecommunication services, developed and adequate road and air transport services, reliable water and electricity supply facilities have paramount importance for the profitability of foreign companies and in attracting FCI. Ethiopia to attract FCI develop ambition plan for infrastructure. The Grand Ethiopian Renaissance Dam is an under-construction gravity dam on the Blue Nile River in Ethiopia. The dam will be the largest hydroelectric power plant in Africa when completed.

#### **2.1.4.4. Political Stability**

The economic process of a country and in particularly the inflow of FCI into a country can be disrupted by unsettled, implicit or explicit, internal or external political disputes and crises. Whatever the economic environment the country has, without the political stability, it is very difficult to get the country FCI. Political instabilities can delay FCI until the storm weather away or diverts away for good (Birehanu and Kibre (2003)). In Ethiopia for example, after the late Prime Minister (PM) of Ethiopia who has been in power for 20 years passed away unexpectedly, there was a lot of investment fear but the current government followed the constitution process and has been relatively stable again.

Asiedu (2002) findings indicates that FCI in Africa is not solely determined by availability of natural resources and that can play an important role in directing FCI through trade reform, macroeconomic and political stability, efficient institutions and improvement in infrastructure.

#### **2.1.4.5 Principal Production Sites**

Ethiopia has globally competitive advantages in the production of roses in quality, freight cost and production cost. According to a document published in 2001 by the Ethiopian Institute of Biodiversity Conservation and Research Addis Ababa, the capital, with its altitude, raised about 2000 meters, is the most suitable place for the production of high quality roses. Besides its suitable weather, all the infrastructures like roads, power, telecommunication and water have been advantaged for the investors in floriculture sector.

#### **2.1.4.6 High Level of Government support and Investment Incentives**

FCI policy instruments used to attract foreign investors. This have some impact to determine FCI but as explained in Asiedu (2004) the investment incentives by itself cannot be enough. The host country should increase other determinants like infrastructure and market size.

### **2.1.4.7 Little capital**

According to the neoclassical approach, the availability of little capital in the developing countries makes its return to be increase. In this line of argument, capital moves from a country where return on capital is low to a place where return on capital is high. This approach is based on the perfect competition and risk aversion (Harrison, Dalkiran and Elsey (2000)).

### **2.1.4.8 Trade liberalization**

Most of literature's focuses on the empirical relation between trade and growth. The findings are mixed. Many studies find a connection between trade, or some other measure of openness, and growth. Bajona, Gibson, Kehoe and Ruhl (2008) among others studied the theoretical relationship between trade liberalization and growth. They concluded that trade liberalization leads to higher productivity or higher rates of growth in real GDP (Bajona, Gibson, Kehoe and Ruhl (2008)).

## **2.1.5 Growth Theories and Foreign Capital Component**

This section provides various theories of economic growth and how the capital component can be integrated in to these theories. The theoretical view about economic growth can be classified under three broad headlines, namely: (1) the Keynesian (Harod-Domar growth model), (2) the neo-classical (Solow) growth model, and (3) the endogenous growth theory.

### **2.1.5.1 The Harod-Domar Model**

Early theoretical formulations that relate external finance with economic growth were based on the Harod-Domar model. This model uses saving as a ladder to growth (Hansen and Tarp, 2000). The model is based on the assumptions that potential output is proportional to the stock of capital and factor inputs are employed in fixed proportion with no possibility of substitution. The model further assumes that; the economy is closed, there are only two

factors of production (labor and capital), labor is homogeneous and grows at a constant rate, and there is no technical progress.

Therefore, in the Harod-Domar framework, change in potential output will be:

The incorporation of this gap led to the Two-Gap model where both savings and foreign exchange act as the constraints that impede growth (Chenery and Strout, 1966). In this model both gaps represent separate or independent limit to growth where inflow of foreign fund is used to fill the gaps (Ibid). Moreover, according to the model, it is one of the two constraints that would be binding at a given point in time. That is, it is the larger of the two gaps that constrains growth. Therefore, the impact of foreign transfer relies basically on identifying the binding constraint (Weisskopf 1973).

### **2.1.5.2 The Neo-classical (Solow) growth model**

Unlike the Harod-Domar model, the neoclassical growth model allows for factor input substitution and diminishing marginal returns in the production process (Johns, 1998). The basic neo-classical growth model shows that for the growth of an economy capital accumulation is the central issue. The model further shows that aggregate saving (investment) determines the growth of capital stock, which, in turn plays a key role in the growth of an economy (Ibid). Technology is considered as exogenous, whose prime role is to augment labor (Ibid). In this framework, the rate of investment and population growth determines the growth rate of per capita output (Ibid).

Nevertheless, growth continues only in the transition to a new steady state. In the long run, the rate of technological change which is exogenous by assumption, determines the growth rate of the economy (Schmidt-Hebbel, Serven and Solimano, 1996). This implies that policy measures do not affect long run growth rate. Thus, the standard neoclassical growth model does not emphasize the contribution of policy for long run rate of growth (Durberry, Gemmell and Greenway, 1998).

However, foreign capital (finance) can be used to bridge this gap by relaxing the budget constraints faced by individuals. Often, developing countries cannot domestically produce all the capital goods 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.

### **2.1.5.3. Endogenous Growth Theory**

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 (Romer, 2006) allowing growth to occur continuously at a rate of human capital accumulation. This addition into the growth theory changes very little, with foreign capital 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(2006), suggests equilibrium can be reached where continuous long term growth exists. This means that foreign aid will increase growth well into the long run .Romer (2006) 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 capital 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.

In both Harrod-Domar and Solow growth models, foreign capital is treated as a component of total saving. However, the Solow model argues that foreign capital is most productive when the country is poorest (Bulir and Lane, 2002). To capture the macroeconomic complication associated with foreign capital, modern theories have extended their analysis to examine the influence of foreign capital inflows on several other variables. This includes examining the impact of capital inflows on saving, investment and economic growth.



## 2.1.6 The Causal Relationship between Foreign Capital Inflow, and Economic Growth

Foreign capital inflow remains a key engine in explaining economic growth both in developed and developing countries. Namely, the majority of empirical studies of inter-country differences in growth rates suggest that high growth is correlated with high foreign investment rates. Endogenous growth theory recently also emphasizes the link between and growth. It postulates that since FDI includes not only expenditures on capital goods but also expenditures on technology advances and human capital augmentation, diminishing returns to capital will not exist. Countries, hence, that devote a high proportion of productivity to Foreign capital inflow may sustain more rapid growth than countries that invest less in these areas (UNCTAD 1999).

Furthermore, the strong links between foreign capital inflow and growth would be a result of either the growth driven foreign capital inflow -led growth; this could be probable for two variables that move together through feedback or bi-directional causality (Zhang 2001). In addition, Zhang (2001) reports that economies that experience fast economic growth, not only generate more demand for foreign capital inflow but they also provide better opportunities for making profits, and hence attracting more foreign capital inflow inflows. In addition to this, would cause faster economic growth and support economic development of the host economy via direct effects and indirect spillover effects.

Thus, foreign capital inflow and economic growth are maybe positively interdependent and would lead to a two way causal link between them. Moudatsou (2001, P.2) reports

*“The feedback hypothesis between two variables is taken place, when the lines of causation frequently are going both from supposed causes to growth and from growth to the supposed causes”.*

Thus, the most interesting economic picture suggests a bi-directional causality between FDI and economic growth in the host economy. The studies that focused on the explanations of growth have been pursued in several different ways. Yet, the major problem with interpretation of these studies is the difficulty in determining the direction of causation(Moudatsou 2001).

Shan et al. (1997) pointed out that the causal relationship between foreign capital inflow and growth depends on several economic, political and cultural factors, such as the economic development level, the productivity of foreign capital inflow and the policies shaping foreign capital inflow. In addition, Moudatsou (2001) argued that the foreign capital inflow and growth links seem to be different for countries of different stage of growth.

Shan (2002) argued that most of the previous studies on the links between foreign capital inflow and growth suffer from two major problems. First, those studies assumed uni-directional causality between foreign capital inflow and growth and estimated the impact of on economic growth based on that assumption, without testing the direction of the causality. They also only used a single equation model, which fails to consider the possible two-way causality and cannot deal with the simultaneity issue properly. Second, the majority of those studies that used cross-section data assume a common economic structure and similar production technology across different countries. The significance of conclusions drawn from cross-sectional data based on the development in the panel data analysis regarding a long-run causal relationship is questionable (Shan et al. 1997). For example, Nair-Reichert and

Weinhold (2001) apply a traditional panel causality test proposed by Holtz-Eakin et al. (1988) and the mixed fixed and random (MFR) panel causality test in order to avoid the misleading result of cross-section data analysis. And also to provide a sense of whether there is a causal relationship between foreign capital inflow and growth in panels of 24 developing countries from 1971 to 1995. They found that foreign capital inflow has a strong positive causal impact on growth, but they did not provide evidence on the direction of causality. Likewise, Choe (2003) used the traditional panel data causality testing method, developed by Holtz-Eakin et al. (1988), for 80 countries from 1971 to 1995, finding that there is a bi-directional causality between FDI and growth, although he finds the causal impact from foreign capital inflow to growth to be weak.

### **2.1.7 The Technology Gap**

Most developing countries believe that the principal benefits of foreign capital inflow are embodied in increasing their technological and scientific capacities, and in narrowing the technological gaps between them and developed countries. FCI contributes to the technological progress in the developing countries and is an essential factor for the technology inflows that can create and strength overall technological capabilities (UNCTAD 2006). Several studies by various scholars have noted that there are many factors that could be considered important for host developing countries enabling them to absorb the benefit of new technology transfer such as the inherent capacity and potential to make these absorptions.

Barro and Sala-I-Martin (1997) argued that the long-run growth rate depends on the innovation of new products or technologies in a few leading countries. Even though the technological imitation is typically cheaper than invention, many countries have a preference to copy rather than invent. This implies that follower countries, these are developing and less developed countries, will grow relatively faster and catch-up with the leader countries. In that case, the impact of foreign capital inflow on economic growth is expected to be larger for a larger technological gap between home and host countries. However, in terms of technological development ,developing economies are in general lagged behind; foreign capital inflow would be the important way of spurring economic growth in the least advanced economies (Colen et al. 2008).

Grossman and Helpman (1994) postulated that the growth rate of the technological leader has been increasing over time, which can happen in the exogenous model. And also that the countries appear not to be converging to a common level of per capita income, as they must the exogenous model if the countries share similar saving behavior and technologies. In addition, Fagerberg (1994) showed that the technological differences between countries are the outcome of the differences in GDP per capita across countries. Moreover, he added that a large part of the actual differences in growth rates between OECD countries could be explained by the size of the technology gaps.

UNCTAD (2006) reports that the technology gap between developed and developing economies must be bridged, in order to create a sustainable development for developing economies, and to compete successfully in a global economy. The report found that the differences in the stock of knowledge creates approximately 60 per cent of the differences in the income levels between sub-Saharan African and industrialized countries.

Colen et al. (2008) illustrated that the rate of catch-up depends on the level of human capital in the developing countries, and therefore, on the ability to absorb the positive spillovers from foreign capital inflow. The impact of foreign capital inflow on economic growth is expected to depend on the technology gap between the home and host countries, a large technology gap might slow down the knowledge and technological spillovers.

## **2.2 Empirical Literature**

A number of studies have dealt with the impact of foreign capital on savings, investment and economic growth during the last three decades. Most of the earlier studies showed that foreign capital inflow has a negative impact economic growth of developing countries. The United Nations report in 2013 discloses that foreign capital inflow to developing countries reached \$759 billion accounting for 52 percent of the global total, 1.46 trillion dollars (UN News Centre, 2014). The World Investment Report captures Ethiopia as the third largest recipient of FCI in Africa after Mozambique while South Africa is the first. The country was a destination for FCI projects worth 4.5 billion dollars in 2014, which is a significant increase from the \$441 million in 2012 (UNCTAD, 2014).

### **2.2.1 Foreign Capital and Economic Growth**

Many studies have been conducted about the link between foreign capital inflow and economic growth. Some of these include: Papanek (1973) disaggregated foreign capital inflows in to three principal components: foreign aid, foreign private investment and all other foreign inflows. He used cross section data of 34 countries in the 1950s and 51 countries in the 1960s. He found that all three flows (foreign aid, foreign private investment, and other foreign inflows) had a statistically significant positive impact on growth and the effect of foreign aid on economic growth was stronger than other factors. Stoneman (1975) tested the impact of foreign capital on the economic growth of poor countries. He criticized his predecessors for failing to distinguish between two main effects of foreign capital: the direct balance of payments effect (inflows of capital enable higher investment and consumption); and effects on the structure of the economy (foreign inflows reduce exports, change the capital output ratios, affecting income distribution etc). He performed an Ordinary Least Square (OLS) regression analysis for a five-year period between 1955 and 1970, on a main sample of 188 countries and several sub-samples, using the following explanatory variables: gross domestic savings, net inflow of direct investment, net inflow of foreign aid other foreign long-term flows and the stock of foreign direct investment. The dependent variable was annual average

growth in GDP. His results confirmed the favorable impact of foreign aid and domestic savings on economic growth, but suggested that the stock of foreign direct investment retarded growth and that the significance of this increased when the lag of the dependent variable was used.

Balassa(1978) showed using a simple growth model that labor inputs(L),foreign capital inflows(Kf) and capital formation from domestic savings (Kd) were positively related to output growth(Y), using pooled data of ten countries for the period 1960-73.However the effects of foreign capital inflows on output growth were smaller as compared to domestic capital.

Mosley (1980) also disaggregated foreign capital inflows in to aid and other financial inflows and lagged foreign aid inflows by five years. Using a Two Stage Least Square (2SLS) regression, he investigated the impact of capital inflows on growth for 83 countries, during the period of 1966-77.The effect of foreign aid and other inflows on growth was negative but statistically insignificant in the case of all 83 developing countries. However, for the 30 poorest countries, foreign aid was significantly positive when lagged by five years.

Dowling and Hiemenz (1983) tried to find the relationship between foreign aid, savings and growth in the presence of policy variables. Their sample covered 52 countries of the Asian region for the period 1968-79.They performed an OLS regression using standard explanatory variables, i.e. foreign aid, other capital inflows and savings, and four policy variables. All three variables were found to be positively and significantly related to economic growth. They reported that economic policies have been conducive to a productive allocation of foreign aid and other resources.

Shabbir and Azher (1992) employed a two equation simultaneous model for economic growth and saving ratio (National saving as a ratio of GNP) using annual time series data for Pakistan during the period 1959-60 to 1987-88.The model was estimated by the 2SLS method. Their results showed that foreign private investment had a positive and significant effect on economic growth measured by GNP growth rate when total disbursements were excluded. However, this positive impact became insignificant when total foreign disbursements were

included. The impact of foreign private investment on national savings turned out to be negative and significant in both cases, i.e. with and without foreign disbursements.

Khan and Rahim (1993) also tried to estimate the impact of foreign assistance on economic development of Pakistan. They employed a single –equation model for estimating savings and economic growth functions for the period 1960 to 1988. They also separated different types of foreign capital and estimated their effects on GNP growth and savings rate using the OLS method. They came up with a negative but insignificant impact of foreign assistance on savings held that different types of foreign capital had different effects. For example, foreign aid was found to have no measured effect on savings, foreign direct investment was inversely related to savings but insignificant and loans were negatively related to domestic savings but with a significant coefficient. Their second equation produced a significant positive effect of foreign capital assistance (one year lagged) on the growth rate of GNP. Foreign loans and grants had positive effects on economic growth.

Iqbal Zahid (1998) used a multiple regression framework to separate out the effects of key macroeconomic factors on the economic growth of Pakistan over the period 1959-60 to 1996-97. The quantitative evidence from the OLS regression showed that human capital (peroxide by primary school enrollment as a ratio of labor force) was an important prerequisite for accelerating growth. The empirical results also suggested that the openness of the economy promoted economic growth. The budget deficit and external debt were found to be negatively related to economic growth.

Bowen (1998) tried to measure the direct and indirect relationships between foreign aid and economic growth using a cross-country data for 67 less-developed countries for the period 1970 -88. The direct aid growth relationship was not significant. However, indirect aid-growth relationship, via its interaction with domestic savings, was significant and negative. The results obtained using 2SLS regression analysis showed that low per-capita income rather than low savings rate led to high aid levels.

Burnside and Dollar (2000) estimated a model using a panel data for 56 countries. They used the 2SLS method to estimate simultaneous equations model for growth, aid and policy .They

found that foreign aid had a robust positive impact on economic growth in a good policy environment. Griffin (1970), estimated the relationship between foreign aid and economic growth with an empirical study using data from 32 LDCs for the 1962-1964 and found a negative relationship between foreign aid and economic growth. However, he used the current account deficit as a measure of foreign capital and estimated gross economic growth as the difference between gross domestic investment and the capital account balance. Hansen (2002) later argued that Griffin's regression results were based on an identity rather than a behavioral equation. Consequently, using data derived from an ex post accounting relationship tends to yield a biased and spurious negative correlation and regression coefficient. Similarly, as argued by Papanek (1972), a current account deficit can be financed by various ways, such as foreign aid, foreign private investment, short-term capital borrowing, change in foreign exchange reserves, liquidation of private assets abroad, even errors and omissions. Therefore, treating the current account deficit as foreign aid serves as a poor proxy.

Weisskopf (1972a) also tested the hypotheses that the level of domestic savings in under developed countries was behaviorally related not only to the level of national income but also to the level of net foreign capital inflow. His empirical results from time series data for at least seven years for 44 under 35 developed countries showed a negative impact of foreign capital inflows (proxied with trade deficit) on domestic savings. He concluded that approximately 23 percent of net foreign capital inflow substituted for domestic savings. He further explained that the negative impact of foreign capital inflow is applied to extant savings but not to ex post savings. Bowles (1987) tried to address the issue of causal relationship between foreign aid and domestic savings, applying the bivariate Granger causality tests to the annual data related to 20 countries over the period 1960-81. He came up with mixed results. In half of the 20 countries, time series data did not indicate any causal relationship between foreign aid and domestic savings. In three cases, domestic savings caused aid, in five cases, aid caused domestic savings and in two cases, there was a feedback between foreign aid and domestic savings in the Granger sense.

Bowen (1998) also conducted a study to measure the direct and indirect relationship between foreign aid and economic growth using a cross-country data for 67 less-developed countries



for the average of variables for the period 1970-88. His model uncovered an indirect aid growth relationship via its interaction domestic savings, which was significant and negative.

Razzaque and Ahmed (2000) performed a time-series study over the period 1973-1998 to re-examine the relationship between foreign aid and domestic savings in Bangladesh using co-integration technique. They found a negative relationship between foreign aid and domestic savings. Halevi (1976) examined the relationship between long-term capital inflows in aggregate capital formation and in its components, private and public investment and consumption for 44 countries in the late 1960s. When all variables were expressed in per capita terms, he found a positive and significant relationship between long-term capital (aggregate) and private and public inflows and investment. He also found that long-term capital was positively related to public consumption and negatively related to private consumption. He concluded that there was a significant link between long term capital inflow, investment and growth but such capital inflow also tended to increase public consumption.

Mosley (1987) found a positive relationship between foreign aid and economic growth. Bhalla (1991) estimated a simple investment-growth model for Sri Lanka for the period 1956-86 and found a positive relationship. Snyder (1996) examined the relationship between foreign aid and private economic growth using annual panel data for 36 developing countries over the period 1977-1991 and found a negative relationship.

## **CHAPTER THREE**

### **Model Specification and Methodology**

Different types of studies were undertaken in order to understand the impacts of foreign capital inflows (FCIs) on economic growth in developing countries. And different variables and methods were used to analyze it. Some studies focused on the impacts of foreign capital inflow on the domestic savings and investment, while some other focused to study the impact of foreign capital inflow on GDP growth and on the different sectors of the economy.

It is difficult to analyze the impact of foreign capital inflows on all sectors and variables in a single paper, and as described earlier in the introduction part that the major objective of this paper is to analyze the impact of foreign capital inflows GDP growth in Ethiopia. Therefore I narrow down my analysis only to the impact of FCIs on GDP (economic) growth.

### **3.1 Model Specification**

In line with the theoretical propositions reviewed in the literature, the impacts of foreign capital inflows on economic growth will be examined by specifying the following growth equations.

#### **3.1.1 Growth Equation**

The growth model, which is used in this study, is based on endogenous growth model. The endogenous growth models developed by Lucas-Romer extend the old neo-classical model by emphasizing the role of endogenous factors (i.e., human capital stock and R&D activities) as the main engines of economic growth. While early neo-classical models assume total factor productivity growth (or technical progress) as exogenously given, the newer endogenous growth models attribute this component of growth to the ‘learning by doing’ effect occurring between physical and human capital, which result in increasing returns to scale in production technology(Lucas, 1988).Therefore, the production function under endogenous growth theory can be written as:

$$Y_t = f(K_t, L_t, HC_t) \text{-----} \quad (3.1)$$

Following the theoretical and empirical review and work performed by Rana and Dowling(1988), Growth and Savings equations are developed. Moreover, attempt is made to incorporate other factors that are believed to affect growth and savings.

Rana and Dowling (1988) pointed out that the impact of foreign capital on economic growth of developing countries is controversial and available researches indicate that while foreign capital is a partial substitute for domestic savings these inflows have nevertheless made a positive contribution to economic growth. (Rana and Dowling 1988). The evidence is less clear-cut regarding the relative importance of various types of foreign capital flows as contrasted with other factors (e.g., the degree of export orientation, saving performance, etc.) and whether foreign capital improves or hinders economic efficiency. (Ibid).

The growth equation of the Rana and Dowling (1988) model is derived from a two sector model comprising export and non-export sector. The export variable is included in the growth equation for at least four reasons Rana and Dowling (1988). First, exports enable countries to specialize in the production of commodities in which they have a comparative advantage; resources which are saved in this way can then be used for investment .Second, trade provides a vent for surplus commodities which bring otherwise unemployed resources in to use. Third, trade can expand production possibilities through its effect on such factors as competition, access to new knowledge, technology and ideas; these are the so-called dynamic gains from trade. Fourth, trade enables countries to purchase goods from abroad. If there are no domestic substitutes, the ability to import can relieve bottlenecks in production and thus increase savings and investment; and imports may simply be more productive than domestic resources. In addition to the aforementioned variables, according to Acemoglu (2007), human capital can play a major role in economic growth and cross-country income differences.

Human capital refers to all the attributes of workers that potentially increase their productivity in all or some productive tasks. The term is coined because much of these attributes are accumulated by workers through investments. Human capital theory, developed primarily by Becker (1965) and Mincer (1974), is about the role of human capital in the production process

and about the incentives to invest in skills, including pre-labor market investments, in form of schooling, and on-the-job investments, in the form of training.( Acemoglu ,2007).

Physical-human capital interactions could potentially be important, since a variety of evidence suggests that physical capital and human capital (capital and skills) are complementary, meaning that greater capital increases the productivity of high human capital workers more than that of low skill workers. This may play an important role in economic growth, for example, by inducing a “virtuous cycle” of investments in physical and human capital. (Ibid) Hence, with the expected signs indicated below the variables, growth function is given by:

$$GDP = f(AID, FDI, S, X, LF, HC) \dots\dots\dots (3.2)$$

(±) (±) (+) (+) (+) (+)

Where,

GDP = gross domestic product

AID=foreign aid as a percentage of GDP

FDI=foreign direct investment as a percentage of GDP

S=gross domestic saving as a percentage of GDP

X= export as a percentage of GDP

LF= labor force

HC=human capital peroxide by education expenditure

Taking the natural logarithm to all but FDI the growth equation can be rewritten as:

***LGDP=***

collected from different sources. 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.

### **3.3 Methodology**

#### **3.3.1 Stationary and Non – Stationary**

The standard classical methods of estimation are based on the assumption that all variables are stationary. However, most economic variables are not stationary (Gujarati, 1995). A data series is said to be stationary if its error term has zero mean, constant variance and the covariance between any two – time periods depends only on the distance or lag between the two periods and not on the actual time which it is computed (Harris, 1995).

#### **3.3.2 The Unit Root Test**

Several tests are usually employed to test whether time series variables are stationary or non stationary; the Dick-Fuller (DF), the Augmented Dick-Fuller (ADF) test, Auto-Correlation Function (ACF) and Phillips-Peron test. In this study the researcher is going to employ the ADF test to determine the existence of a unit root. By incorporating the autoregressive process of order  $p$ , this model becomes superior to DF. Basically this test has been chosen for its consistency, accuracy and resourcefulness. The general form of the ADF equation where only an intercept is included is as follows:

Where,  $Y_t$  is any variable in the model to be tested for stationary,  $e_t$  is an error term and

more than one co-integrating vector. In fact, if there are  $n$  variables in a model there may be  $n$  co-integrating vector or less. The Engle Granger method has no systematic procedure for separate estimation of the multiple co-integrating vectors. This method makes the implicit assumption that the co-integrating vector is unique, which means that we are bound to end with a model that is a linear combination of independent co-integrating vectors. Second, the EG approach relies on a two-step estimator.

The first step is to generate the error series and the second step uses these generated errors for estimation, thereby carrying over errors obtained from regression using the residuals. Hence any error introduced in the first step is carried in two the second step. Third, co-integration test may depend on the variable put in the left side of the co-integration. That is, the test is not invariant to the variable used for normalization (Enders, 1996). Finally, the method does not allow the variables in the right hand side to be potentially endogenous (Harris, 1995). (Therefore, this paper chooses to use the Johansen maximum Likelihood Procedure (1988) since it addresses the above stated weakness of the E-G method.

## **B) Johansen (1988) Maximum Likelihood**

The Johansen (1988) procedure enables estimating and testing for the presence of more than one co-integrating vector. Moreover, it permits to estimate the model without priorly restricting the variables as endogenous and exogenous. Under this procedure, the variables of the model are represented by a vector of potentially endogenous variables.

The starting point in this procedure is formulation of unrestricted vector autoregressive (VAR) model in the following form;

$Z_t =$

parameters,  $\mu$  is a vector of deterministic component (i.e., a constant and trend),



measures the extent of correlation of the co integration relations with the stationary elements in the model.

In general, to identify the number of co integrating vectors in the system, the Lambda max ( $\lambda$  max) and Lambda trace ( $\lambda$  trace) statistics are used. They are obtained from the following formulas;



identified in the long run analysis, we can develop the VECM by conditioning on the exogenous variables. In this case, only the error correcting terms of the endogenous variables appear in the error correction model. Thus, assuming that  $Y_t$  is endogenously determined in the model and  $X_{jt}$  represents weakly exogenous variables, we can model for  $Y_t$ . This is performed using the lagged first difference of  $Y_t$ , the current and lagged first differences of the explanatory variables as well as the error correcting term (designed to capture adjustment speed to the long run equilibrium). That is,

$\Delta$

## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1 UNIT ROOT TEST

Non-Stationary of time series data has often been regarded as a problem in empirical analysis. Working with non-stationary variables lead to spurious regression results, from which further inference is meaningless. Hence, the first step in time series econometric analysis is to carry out unit root test on the variables of interest. The test examines whether the data series is stationary or not. To conduct the test, the conventional Dickey-Fuller (DF) and Augmented Dickey – Fuller (ADF) test are used with and without a trend. The null hypothesis in these tests claims that the series under investigation has unit root. On the other hand, the alternative hypothesis claims that the series is stationary. The results of the test for the variables at level and first difference are presented in Table 4.1 and 4.2 below respectively.

**Table 4.1: Unit Root Tests of the Variables at Level**

variables	Dickey Fuller (DF)		Augmented Dickey Fuller (ADF)			
	Lag Length 0		Lag Length 1		Lag Length 2	
<b>LGDP</b>	1.940	-0.1481	1.513	-0.5360	2.252	0.4554
<b>LAID</b>	-2.224	-2.134	-2.099	-1.944	-2.544	-2.733
<b>LFDI</b>	-2.067	-2.544	-1.555	-2.109	-1.195	-1.582
<b>LS</b>	-3.469	-2.741	-2.608	-2.593	-3.404	-3.389
<b>LX</b>	-2.022	-2.155	-2.145	-2.292	-1.990	-2.145
<b>LLF</b>	-0.1104	-1.806	-0.1549	-1.843	-0.5093	-2.356
<b>LHC</b>	3.225	1.038	1.932	-0.3378	1.916	-0.1943

*Source: Own computation using STATA*

**Table 4.2: Unit Root Tests of the Variables at First Difference**

variables	Dickey Fuller (DF)		Augmented Dickey Fuller (ADF)			
	Lag Length 0		Lag Length 1		Lag Length 2	
<b>DLGDP</b>	-3.908**	-4.693**	-3.805**	-4.808**	-4.348**	-3.754**
<b>DLAID</b>	-6.057**	-6.681**	-3.093*	-3.693*	-3.785**	-3.344**
<b>DLFDI</b>	-6.555**	-6.726**	-5.091**	-5.94**	-4.549**	-3.594**
<b>DLS</b>	-8.120**	-8.004**	-3.911**	-3.945**	-3.481**	-3.355**
<b>DLX</b>	-5.187**	-5.280**	-4.065**	-4.140**	-4.020**	-4.102**
<b>DLLF</b>	-5.036**	-5.276**	-5.766**	-5.944**	-3.516**	-4.688**
<b>DLHC</b>	-4.619**	-4.804**	-4.514**	-4.665**	-4.429**	-4.599**
Critical Value	1% = -3.646342 and -2.945 with and without trend, respectively					
	5% = -2.954021 and -2.616 with and without trend, respectively.					

*Source: Own computation using STATA and Note that: 'D' before each variable represents 'first difference'.*

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

(Alemayehu et al, 2009). Hence, the optimal lag length for this study has been determined using the Akaike Information Criterion (AIC) as this method has been proven in most empirical paper to be superior to other tests. According to the Akaike Information Criteria, the VAR estimate with the lowest AIC in absolute value is the most efficient one. In addition, the optimal lag length that is obtained from the AIC is also confirmed by the model reduction test. This result is reported in the following two consecutive tables.

**Table 4.3: Model reduction Test for Growth Equation**

Progress to date						
Model	T	p	log-likelihood	SC	HQ	AIC
SYS( 3)	31	56	OLS 150.37721	-3.4984	-5.2444	-6.0889
SYS( 2)	31	105	OLS 193.51470	-0.85357	-4.1273	-5.7106
SYS( 1)	31	154	OLS 321.16888	-3.6614	-8.4629	-10.785
Tests of model reduction (please ensure models are nested for test validity)						
SYS( 2) --> SYS( 3): F(49,55) = 0.82236 [0.7560]						
SYS( 1) --> SYS( 3): F(98,27) = 1.3407 [0.1937]						

**Source: Own computation using STATA**

As shown in the table above the VAR estimates was conducted successively from lag length three to one. Based on AIC and HQ criterion, the second lag was found to be optimal for growth equation. Though the model reduction test ,i.e., model reduction from *VAR (2) to VAR (1)* or from *SYS (2) --> SYS (3)*, is not rejected based on the overall F test at any level of significance ,based on AIC and HQ criterion VAR(2) is the data congruent model .

### 4.2.1 Growth Equation

Table 4.1 and 4.2 showed that all the variables contained in the growth equation are I(1). This permits to conduct the test for co integration among the variables. The

vector is not rejected at 1% significance level. This points the presence of one co integrating vector. The test is reported in the following table.

**Table 4.4: Johansen Co integration Test for Growth Equation**

	Trace statistics	Eigen Value	P - value
0	144.09	0.82019	0.002**
1	85.755	0.65020	0.200
2	50.042	0.51810	0.637
3	25.221	0.34398	0.909
4	10.888	0.18483	0.959
5	3.9399	0.09498	0.902
6	0.54676	0.015953	0.460

*Source: Own computation using STATA*

The result, depicted in Table 4.4, reports that there is one co integrating vector in the system. The null of no-co integration vector (r

1. **Standardized** (

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

**Table 4.6: Standardized (**



**Table 4.7: Test of Weak Exogeneity (Test for Zero Restriction on  $\alpha$  Coefficients)**

	LR test of restrictions: Chi <sup>2</sup> (1)	Probability Value
<b>LGDP</b>	3.8897	[0.0486]*
<b>LAI</b>	0.10854	[0.7418]
<b>FDI</b>	0.32379 [0.5693]	[0.5693]
<b>LS</b>	2.024	[0.0875]
<b>LX</b>	0.0064055	[0.9362]
<b>LHC</b>	0.82871	[0.3626]
<b>LLF</b>	0.73584	[0.3910]

*Source: Own computation using STATA*

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

Once the long run relationship is defined, the next task is to formulate test of significance on the long run parameters. This test can be obtained by imposing restriction on

**Source: Own computation using STATA**

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

As it is explained from the table, the long – run results depict that all explanatory variables, except human capital (LHC), for LGDP were found to be significant from zero. That is, the result rejects the null hypothesis that the

variable produced significant and negative impact on growth. The result implies that LAID variable play a major role in inducing growth. The long run elasticity of LGDP with respect to LAID is 0.20241, implying one percent increase in foreign aid produces 0.20241 percent increment in output. Moreover, domestic saving has also significant and positive effect on growth of GDP. However, human capital (LHC) has a negative and insignificant effect on output. This might be due to high level of illiteracy rate in the nation. Agriculture, being the dominant sector in the Ethiopian economy, is the great contributor to GDP and labor forces engaged in the sector are almost illiterate. Moreover, using expenditure on education may not be a good proxy for human capital.

### **4.3. The Short Run Dynamic Modeling (Vector Error Correction Model)**

#### **4.3.1 Growth Equation**

The existence of stationary and co integration permits to develop the following error correction model for growth.

**Source: Own computation using STATA**

*Diagnostic tests*

*AR 1-2 test:*  $F(2, 21) = 2.3037 [0.1246]$   
*ARCH 1-1 test:*  $F(1, 21) = 0.76345 [0.3921]$   
*Normality test:*  $\text{Chi}^2(2) = 2.4555 [0.2930]$   
*Hetero test:*  $F(18, 4) = 0.24093 [0.9852]$   
*RESET test:*  $F(1, 22) = 0.0021235 [0.9637]$

The various diagnostic test of the model points no problem regarding the regression analysis. That is, there is no an indication of serial autocorrelation as shown by the Breusch Godfrey LM test for serial correlation. The white test for heterocedasticity also does not reject the null hypothesis of homocedasticity errors. Moreover, the ARCH test (Engle, 1982) indicates the absence of autoregressive conditional hetrocedasticity errors. Similarly, the general test for misspecification as provided by Ramsey's (1969) RESET test does not reject the null hypothesis of no functional misspecification in the estimated equations. And finally, the Jarque Bera test for normality indicates that the null hypothesis of normality distributed error terms is not rejected. In addition, the reported F-statistics rejects the null hypothesis that the coefficients of all explanatory variables except the constant term are jointly zero .In general, no problem is detected by the diagnostic statistics of the model which lends support to the reasonableness of the specification. The short run model shows that both current and past net FDI has a negative influence on growth. This could be possibly due to the fact that benefits from FDI are not realized in the short period of time and out flows exceed inflows. Moreover, both aid and saving produced statistically significant positive result. The short run model further shows that labor and human capital have a positive effect on real gross domestic product of Ethiopia which is consistent with what growth theories hypothesized. The lagged error correction term (ECT-1) included in the model to capture the long run dynamics between the co integrating serious is correctly signed (negative). This coefficient indicates a speed of adjustment 14.17 percent from actual growth in the previous year to equilibrium rate of economic growth. This implies that in one year the real gross domestic product adjusts itself to the equilibrium by 14.17%.

## **CHAPTER FIVE**

### **CONCLUSIONS AND POLICY IMPLICATIONS**

#### **5.1 Conclusions**

This paper analyzes the impact of foreign capital inflow on economic growth in Ethiopia. In doing so, it utilizes the Johansen Maximum Likelihood Procedure in analyzing the data. The study has investigated the relationship between several variables and is conducted on annual data covering the period 1974/75 to 2008/09 E.C. The time series property of the variables contained in the growth equations is addressed through the test for stationarity and the result found that all the variables are stationary after first differencing. Therefore, VAR and error correction models are estimated to assess the impact of FCI. The test for cointegration is performed and the result confirmed the existence of long run relationship among the variables in the model. The growth equation is developed to examine its interaction with FCI (FDI and AID), saving and other variables. The main outcome of the empirical assessment confirms that foreign aid and domestic saving variables produced significant and positive influence on growth both in the long and short run.

Moreover, both in the long run and short run net FDI has a negative influence on growth. long and short run models.

## **5.2 Policy Implications**

In the context of recommendations, it is clear that aid contributes positively to economic growth both in the long run and short run. Hence, there is a need to concentrate on the national economic policies, as aid can be more helpful in boosting economic growth of the country in the presence of appropriate national economic policies like monetary, fiscal and trade. On the other hand, foreign direct investment show a negative impact on economic growth both in the long and short run. So, Ethiopia should focus on aid in the long run for the sake of economic growth. In addition to this, the negative impact of on growth may partly be explained by the substitutability between domestic and foreign investments. Therefore, emphasis should be given in allowing foreign companies that are complementary with domestic investment projects.

Moreover, the regression result points out, domestic saving facilitates the economic growth process of Ethiopia. Thus, to achieve sustainable growth, the government should give due considerations to raise domestic saving .

## REFERENCE

- ADBG, Operation Evaluation Department (2000). Structural adjustment program in Ethiopia. Project Performance Evaluation Report.
- Adams, S. (2009). Foreign Direct investment, domestic investment, and economic growth in Sub-Saharan Africa. *Journal of Policy Modeling* 31 (6), 939–949.
- AFDB/OECD (2008). African Economic Outlook: Ethiopia. p. 301-313
- Agrawal, G. and Khan, M.A. (2011). Impact of FDI on GDP: A Comparative Study of China and India. *International Journal of Business and Management*, 6 (10), 71-79.
- Ali, S. and Guo, W. (2005). Determinates of FDI in China. *Journal of Global Business and Technology*, 1(2), 21-33.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson (2001), ‘The Colonial Origins of Comparative Development: An Empirical Investigation’, *The American Economic Review*, 91(5):1369-1401
- Asiedu, E. (2002). On the determinants of Foreign Direct Investment to Developing Countries: Is Africa Different? *World Development*. 30 (1), 107-119.
- Asiedu, E. (2004). Policy Reform and Foreign Direct Investment in Africa: Absolute Progress but Relative Decline. *Development Policy Review*, 22 (1), 41-48.
- Ayelech, T. M. and Helmsing, A.H.J. (2010). Indigenization or enclave formation? The development of the Ethiopian cut flower industry. *Journal of Modern African Studies*, 48 (01), 35-66.
- Balasubramanyam, V.N., Salisu, M. and Sapsford, D. (1996). Foreign Direct Investment and Growth in EP and IS Countries. *The Economic Journal*, 106 (434), 92-105.
- Alemayehu Geda, Daniel Zerfu and Ndung'u, N. (2009), *Applied Time Series Econometrics: A Practical Guide for Macroeconomic Researchers with a focus on Africa*.
- Barro, R., and Lee, J.W. (1993), International comparison of educational attainment. *Journal of Monetary Economics*, 32(3), 361-394.

Befekadu, D. and Birhanu, N. (1999/2000) , Annual Report on the Ethiopian Economy, Addis Ababa, EEA.

Befekadu, D. (1992), "Growth and foreign debt: The Ethiopian experience: 1964-86". Nairobi: AERC Research paper 13.

\_\_\_\_\_ (2001), Annual Report on the Ethiopian Economy, Addis Ababa, EEA.

Blanchard and Fischer (1989), "Lectures on Macroeconomics". London: The MIT Press  
Cambridge, Massachusetts, England.

Boone, P. (1996), Politics and the effectiveness of foreign aid, *European Economic Review*, 40:289-329.

Bosworth, B. and Collins, S. (1999), "Capital Flows to Developing Economies: Implications for Savings and Investment," *Brookings Papers on Economic Activity*, 1999/1, pp. 143–180.

Bosworth, B.P. and Collins, S.M. (1999), "Capital flows to developing economies: implications for saving and investment", *Brookings Papers on Economic Activity*, 1, 143-180.

Bowles, P. (1987), "Foreign Aid and Domestic Savings in Less Developed Countries: Some test of Causality" *World Development*, 15(6), 789-796.

Burnside, C. and D. Dollar (2000), "Aid, policies, and growth", *American Economic Review*, 90,847-868.

Bajona, C., Gibson, M.J, Kehoe, T.J and Ruhl, K.J. (2008). Trade Liberalization, Growth, and Productivity. Federal Reserve Bank of Minneapolis.

Berhanu, N. (1999). Foreign Direct Investment in Ethiopia. Alemayehu Geda (ed.) *Economic Focus*, Vol. 2, No. 3.

Berhanu, N. and Kibre, M. (2003). International Competitiveness and the Business Climate in Ethiopia. *Ethiopian Economic Association Working Paper No. 1/2003*.

Borensztein, E., De Gregorio, J. and Lee, J-W. (1998). How Does Foreign Direct Investment Affect Economic Growth?. *Journal of International Economics*, 45 (1), 115-135.



Chenery. H.B. and A.M. Strout (1966), "Foreign Assistance and Economic Development," American Economic Review, LVI, 4, September 67

Delali, A (2003). The Determinants and Impacts of Foreign Direct Investment. Munich Personal RePEc Archive. Taken from [http://mpira.ub.uni-muenchen.de/3084/1/MPRA\\_paper\\_3084.pdf](http://mpira.ub.uni-muenchen.de/3084/1/MPRA_paper_3084.pdf).

Dunning, J. H. (1993). Multinational Enterprises and the Global Economy. Addison Wesley.

EEA (2000). Annual Report on the Ethiopian Economy. Addis Ababa, Ethiopia: United Printers.

EIA (2008). Ethiopian Investment Guide 2008. Addis Ababa, Ethiopia.

EIA (2013). Ethiopian Investment Guide 2013. Addis Ababa, Ethiopia. Taken from [http://www.ethemb.se/TEXT%20files/Investment\\_Guide%202013.pdf](http://www.ethemb.se/TEXT%20files/Investment_Guide%202013.pdf).

FIAS (2001). Foreign Investment Strategy Framework: Ethiopia. Washington D.C.

Frenkel, M., Funke, K. and Stadtmann, G. (2004). A panel analysis of bilateral FDI flows to emerging economies. Economic Systems, 28 (3), 281–300.

Fu, X. (2012). Promoting Manufacturing Foreign Direct Investment from China to Ethiopia. Master thesis, Harvard University.

Geda, A. (2008). The political economy of growth in Ethiopia in Benno Ndulu, Stephen A.O'connell, Jean\_Paul Azam, Rober H.Bates, Augustin K. Fosu, Jan Willem Gunning and Dominique Njinkeu (eds). The Political Economy of Growth in Africa: 1960-2000. Cambridge: Cambridge University Press).

Haile, G. and Assefa, H. (2006). Determinants of Foreign Direct Investment in Ethiopia: A time-series analysis. University of Westminster.

Harrison, A., Dalkiran, E. and Elsey, C. (2000). International Business: Global Competition from a European Perspective. Oxford University Press.

Ito T. (2012). Export platform Foreign Direct Investment: Theory and Evidence. Institute of Developing Economies, Japan.

Li, X. and Liu, X (2005). Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship. *World Development*, 33 (3), 393-407.

Lumbila, K.N. (2005). What Makes FDI Work? A Panel Analysis of the Growth Effect of FDI in Africa. African Region Working Paper Series No. 80.

Mamo, S. (2008). Determinates of Foreign Direct Investment in Ethiopia. Master thesis, Maastricht University.

Ram, R. and Zhang, K.H. (2002). Foreign Direct Investment and Economic Growth: Evidence from Cross-Country Data for the 1990s. *Economic Development and Cultural Change*, 51 (1), 205-215.

Reiter, S. L. and Kevin, S.H. (2010). Human Development and Foreign Direct Investment in Developing Countries: The Influence of FDI Policy and Corruption. *World Development*, 38 (12), 1678-1691.

Root, F.R., and Ahmed, A.A. (1979). Empirical Determinates of manufacturing Direct Foreign Investment in Developing Countries. *Economic Development and Cultural Change*, 27 (4), 751-767.

Stevens, G.C. (1989). Integrating the Supply Chain. *International Journal of Physical Distribution and Logistics Management*, 19 (8), 3-8.

UNCTAD (2002). Investment and innovation policy review: Ethiopia. United Nations, New York and Geneva. Taken from <http://unctad.org/en/docs/poiteipcm4.en.pdf>.

UNCTAD (2004). Investment and Innovation policy review in Ethiopia. United Nations, New York and Geneva. Taken from [http://unctad.org/en/docs/iteiia20042\\_en.pdf](http://unctad.org/en/docs/iteiia20042_en.pdf).

World Bank Economic Review, 15 (2): 177-219.

## APPENDIX A: DIAGNOSTIC TESTS

### A. DIAGNOSTIC TEST FOR GROWTH MODEL

GDP : AR 1-2 test:  $F(2,18) = 2.3096$  [0.1280]  
S : AR 1-2 test:  $F(2,18) = 7.2916$  [0.0048]\*\*  
AID : AR 1-2 test:  $F(2,18) = 2.0719$  [0.1549]  
FDI : AR 1-2 test:  $F(2,18) = 0.91976$  [0.4166]  
HC : AR 1-2 test:  $F(2,18) = 1.3430$  [0.2860]  
LF : AR 1-2 test:  $F(2,18) = 0.45569$  [0.6411]  
GDP : Normality test:  $\text{Chi}^2(2) = 1.4789$  [0.4774]  
S : Normality test:  $\text{Chi}^2(2) = 5.6737$  [0.0586]  
AID : Normality test:  $\text{Chi}^2(2) = 4.3190$  [0.1154]  
FDI : Normality test:  $\text{Chi}^2(2) = 2.6737$  [0.2627]  
HC : Normality test:  $\text{Chi}^2(2) = 8.1909$  [0.0166]\*  
LF : Normality test:  $\text{Chi}^2(2) = 15.712$  [0.0004]\*\*  
GDP : ARCH 1-1 test:  $F(1,18) = 0.60132$  [0.4481]  
S : ARCH 1-1 test:  $F(1,18) = 0.026605$  [0.8722]  
AID : ARCH 1-1 test:  $F(1,18) = 0.39843$  [0.5358]  
FDI : ARCH 1-1 test:  $F(1,18) = 0.021056$  [0.8862]  
HC : ARCH 1-1 test:  $F(1,18) = 5.4327$  [0.0316]\*  
LF : ARCH 1-1 test:  $F(1,18) = 0.13631$  [0.7163]  
GDP : hetero test:  $F(18,1) = 0.030979$  [1.0000]  
S : hetero test:  $F(18,1) = 0.092333$  [0.9959]  
AID : hetero test:  $F(18,1) = 0.055867$  [0.9995]  
FDI : hetero test:  $F(18,1) = 0.047189$  [0.9998]  
HC : hetero test:  $F(18,1) = 2.8960$  [0.4359]  
LF : hetero test:  $F(18,1) = 0.022723$  [1.0000]

### MULTIVARIATE DIAGNOSTIC TEST

Vector AR 1-2 test:  $F(72,22) = 0.73598$  [0.8337]  
Vector Normality test:  $\text{Chi}^2(12) = 39.564$  [0.0001]\*\*  
Vector hetero test:  $\text{Chi}^2(378) = 390.05$  [0.3236]