THE IMPACT OF FOREIGN DIRECT INVESTMENT ON POVERTY REDUCTION IN ETHIOPIA: COINTEGRATED VAR APPROACH

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This is to certify that the thesis prepared by Remla Kedir entitled: *The Impact of Foreign Direct Investment on Poverty Reduction in Ethiopia: Cointegrated VAR Approach* and submitted in partial fulfillment of the requirements of the Degree of Masters of Science in Economics (International Economics) complies with the regulations of the university and meets the accepted standards with respected originality and quality.

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Abstract

The Impact of Foreign Direct Investment on Poverty Reduction in Ethiopia: Cointegrated Var Approach

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Many developing countries are competing to attract foreign direct investment with a belief that it can be a tool for poverty reduction. The Ethiopian government has opened several economic sectors to foreign investors and issued several investment incentives for foreign investors. Since the market oriented economic reforms took place in 1992 emphasis has been given to attracting FDI. In this study, the relationship between FDI and poverty reduction is analyzed empirically. It is based on secondary data which was collected from the Ethiopian investment agency, UNCTADs database and the World Bank's world development indicators. The period covered in the study is 1970-2009. The model was estimated using the Co-integrated VAR approach. The results show that FDI has a negative, impact on economic growth and hence does not reduce poverty in the country. This may be due to the under development of human capital, backward institutions, crowding out of domestic investment or other reasons which require further investigation. The fact that FDI does not contribute to poverty reduction has an important implication for policy makers, especially trade and FDI policies must be checked closely in order to make FDI growth enhancing in Ethiopia.

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Acronyms

ADLI	Agricultural Development Led Industrialization
AGOA	African Growth Opportunity Act
AIC	Akaike information criterion
BITs	Bilateral Investment Treaties
EEA	Ethiopian Economic Associations
EIA	Ethiopian Investment Authority
FDI	Foreign direct investment
FIAS	Foreign Investment Advisory Service
GDP	Gross Domestic Product
HQIC	Hannan-Quinn information criterion
IFC	International Finance Corporation
IMF	International Monetary Fund
LDCs	Least Developed countries
MNCs	Multinational corporations
NEPAD	New Partnership for Africa's Development
OECD	Organization for Economic Cooperation and Development
PCI	Per capita income
PPP	Purchasing power parity
SBIC	Schwarz's Bayesian information criterion
SNNPR	Southern Nations, Nationalities and Peoples Region
SSA	Sub-Saharan Africa
TNCS	Transnational corporations
UNCTAD	United Nations Conference on Trade and Development

Chapter One: Introduction

1.1 Background of the Study

Investment is known to be the engine of sustainable growth. However in LDCs the national level of savings is quite low. Consequently, there exists a huge gap between the required rate of investment and the existing rate of savings. The Brussels Declaration contained 30 international development goals for LDCs, including the attainment of an investment to GDP ratio of 25 per cent and an annual GDP growth rate of at least 7 per cent in order to achieve sustainable development and poverty reduction in LDCs. (UNCTAD, 2010, p 5).

Ethiopia is one of the World's poorest countries. According to MoFED (2010), out of a population of more than 80 million, estimated 29.2 percent of the population was living below the poverty line in 2009/2010. The Ethiopian economy has to grow at least at annual growth rate of 10% for more than two decades so that the country can attain the per capita income level achieved today by average Sub- Saharan African (SSA) countries. However, Ethiopia's gross domestic savings as proportion of GDP is quite low, and it is unlikely to achieve this growth rate by mobilizing the meager domestic savings (EEA, 2000 and 2007).

An alternative source of capital that can be used to fill this gap and bring about sustainable development is foreign direct investment (FDI). Foreign direct investment (FDI) is stated to be an important source of capital formation, know-how, employment generation and trade opportunities for LDCs and called for accelerating FDI inflows into these countries.

According to Hayami (2001) and Todaro and Smith (2003), the contributions of FDI to the development of a country are widely recognized as filling the gap between desired investment and domestically mobilized saving, increasing the tax revenues, and improving management, technology, as well as labor skills in host countries. These could help the country to break the vicious cycle of underdevelopment.

Since 2001, both LDC governments and their development partners have pursued proactive FDI-promotion policies. Although there was an abrupt interruption of the secular trend in 2009, FDI flows to LDCs grew at an annual rate of 15 per cent during 2001-2010 as a whole to reach an estimated $24 billion by 2010, compared with $7.1 billion in 2001, and their share in global FDI flows rose from 0.9 per cent to over 2 per cent (UNCTAD, 2011).

According to UNCTAD (2010), the Brussels goal of 7 per cent growth is being achieved by LDCs as a group and by 15 LDCs individually (UNCTAD, 2010, p 5). However this improved performance has been the result of an exceptional boom in international commodity prices and was not broad-based across LDCs. Furthermore, their per capita GDP growth is modest and is lagging behind that of other developing countries. Indeed 11 LDCs even saw their per capita income decline.

In the past decade (2001–2010) FDI inflows have been the most important external private capital flows for LDCs, exceeding foreign portfolio and other investments combined (UNCTAD, 2011). FDI does play an important role in LDCs and this importance has grown over the past decade, as evidenced by the expanding presence of the largest transnational corporations (TNCs).

Most LDCs have been making efforts to improve the investment environment over the years, through, for instance, reducing taxes, establishing an investment promotion agency to better assist foreign investors and abolishing FDI-related restrictions. Furthermore, increased attention has been paid by many LDCs to policy initiatives at the bilateral, regional and multilateral levels in order to enhance international cooperation and/or integration in matters relating to FDI.

Since the liberalization of the Ethiopian economy in 1992, the government has provided various incentive packages to attract foreign investors. Numerous macroeconomic reforms have been implemented with the objective of achieving macroeconomic stabilization and growth. The macroeconomic reforms include privatization of state owned enterprises, liberalization of trade policy, reduction of import tariff rates, elimination of non-tariff barriers, devaluation and deregulation of price & exchange rate controls (UNCTAD, 2002). The Ethiopian Investment Agency (EIA) was also established in 1992 to promote private investment, primarily foreign direct investment.

1.2 Statement of the Problem

The United Nations' Millennium Development Goals (MDG) Declaration outlines eight commitments to be reached by developing countries by 2015. The achievement of these Goals will contribute to improved human development and notable poverty reduction. However, realizing these goals requires a significant level of capital investment. A major source of this capital investment for LDCs is Foreign Direct Investment (FDI).

The gap between investment and saving in Ethiopia is very wide due to low level of income and domestic savings (Getinet and Hirut, 2006). Realizing the inadequacy of the domestic capital, the country has opened several economic sectors to foreign investors. The government has also issued several investment incentives. Since 1992 market oriented economic reforms have taken place and emphasis has been given to attracting FDI (Ethiopian Economics Association, 2004). Especially for the agricultural sector, regulations on investments have been relaxed significantly. No minimum capital is required anymore; foreign agricultural activities are exempted from the payment of custom duties and taxes on imports of capital goods. According to the export orientation of the foreign investor, they are exempted from income tax for a certain time period. Foreign investments are also exempted from the payment of sales and excise taxes for export commodities. As a result, there has been a significant increase in the inflow of FDI in Ethiopia.

Studies conducted in order to investigate the impact of FDI on poverty reduction are cross country analyses, but the role of FDI depends on both the economic and social conditions of a country. Since countries differ in their socio-economic conditions, country specific studies are crucial. Therefore, this study explores both analytically and empirically the relationship between foreign direct investment and poverty reduction through growth in per capita income. There are studies that show the importance of FDI for LDCs in order to bring a fast rate of growth. However, most of these studies are regional analysis and not country specific.

1.3 Objectives of the Study

The general objective of the study is to assess the contribution of foreign direct investment to poverty reduction in Ethiopia.

The specific objectives are:

- To investigate the relationship between FDI and poverty reduction in the country;
- To examine whether there exists a causal relationship between FDI and poverty and
- To forward some policy implications that are expected to improve the contribution of FDI in order to insure it benefits Ethiopia.

1.4 Data Source and Methodology

This paper is entirely based on secondary data. The major data sources are the Ethiopian Investment Authority (EIA), country reports & world investment reports published by the United Nations Conference on Trade and Development (UNCTAD) and UNCTAD's database. Real per capita GDP is the indicator used to measure poverty in the study and annual FDI inflows to measure the FDI. Both quantitative and qualitative methods of data analysis are used. The econometric method employs cointegrated vector auto regressive technique and vector error correction analysis using time series data from 1970-2009.

1.5 Scope and Limitation

This study focuses on the impact of FDI on poverty reduction in Ethiopia and the period covered was from 1970 until 2009. Real per capita GDP was used to indicate poverty.

The causal relationship between FDI and real per capita GDP was also analyzed in the study.

Availability of data is usually a challenge for researchers in most developing countries like Ethiopia, as was the case in this study. As a result, some variables in the empirical model had to be replaced or excluded. The shortcoming of such procedures is that, the quality of estimated results could be reduced.

1.6 Significance of the Study

There is a volume of research undertaken regarding the relationship between FDI and poverty reduction. However, there is still an ongoing debate as to their relationship due to the fact that different results were found from different regions and its long run effect has also been questioned. As a result this study will contribute to the debate by providing evidence from Ethiopia.

In addition, most of these studies are regional and are not specific for countries. But there are different conditions in different countries; for instance, economic settings, natural resources, level of development etc. vary from country to country. Thus, country specific studies are needed.

1.7 Organization of the Study

This thesis has six chapters. After the above introduction, chapter two provides a review of theoretical and empirical literature related to FDI and its linkage between poverty and

growth. Chapter three provides a brief review of the economic structure of Ethiopia, the FDI policy of the country and the sectoral & regional distribution of FDI in Ethiopia. The data types and sources, model specification and estimation techniques are discussed in the fourth chapter. Chapter five reports the results of the empirical analysis and chapter six presents conclusion and policy implication. .

Chapter Two: Review of the Literature

2.1 Main Concepts and Definitions of FDI

Foreign Direct Investment can be defined as an investment made by a firm or an entity based in one country, into a firm or entity based in another country. According to the World Bank, foreign direct investment is defined as "an investment made to acquire a lasting management in an enterprise operating in a country other than that of the investor." According to the IMF (1993) Balance of payment manual, an investment by a foreign investor is regarded as FDI if the direct investor holds at least 10 percent of the ordinary share or voting power of a firm.

Countries differ in the threshold value for foreign equity ownership which they take as evidence of a direct investment relationship. This is the level of participation at or above which the direct investor is normally regarded as having an effective say in the management of the enterprise involved. The threshold value usually applied for FDI is 10%, for data on the operations of TNCs; it involves chosen ranges of between 10-50% (UNCTAD, 2011).

According to Chryssochoidis, Millar and Clegg (1997), there are five different types of FDI. The first type of FDI is made to gain access to specific factors of production, e.g. resources, technical knowledge, patent or brand names etc. owned by a company in the host country. If such factors of production are not available in the home economy of the foreign company, and are not easy to transfer, then the foreign firm must invest locally in order to secure access.

The second type of FDI is developed by Raymond Vernon in his product cycle hypothesis. According to this model the company shall invest in order to gain access to cheaper factors of production, e.g low cost labor. The government of the host country may encourage this type of FDI if it is pursuing an export oriented development strategy. Since it may provide some form of investment incentive to the foreign company, in form of subsidies, grants and tax concessions. If the government is using an import substitution policy instead, foreign companies may only be allowed to participate in the home economy if they possess technical or managerial know-how that is not available to domestic industry. Such know how may be transferred through licensing. It can also result in a joint venture with a local partner.

The third type of FDI involves international competitors undertaking mutual investment in one another, e.g. through cross-shareholdings or through establishment of joint venture, in order to gain access to each other's product ranges. As a result of increased competition among similar products and R&D-induced specializations this type of FDI emerged. Both companies often find it difficult to compete in each other's home market or in third-country markets for each other's products. If none of the products gain the dominant advantage, the two companies can invest in each other's area of knowledge and promote sub-product specialization in production.

The fourth type of FDI concerns the access to customers in the host country market. In this type of FDI there is no observed shift in comparative advantage either to or from the host country. Export from the company's home base may be impossible, for example,

certain services, or the capability to request immediate design modifications. The limited tradability of many services has been an important factor explaining the growth of FDI in these sectors.

The fifth type of FDI relates to the trade divisionary aspect of regional integration. This type occurs when there are location advantages for foreign companies in their home country but the existence of tariffs or other barriers of trade prevent the companies from exporting to the host country. The foreign companies therefore jump the barriers by establishing a local presence within the host economy in order to gain access to the local market. The local manufacturing presence need only be sufficient to circumvent the trade barriers, since the foreign company wants to maintain as much of the value-added in its home economy.

2.2 Definitions of Poverty

Baud *et al.*, 2007, characterizes poverty by eight most important kinds of deprivation: inadequate and unstable incomes; inadequate, unstable or risky asset bases (for example, lack of education and housing); inadequate provision of public infrastructure (running water, sanitations, drainage, roads and sidewalks); inadequate provision of basic services; limited safety-nets for those unable to pay for services; inadequate protection of vulnerable groups through laws and rights; and powerlessness of vulnerable groups within political and bureaucratic systems. Therefore poverty is a multidimensional and complex concept.

The above characterization of poverty gives the impression that it is noticeable that poverty is not only defined by inadequate income. It is a manifestation of collective 'structures of constraint', which make it difficult for poor households to meet their needs and gain access to collective provisions of services (Baud *et al.*, 2007). There is a cause and effect relationship that deepens poverty for individual households: deprivation in one area hinders households from meeting their needs in the other areas (Baud *et al.*, 2007; Sen, 1999). For instance, deficiencies in housing, drinking water and sanitations can lead to poor health. This in turn prevents the afflicted from working effectively and reduces their ability to earn income (Baud *et al.*, 2007).

In the classic debate, poverty is defined as uni-dimensional-i.e. poverty of income (Pradham & Ravallion, 1998). One may classify poverty as 'absolute poverty' or 'relative poverty' based on income. Absolute poverty refers to inability to meet the estimated costs for satisfying minimum expenses for basic food and other necessities needed to survive. On the other hand relative poverty relates to, minimum level of consumption as proportion of total or average consumption (Owuor, 2006; Rakodi, 2002a). Households or individuals are considered poor when the resources they command do not enable them to consume sufficient goods and services to achieve reasonable minimum level of welfare (Rakodi, 2002a).

2.3 Linkage between FDI, Growth and Poverty Reduction

Various studies have been undertaken in order to investigate the relationship between FDI and economic growth. In the past FDI was seen by policy makers with skepticism

because it was believed that it may result in hurting infant domestic industries, loss of political sovereignty and deterioration of balance of payment due to the foreign investors' excessive capital good importation and repatriation of profit.

However, recently FDI has started to be encouraged due to claims of its positive effects on growth. For example, according to World Bank "FDI brings with it considerable benefits: technology transfer, management know-how, and export marketing access. Many developing countries will need to be more effective in attracting FDI flows if they are to close the technology gap with high income countries, upgrade, managerial skills and develop their export markets." (World Bank,1993). Caves (1996), also states that, the rationale for increased efforts to attract more FDI, stems from the belief that FDI has several positive effects. Among these are productivity gains, technology transfers and the introduction of new processes, managerial skills, and know-how in domestic market, employee training, international production networks, and access to markets.

Foreign direct investment may have a direct and/or an indirect impact on poverty reduction in the host economies. By indirect impact, it is to denote that FDI may induce the reduction of poverty through economic growth which results in the improvement of living standards due to the increase in GDP, improvement of technology and productivity, as well as the economic environment. On the other hand, FDI may have a direct impact on poverty reduction through employment creation and income generation resulting from the increment in the demand for employment by the foreign investors. FDI can alleviate poverty by creating employment, directly and indirectly, in host

countries. Investments by MNCs often directly generate new employment and create jobs (indirectly) through forward and backward linkages with domestic firms (Asiedu, 2008).

In addition, there are various channels through which FDI may result in poverty reduction through indirect ways. For example, FDI serves as a source of finance for economic development. Aseidu (2008) puts three reasons for the importance of FDI as a source of finance particularly to Africa. First, income levels and domestic savings in the region are low. Second, foreign aid to the region has been declining. Third, the New Partnership for Africa's Development (NEPAD) declaration stipulates that in order for the continent to achieve its Millennium Development Goal (MDG) of reducing the number of people living on less than a dollar a day by half in 2015, the continent needs to fill an annual resource gap of US$64 billion (about 12 per cent of GDP). Given the low savings rate and the decline in official assistance, the continent may have to rely on MNCs to provide the necessary capital needed for poverty alleviation (Asiedu, 2008).

Secondly, through FDI there will be transfer of new technologies, innovations, knowledge, new best practices and other intangible assets to the economy of the host country. The transfer of such intangible assets in the form of new business ventures (for example multinationals relocating) also often results in higher wages for production workers and is a much less volatile form of international investment than portfolio investment flows (Bhorat and Poswell, 2003). Findlay (1978) postulates that FDI increases the rate of technical progress in the host country through a "contagion" effect from the more advanced technology, management practices, etc., used by foreign firms.

The diffusion of all these intangible assets may also increase efficiency and productivity, and hence increase wage of workers in the host country.

A number of authors have also argued that multinationals may deliberately transfer technology to local suppliers as part of a strategy to build efficient supply chains for overseas operations (Pack and Saggi 2001; Blalock 2002; Javorcik 2004). By transferring technology to local suppliers, the downstream multinationals lower the cost of non-labor inputs. This cost-reduction motive implies that multinationals transfer technology to suppliers because it grants a private benefit to them.

Thirdly, FDI may result in crowding in of domestic investment. Jenkins and Thomas (2002) argue that FDI can contribute to economic growth not only by providing foreign capital but also by crowding in additional domestic investment; so it increases the total growth effect of FDI. On the other hand, FDI may also have a crowding out effect. According to Cobham (2001) there could be crowding out of domestic firms and possible contraction in total industry size and/or employment because of FDI. However, Cotton and Ramachandran argue that crowding out is a more rare event and the benefit of FDI tends to be prevalent (Cotton and Ramachandran, 2001).

Fourth, FDI can have a great contribution to economic growth in developing countries is by supporting export growth of the countries. FDI may provide access to new overseas markets and may also serve to improve efficiency and productivity, and to increase competition in the host country. Most foreign firms, especially multinational companies

from industrialized countries are well connected globally in terms of access to financial markets, consumer outlets and transportation networks (Jenkins and Thomas, 2002). Nevertheless, the role of FDI in export promotion remains controversial and depends crucially on the motive for such investment (World Bank, 1998).

Another way through which FDI can play a positive role on poverty reduction is through taxation of foreign subsidiaries. This will raise government revenues, which in turn can be used to fund various social development programs, including productive improvement and development of labor-intensive economic activities which will result in poverty alleviation.

But, in order to realize the benefits from this indirect role of FDI to alleviate poverty in the host countries, some pre-conditions must be fulfilled. First, the tax system in the host country should be attractive for investment, including from foreign investors. For example, if the tax rates in the host countries are too high as compared to other potential countries for FDI, it may hinder foreign investment. Internationally compatible corporate tax rates should reduce incentives to engage in 'transfer pricing', a practice, which reduces tax revenue in the host economy.

Second, whether or not government budgets gain sufficiently by taxing foreign subsidiaries depends on what policies and agreements are in place to ensure the tax revenue is collected. Foreign firms often use transfer pricing in order to minimize tax burden. UNCTAD (1999) states that, reforms undertaken to restrict profit remittance and

double taxation treaties should have reduced the use of transfer pricing to withdraw income from the host economy. But it is argued in the report that this issue remains a concern for developing countries. A study by UNCTAD indicates, that about 84% of developing countries participating in a survey believed that affiliate companies hosted in their economies shift income to parent firms in order to reduce tax liabilities. The study concludes that transfer pricing continues to be an issue, with action required at both the national level and in the context of international investment arrangements.

Finally, how this collected tax from FDI is spent also matters. This revenue should be spent on employment generating or poverty alleviating programs, such as development of labor-intensive projects or small and medium enterprises, or to support the development of a safety net for the poor, or it is used to finance imports of components or raw materials for domestic capital-intensive industries.

2.4 Empirical Literature

Most studies in developing nations have attempted to investigate the impact of foreign direct investment on poverty reduction from two perspectives. Indirectly, through economic growth, i.e via technology transfer and productivity gains, for domestic firms in developing countries: or directly through employment creation. Much of these studies show that foreign owned firms outperform domestic-owned firms i.e. they have higher productivity. And this productivity difference is due to better technology and management. Blomstrom and Kokko (1998) found that multinational companies play an important role for productivity in their host countries, but the exact nature of the impact

of FDI varies between industries and countries, in their empirical study on the effects of FDI on the host country.

Borensztein et al. (1998) tested the effect of FDI on economic growth in a cross-country regression framework. They used data on FDI received by developing countries from industrial countries only. They found some indications that FDI has a positive effect on economic growth, but this impact was dependent on the human capital stock in the host economy. According to their study, the higher productivity of FDI holds only when the host country has a minimum threshold stock of human capital. Thus, FDI contributes to economic growth only when a sufficient absorptive capability of the advanced technologies that it brings is available in the host economy.

Graham (1995) surveyed the theoretical and empirical literature on the economic consequences of FDI for host countries. Based on the overall finding, he concludes, inter alia, that positive effects of FDI come about largely through the transfer of new technology, knowledge and other intangible assets, leading to productivity increase and improvements in the efficiency of resource allocation. In another study, Blalock (2002) finds evidence of technology transfer through the supply chain in production function estimates in Indonesia, and Beata Smarzynska (2003) finds similar results in Lithuania.

Nonetheless, such diffusion of technology and other better skills may not be obvious in some countries. For example, Cockcroft and Riddell (1991) found that FDI made a negligible contribution to productivity in most African countries during the 1980s.

Ramachandran and Shah (1997) found that only domestic firms with majority foreign ownership are the ones that performed well.

Adeolu B., (2007) investigated the empirical relationship between non-extractive FDI and economic growth in Nigeria by using time series data from 1970–2002. He used an augmented growth model estimated via the ordinary least squares and the two stage least squares method. His results suggest that there is a positive but insignificant relationship between FDI and the overall economy in Nigeria. However he found that FDI in the communication sector has a significant impact on growth and has the highest potential to grow the economy. The manufacturing sector FDI negatively affected the economy in Nigeria.

Seetanah (2001), investigates the impact of foreign direct investment (FDI) on economic growth for a panel of 39 Sub-Saharan African countries for the period 1980-2000. The finding suggests that FDI is an important element in explaining economic performance of Sub Saharan African countries, though to a lesser extent as compared to the other types of capital.

In another study, Abdulhamid Sukar et al. examined the effect of foreign direct investment on economic growth in Sub-Sahara African countries. The methodology involved estimating augmented endogenous growth model using panel data for the period 1975-1999. The results indicate that foreign direct investment has marginally significant positive effect on economic growth. In addition domestic economic

conditions such as macroeconomic policy, openness, and domestic investment have significant positive effect on economic growth.

Sarbapriya Ray (2012) analyzed the causal relationship between Foreign Direct Investment (FDI) and economic growth in India by using ordinary Least Square Method and the cointegration approach for the period, 1990-91 to2010-11. The finding suggests that there is positive relationship between foreign direct investment (FDI) investment and GDP and vice versa. The Granger Causality test established the presence of uni-directional causality which runs from economic growth to foreign direct investment.

Anwar Ul Haq (2012), examined the impact of foreign capital inflows on the economic growth of Pakistan by using the yearly data for the period of 1981 – 2010 and multiple regression analysis and found a positive and significant relationship. He also performed Granger Causality test and found a unidirectional relationship from GDP to foreign direct investment.

Sridharan. P. and Vijayakumar. N (2009) examined the causal relationship between Foreign Direct Investment (FDI) and Growth of the BRICS countries by using Vector Error Correction Model (VECM) to trace the existence of long run relationship. The results of VECM suggested that Growth leads FDI bi-directionally for Brazil, Russia and South Africa and FDI leads Growth uni-directionally for India and China respectively.

Evidence from developed countries seems to support the idea that the productivity of domestic firms is positively related to the presence of foreign firms (Globerman, 1979; Imbriani and Reganeti, 1997). However, the results for developing countries are not so clear, with some finding positive spillovers (Blomstrom, 1986; Kokko, 1994; Blomstrom and Sjoholm, 1999) and others such as Aitken et. al. (1997) reporting limited evidence. Others find no evidence of positive short-run spillover from foreign firms.

Some of the reasons forwarded for these mixed results are that the envisaged forward and backward linkages may not necessarily be there (Aitken et.al.1997) and that arguments of TNCs encouraging increased productivity due to competition may not be true in practice Aitken et al. (1999). Other reasons include the fact that TNCs tend to locate in high productivity industries and, therefore, could force less productive firms to exit (Smarzynska, 2002).

Other than the above mentioned ways, some economists also see FDI as having a direct impact on trade in goods and services (Markussen and Vernables, 1998). Trade theory expects FDI inflows to result in improved competitiveness of host countries' exports (Blomstrom and Kokko, 1998). Resource- or efficiency-seeking investments aim at tapping the best resources the country has to offer with a view to export goods and services, or with the aim to integrate some production processes into the investor’s international production chain. The competitiveness of the exported products, the exchange rate and external demand are of major interest to this kind of investor (Christoph Ernst, 2005).

FDI may also result in crowding in domestic investment in the host country. This in turn leads to increase in income, hence, poverty reduction. However, FDI may also have a crowding out effect in the host economy. A study made by J. Weeks (2000) and M. Agosin (2000) shows that Asia, is the region with the strongest crowding-in effect, while Latin America with the most far-reaching liberalization of FDI rules in the 1990s, does not benefit from crowding-in effects. Looking closer at Argentina, Brazil and Mexico, the studies show a slightly more positive picture than for the whole region, meaning a neutral effect or slight crowding-out effect for the 1990s (also see M. Kulfas, 2002 and D. Ibarra, 2004).

Another way FDI may contribute to growth and reduce poverty is through employment creation. Unemployment is one of the major challenges facing LDCs today and employment creation is believed to be one of the rapid ways of poverty reduction. FDI may enhance employment deliberately. If the foreign investment is market-seeking it is generally concerned with the efficiency of the internal market which includes the labor market. Growth of employment and real wages is very important in contributing to an increase in internal demand, which implies that the foreign producer finds a growing number of domestic consumers of goods produced for the host country market (Christoph Ernst, 2005).

Iyanda (1999), using data for Namibia, finds that about two to four jobs are created locally for each worker employed by an MNC. Asiedu and Gyimah-Brempong (2008)

studied the impact of the liberalization of investment policies on employment and investments by multinational corporations in Africa. They used data for 33 countries over the period 1984–2003 and employed a dynamic panel estimator for their analysis. They found that, liberalization has a significant and positive effect on investment and that liberalization does not have a direct impact on multinational employment — the effect is indirect: liberalization stimulates multinational investments which in turn increases multinational employment. By increasing investment and employment from multinational firms, these liberalization programs contribute to poverty alleviation.

On the other hand, various studies have observed that TNCs made a disappointing contribution to employment creation during the 1990s. Dussel Peters (2000b) has stressed the discrete participation of TNCs in Mexico in terms of employment creation between 1993 and 1998, with a share of 5.7 per cent of national employment. Ramirez (2001) has shown that in Mexico, long-term employment creation in the automobile industry was limited, given that the technology transferred from the parent companies was in the form of capital-intensive, computer-aided manufacturing. Most of the new manufacturing jobs have been created in the *maquiladora* industry, an assembly plant in Mexico along the border between the United States and Mexico, to which foreign materials and parts are shipped and from which the finished product is returned to the original market.

In Argentina, Kulfas, Porta and Ramos (2002) found that TNCs contributed to increased productivity, but at the same time they reduced the number of employees. The number of workers per company fell by 7.9 per cent between 1993 and 1997. The situation is even worse in manufacturing, where average employment declined by 12.7 per cent during the

same period. The services sector also had an employment decline of -2.7 per cent (Christoph Ernst, 2005).

Another important aspect of multinational employment is that MNCs tend to pay higher wages than prevail locally. Harrison (1996) finds that the wage differences between foreign-owned firms and domestic firms in Cote d'Ivoire range from 10 per cent to about 90 per cent. Moreover, multinational presence sometimes generates wage spillovers: wages tend to be higher in industries and provinces that have a greater foreign presence (Lipsey, 1994; Lipsey and Sjoholm, 2001). Axarloglou and Pournarakis, (2007) however, find that the employment and wage effects of FDI vary by industry.

Studies in Latin America also come with the same evidence. For instance, recent research by the Overseas Development Institute (2002) has examined how FDI affects the distribution of income and wages of skilled and less skilled workers in particular. It shows that FDI did not have an inequality-reducing or poverty reduction effect in Latin America.

In order for this channel to be efficient, the amount of jobs created should be more than the jobs destructed (because of layoffs due to mergers and acquisitions, closing of local firms, etc.) in the country. For instance, FDI in labor intensive sector such as agriculture is likely to have the highest impact on welfare of the poor.

When we come to Ethiopia, there is a dearth of empirical literature regarding FDI and poverty reduction. However, there are some studies made on the subject of FDI. Getinet and Hirut (2006) studied the determinants of foreign direct investment in Ethiopia and found that growth rate of real GDP, export orientation, and liberalisation, among others, have positive impact on FDI. On the other hand, macroeconomic instability and poor infrastructure have negative impact on FDI. On the other hand Blen and Sisay (2009) studied the roles of exchange rate uncertainty and political risk on foreign direct investment into Africa by using sample of 12 African countries and employing Fixed Effect and Arellano-Bond GMM estimators. Their results show both macroeconomic uncertainty and political risk to be deterrents of FDI inflows into these African economies.

To summarize, there have been various studies undertaken to investigate the relationship between FDI and growth and poverty by employing various methodologies. However, there is no unanimous agreement as there are mixed findings in different studies. The literature shows that, the evidence for developed countries seems to support the notion that the productivity of domestic firms is positively related to the presence of foreign firms (Globeram, 1979; Imbriani and Reganeti, 1997). The results for developing countries are not so clear, with some finding positive spillovers (Blomstrom, 1986; Kokko, 1994; Blomstrom and Sjoholm, 1999) and others such as Aitken *et. al*. (1997) reporting limited evidence. Still others find no evidence of positive short-run spillover

from foreign firms and negative relationship between FDI and growth like Omoniyi and Omobitan (2011).

The role of FDI seems to be country specific, and can be positive, negative or insignificant, depending on the economic, institutional and technological conditions in the recipient countries. Most studies on FDI and growth are cross-country evidences, while the role of FDI in economic growth can be country specific. According to Zhang (2001) “the extent to which FDI contributes to growth depends on the economic and social condition or in short, the quality of the environment of the recipient country”. As a result, country specific studies are considered necessary.

Chapter Three: Overview of the Ethiopian Economy

Ethiopia, a country with a total population of over 84 million in 2011, is one of the most populous countries in Africa. Ethiopia is a Federal Democratic Republic, including nine regional states: Afar, Benishangul-Gumuz, Amhara, Oromia, Tigray, Somali, Benishangul-Gumuz, Southern Nations-Nationalities and Peoples Region (SNNPR), Gambella and Harari, and two administrative states: Addis Ababa city administration and Dire Dawa City Council. Since 1991, Ethiopia has adopted a market economy after the fall of the Derg regime, which practiced a state controlled economy.

According to UNCTAD (2011) annual report, about 88.6% of the population lives in poverty and 39% of the population lives below $1.25 per day. World Bank's (2008) report indicates that, more than 84% of the population lives in rural area and only 22% of the population has access to improved water sources. UNCTAD's report indicates the life expectancy at birth is 59.3 years. The purchasing power of the people is one of the lowest in the world. Using purchasing power parity (PPP), the GDP per capita of the country for 2011 amounted to $848. The gross domestic saving is one of the lowest in the world, for instance, in 2004/2005, gross domestic saving was only 2.6% of the GDP (or total consumption accounted for 97.4% of the GDP) (EEA, 2007). Table 3.1 shows a summary of the country's profile.

Table 3.1 Country Profile

HDI	**rank 174**
Health (Life expectancy at birth)	59.3
Education (expected and mean yrs of schooling)	0.237
Income (GNI per capita in PPP terms)	971
Inequality (inequality-adjusted HDI)	0.237
Poverty (Multidimensional poverty index in %)	0.562
Sustainability (Adjusted net savings %of GNI)	8.3
Demography (Total population)	84,734,300

Source: UNDP Human Development Report, 2011

The Ethiopian economy is characterized by heavy dependence on agriculture, which accounts for 45% of total GDP. Around 80 percent of the population derives its livelihood directly or indirectly from the agricultural sector. Agricultural exports, mainly coffee and processed and semi-processed hides and skins, account for over 80 percent of all exports, with coffee alone accounting for over 64 percent of foreign exchange earnings. Manufacturing, mining, trade, tourism, construction, services, and other sectors make up the remaining 55 percent of GDP.

The performance of the agriculture sector, however, is highly determined by availability of suitable weather condition. Recurrent drought and traditional cultivation practices, land fragmentation, low level of fertilizer application and high population growth rate are the prime problems of the sector (EEA, 2007). Even though Ethiopia is endowed with a lot of fertile land, 4-6 million people depend on international food assistance even in years with good harvest. Due to increased food aid, the proportion of undernourished population has decreased from 69% in 1995 down to 46% in 2004 (World Bank 2007).

A major reason for this high dependency on food aid is that even though the average annual rainfall is sufficient with 848mm, most of the rain falls intensively, extremely spatial and with very high temporal variability. This leads to high risks of annual droughts and intra-seasonal dry spells as nearly all food crops in Ethiopia come from rain fed agriculture (FAOSTAT, 2005).

In 2007 the main important products especially regarding small scale productions were cattle meat, roots and tubers, cow milk, maize, chilies and peppers, cereals, wheat, coffee, sorghum and sheep meat (FAO statistics, 2009). The flower sector has only recently become an important agricultural sector for Ethiopia. It is a relatively new but at the same time very dynamic sector. Since 2001 up to 2007 the export value of flowers has increased from US$ 0.3 Million up to US$ 113 Million (Joosten, 2007) which accounted for 7.8% of the total export value in 2007.

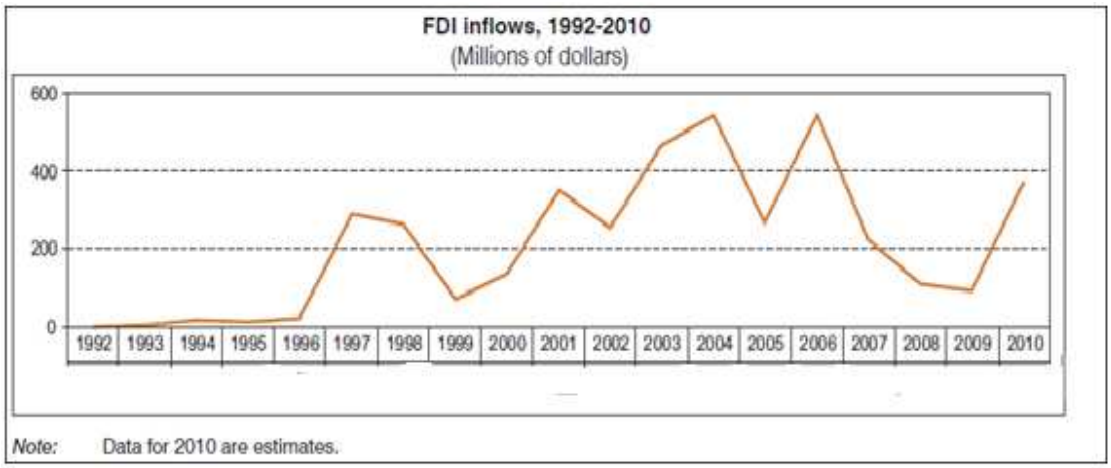
The industrial sector is still at its early stage and Ethiopia is one of the least industrialized economies in the world. Close to half a century, the industrial sector contribution to the GDP ranged between 9 and 11 percent, and the growth rate of the sector is very little compared to the agricultural sector. The employment contribution of the industrial sector was nearly 8% in 2005 (EEA, 2007). Surprisingly, manufacturing goods export accounted for less than 1% of the total exports (UNCTAD, 2002).

The service sector is the second largest sector after agriculture. This sector includes trade, hotels & restaurants, transport & communication, banking & insurance, public administration & defense, education, health and other services. From 1991/92-2004/05, the service sector accounted for 42% of the GDP of the country, and the employment share of the sector is slightly higher than 10% (EEA, 2007).

3.1 FDI in Ethiopia- Overview

Since 1991, Ethiopia has opened many economic sectors for foreign investors. The inflow of FDI to Ethiopia has increased from an annual average of $131 million in 1995-2000 to $312 million in 2001-2006 although there are fluctuations. The total FDI inflow into Ethiopia has increased continuously from US$ 135 Million in 2000 up to US$ 545 Million in 2004. Since then, up to 2007 the yearly FDI inflows have varied between US$ 545 Million and US$ 265 Million (UNCTAD, 2008).

Figure 3.1 FDI Inflows in Ethiopia



Source: UNCTAD World Investment Report 2011

FDI inflows into the agricultural sector account for 32% of the total Ethiopian FDI inflows. And it has increased heavily since 2005 according to the Ethiopian investment agency. Lucie Weissleder argues there can be three main reasons that can account for this significant change in the development of the FDI inflows in the sector. The first one is a significant change in the exchange rate of the main investors, leading to a depreciation of the Ethiopian Birr compared with the currencies of the investors. The second reason, especially against the background of the world food crises, is the grabbing of natural resources to secure the food demand in the investor's country. The investment climate of Ethiopia can be seen as the third reason. (Lucie Weissleder, 2009)

However, Ethiopia still remains one of the least FDI recipients in the world. The average annual FDI flows to Ethiopia from 2003 to 2006 were only $399 million, which is only 1.56% of the total FDI flows into Africa. Ethiopia accounted for only 1% of Africa's inward FDI stock, while representing close to 9% of the population of the continent. Ethiopia's per capita inflows were $5 in 2006, compared with $ 39 for African countries as a whole. FDI as a percentage of GDP of Ethiopia was 0.81% in 2006, compared with 1.6% for Africa (Solomon Mamo, 2008).

3.1.1 Regional Distribution of FDI

The flow of FDI to Ethiopia has been unevenly distributed among the various regions. Even though the incentive system encourages foreign investors to invest in the least developed regions (Gambella, Afar, Somali and Benishangul-Gumuz) of the country by providing especial benefits including provision of land free of any charge, their performance in attracting FDI is very poor (EIA, 2008 and Tagesse, 2001).

As it is shown in table 3.2, most of the FDI is destined in Addis Ababa, the capital. Out of the total 1350 projects (from 1992-2011) 840 of the projects were situated in Addis Ababa. This is because of the regions' better infrastructure, stable political environment and better supply of trained man power. Oromia Region has attracted sizable amount of FDI with respect to the amount of capital invested. That is, of the total FDI operating in Ethiopia during 1992-2911, 36.9% of the capital was invested in Oromia. This may be due to the regions proximity to Addis Ababa, availability of natural resource (arable land

and favorable climate) and large market size as it is the most populous region in the country. About 4% of the total FDI was invested in the Amhara region.

Conversely, Harari, Gambella, Afar, Somali and Benishangul-Gumuz's performance in attracting FDI has been very poor. For example, there is only one project in Harari and Benishangul-Gumuz Regions each and no foreign investments in the Somali region, since the country opened its door to foreign investors.

Table 3.2 Summary of Licensed FDI Projects by Region Since August 22, 1992 - February 02, 2012

Region	No of Projs.	Capital in '000' Birr	%
Addis Ababa	842	10,883,557	31.60%
Afar	7	335,664	0.97%
Amhara	36	1,427,755	4.15%
B.Gumze	1	50,000	0.14%
Dire Dawa	3	96,100	0.27%
Gambella	2	774,900	2.25%
Harari	1	2,500	0.01%
Multiregional	121	5,993,580	17.15%
Oromia	289	12,698,705	36.97%
SNNPR	35	1,505,399	4.38%
Somali			
Tigray	13	574,506	1.67%
Grand Total	1,350	34,342,666	100%

Source: Ethiopian Investment Agency

3.1.2 Sectoral Distribution of FDI

The distribution of FDI flows to Ethiopia is fairly diversified into various sectors ranging from the primary including all types of agricultural activities and mining & quarrying to secondary sector or the industrial activities to the tertiary sector including electricity generation, construction, real estate, trade, hotel and tourism, transport service, education and health service.

As can be seen from table 3.3, manufacturing accounted for 42.9% of the total FDI followed by agriculture which accounted for 26.5% from 1992-2012 and real estate, machinery and equipment rental and consultancy service constitutes 13.86% of the total FDI flows to Ethiopia. Construction contracting, including water well drilling constitutes 11.73%. However, the mining, health and tourism industries are areas that have not received much FDI in the country with each accounting for less than 1% of the total inflow.

Table 3.3 Summary of Licensed FDI Projects by Sector Since August 22, 1992 - February 02, 2012

Sector	No. of projects	Capital in "000" Birr	%
Agriculture	195	9,189,119	26.75
Fishing			
Manufacturing	530	14,734,522	42.90
Mining	11	176,903	0.51
Education	35	363,075	1.05
Health	29	152,978	0.44
Hotels (Including Resort Hotels,Motels and Lodges) and Restaurants	66	394,820	1.14
Tour Operation, Transport and Communication	36	75,083	0.21
Real estate, Machinery and Equipment Rental and Consultancy Service	324	4,761,994	13.86
Construction Contracting Including Water Well Drilling	83	4,031,191	11.73
Electricity (Generation, Transmission and Distribution)			
Others*	41	462,982	1.34
Grand Total	1,350	34,342,666	100

Source: Ethiopian Investment Agency

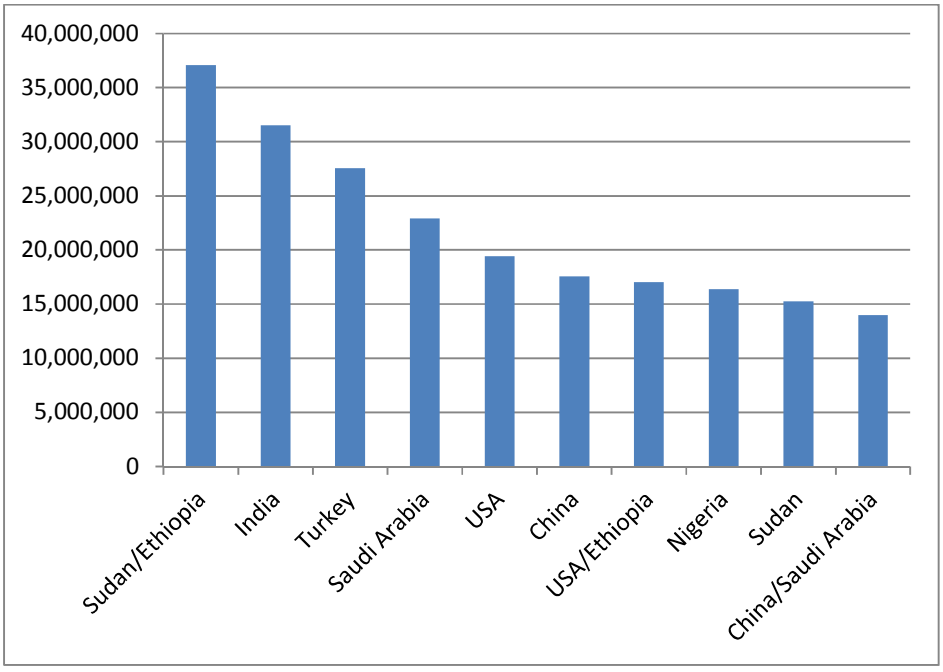
3.1.3 FDI Flows by Country of Origin

During the period 1992-July 2005 Saudi Arabia accounted for half of the FDI flows to Ethiopia. Ethiopian Economic Association (2007) reported that one company -

MIDROC group investment, highly dominates FDI flows originating from Saudi Arabia. Other than this company Saudi was followed by the United Kingdom, accounting for 9.4%. France, USA, China and India were the other major source countries during that period. However, now china has the largest investment in the country followed by India, Sudan, and USA.

Figure 3.2 FDI Flows to Ethiopia by Country of Origin

(in '000' Birr) from July 1992 to July 2005



Source: Ethiopian Investment Agency, 2012.

3.2 FDI and Employment in Ethiopia

As discussed above Ethiopia is one of the least recipients of FDI in Africa. As a result, the amount of people employed in FDI related sectors is very small. As can be seen from table 3.4, employment in FDI accounts for less than one percent of the total labor force in the country during the period of the study.

Table 3.4 Employment by FDI in Ethiopia

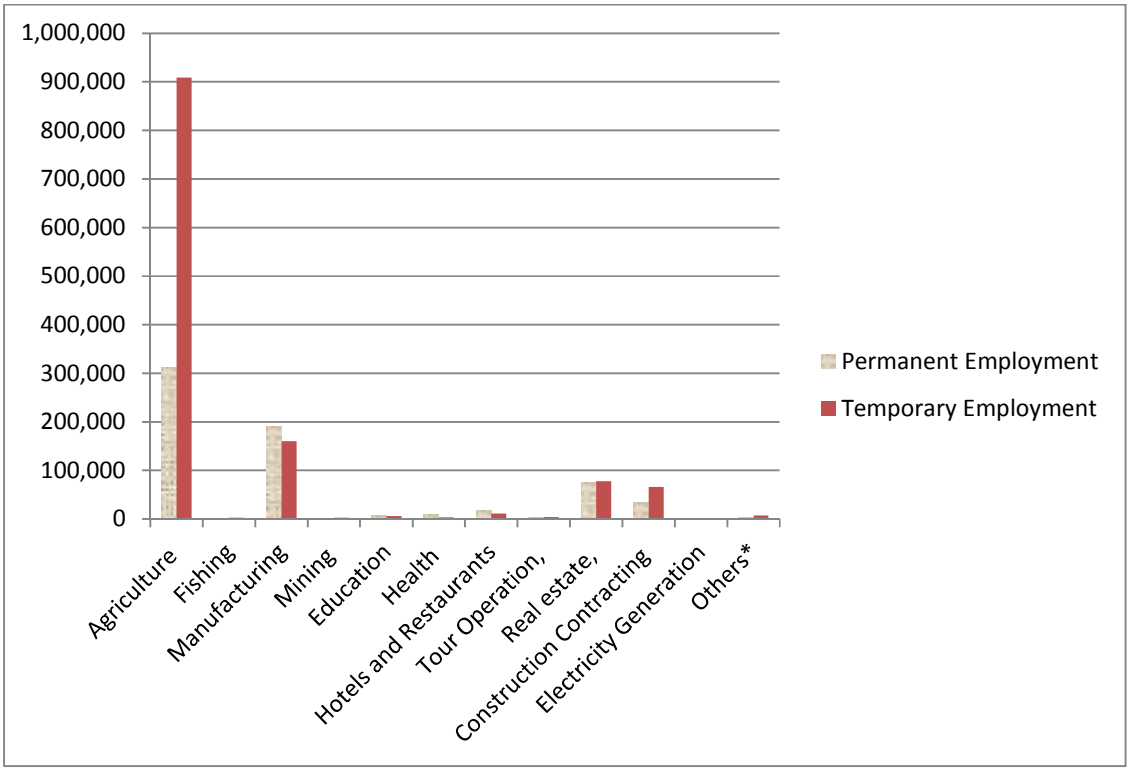
year	Employment	% of labor force
1992	693	0.003
1993	1099	0.004
1994	2356	0.009
1995	665	0.002
1996	2906	0.011
1997	3396	0.012
1998	6700	0.024
1999	1778	0.006
2000	8026	0.027
2001	6510	0.021
2002	6308	0.020
2003	20900	0.064
2004	52991	0.157
2005	47830	0.137
2006	107316	0.298
2007	307213	0.827
2008	563789	1.471
2009	297732	0.753
2010	281890	0.691

Source: Calculated based on data from Ethiopian Investment Agency and World Bank

Agriculture accounts for most of the employment created, employing more than 900,000 people temporarily and more than 310,000 people permanently. 64% of the total FDI employment goes to this sector. The manufacturing sector accounts for 18% of the total

FDI employment in Ethiopia followed by real estate services, which includes machinery, equipment rentals and consultancy services and construction contracting including water well drilling account for 0.08% and 0.05% respectively.

Figure 3.3 **FDI Employments by Sector**



Source: Ethiopian Investment Agency

3.3 FDI Regulatory Framework in Ethiopia

After the fall of the socialist, Derg regime, Ethiopia has adopted a market-oriented economy in 1991. The national investment code has been amended several times since then. The Government initiated a privatization programme in 1995/96. So far over 170 enterprises and units have been privatized. Most of the smaller enterprises and units were sold to domestic investors, whilst a number of the larger enterprises have been

acquired by foreign investors. These include a gold mine, Coca-Cola and Pepsi Cola bottling companies, a brewery, meat processing and canning plants, and a tannery. Over the coming years the Government plans to privatize a further 120 enterprises (EIA, 2008).

After obtaining an approval from Ethiopian Investment Authority or regional investment authorities to invest, foreign investors can invest in all economic sectors other than some sectors exclusively reserved for national investors and the government. To encourage indigenous entrepreneurship and the domestic private sector, the financial sector, import trade, small air transport (less than 20 passengers), commercial water & road transport and several small businesses are reserved for national investors(UNCTAD, 2002). However, now foreign investors are allowed to jointly invest and work with the government in basic infrastructures. For instance, foreign investors are now particularly sought to set up hydroelectric power plants in the country and the government has now liberalized the telecommunication services sector, allowing foreign investors to participate in telecom activities jointly with the government.

Some of the sectors which are open for foreign investors and in which the country is currently seeking include: Manufacturing industries (including food, beverages, chemicals and, pharmaceuticals, plastics, metallic and non-metallic products, paper products, leather and leather products, textiles and garments); Agriculture, including agribusiness and processing for exports; Grade 1 construction contract Real-estate development; Engineering and management consult; Education and health services; and Mining and quarrying of gold, marble and granite;

The initial capital requirement for a wholly foreign-owned enterprise is a minimum of USD 100,000. But wholly foreign-owned consultancies and publishing companies can obtain the investment license with USD 50,000. To invest jointly with Ethiopian investors, foreign investors should invest a minimum of USD 60,000 and the national investors should acquire at least 27 percent of the equity. To encourage export-oriented FDI, foreign enterprises that export at least 75% of their output are not required to meet the minimum capital requirement. Nevertheless, the investment code does not indicate the initial investment is whether in cash or in kind (UNCTAD, 2002).

There are various incentives given to foreign direct investors. These include: exemption from payment of export custom duties, income tax holidays from 2 to 7 years depending on the region and the sector of the investment. All imported capital goods and spare parts worth up to 15% of the value of the capital good are exempted from import tariffs and custom duties. In addition, the foreign investors can carry forward their initial operating losses and apply any depreciation methods for their financial statement. Besides, all foreign investors are exempted from profit tax for two years. This exemption is extended to 5 years for investors exporting at least 50% of their product and supply 75% of their product as input to exporters. With regards investment guarantees, the investment code provides guarantee for repatriation of capital, interest payments on foreign loans, profit, dividends, asset sell proceeds and technology transfer payments. Except in major cases of public interest, the investment code also provides guarantee against expropriation (EIA, 2008; EEA, 2007).

Chapter Four: Methodology

4.1 Definition of the Variables and Data Source

The main objective of this paper is to assess the impact of FDI on poverty reduction in Ethiopia. As a result in this study real per capita GDP is the indicator used to measure poverty. Economic growth remains a necessary ingredient for poverty reduction. Recent studies suggest that growth tends to lift the incomes of the poor proportionately with overall growth. For instance, by regressing the growth of average income for the poorest 20% and the poorest 40% of the population against the growth of GDP per capita, Roemer and Gugerty (1997) found that on average the poor do benefit from economic growth. In another study, Ravallion (2007), used data from household surveys for 67 developing and transitional economies over 1981-94 and they found that almost always, poverty fell with growth in average living standards and rose with contraction. Dollar and Kraay (2000), estimating the link between the income of the poor (defined as the bottom 20% of the income distribution) and overall income or per capita GDP and found that; as overall income increases, on average, income of the poor increases by exactly the same rate.

Real per capita GDP: is obtained by taking the ratio of real GDP to the population.

Foreign direct investment (FDI): to measure the FDI, the net inflow of FDI was used. It includes the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.

Openness of the host economy to trade (OPEN): The ratio of trade (imports and exports) to GDP is used to capture this variable as is the case in many studies. FDI inflows are expected to result in improved competitiveness of host countries exports. As exports and investment increase, they will have a multiplier effect on GDP. Increased exports and investments may also generate foreign exchange that can be used to import capital goods. Further, if the additional investment is engaged in labor intensive techniques, employment will rise.

Infrastructure development (INFR): a developed infrastructure results in reduction of operating costs, increase in productivity and facilitates production. Infrastructure increases the productivity of investment and thereby enhances economic growth. In the literature, the number of telephones per 1,000 people is often used to measure infrastructure development. The defects of this measure are that it does not take into consideration the rise in the number of mobile phones and that it measures only the availability of the facility and not reliability. In this study, the amount of annual electricity production is used as an indicator for infrastructure development.

Government size (GOVCONS): a higher level of government consumption should entail provision of basic needs for the citizens. This will in turn ensure a better social capital that should encourage production and growth. This is measured as the ratio of total government consumption to GDP.

Human capital (HUMCAP): many researchers include human capital in their growth equations because it is one of the most important factors affecting growth in a country. In this study, expenditure on education was used as a proxy for human capital, to show

the impact of education to poverty reduction. Akinlo (2004) and Borensztein et al. (1998) included human capital in their growth equations.

Inflation (INFL): it was included because the inflation rate serves as an indicator of overall macroeconomic stability of the country. Asiedu (2003) considered inflation as proxy for economic instability and as determinant of economic growth.

4.2 Model Specification

4.2.1 Theoretical Framework

In this study the impact of FDI on poverty reduction is analyzed based on the standard growth accounting model. The augmented Solow production function specifies that output is a function of labor, human capital, capital stock and productivity (Mankiw, 1992). By using the Cobb Douglass production function we can write

$$Y_i = A_i K^{\beta}_i L^{\mu}_i H^{\Omega}_i \quad \text{.....(4.1)}$$

Where Y represents the output flow; and K_i, L_i and H_i are the total factor productivity, capital stock, the labor, the human capital stock respectively. A_i, accounts for the output growth that is not accounted by the growth in factors of production included.

Taking logs and differentiating Equation 4.1 with respect to time, we obtain the familiar growth equation:

$$y = a_i + \beta k_i + \mu l_i + \Omega h_i \quad \text{..... (4.2)}$$

The lower case letters represent the growth rates of output, capital stock, labour and human capital, and α, β, μ and Ω represent the technical progress, capital stock, labor and human capital, respectively.

Equation 4.2 shows the fundamental growth accounting equation, which decomposes the growth rate of output into growth rate of total factor productivity plus a weighted sum of the growth rates of capital stocks, human capital stock and the growth rate of labor.

In this study capital stock is indicated by the net inflow of foreign direct investment and government consumption.

So,

$$y = a + \beta k_1 + \pi k_2 + \Omega h + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.3)$$

Where k_1 and K_2 represent capital stock and ε represents the error term.

4.3 Economic Approach

Recognizing the possibility of endogeneity in the relationship between the independent variables and GDP growth, this study is based on the Vector Autoregressive (VAR). The VAR approach is preferred for the present study as it does not require us to differentiate the variables as endogenous or exogenous. VAR is commonly used for forecasting systems of interrelated time series and analyzing the dynamic impact of random disturbances on the system of variables. In addition, a simple cointegrated VAR model (which combines co-integration analysis and VAR time series process) helps to account for spurious correlations and exo-genitive bias *(Badawi, 2005).*

Moreover, testing for co-integration using single equation approach by itself has draw backs because it may give misleading results, if more than one cointegration relationship is present.

4.3.1 Test for Stationarity

Estimation of parameters and hypothesis testing using time series data requires an investigation of the data generating process of the variable under consideration. This investigation helps to avoid estimating a spurious correlation between variables in a regression, where what actually exist is correlated time trend rather than a meaningful economic relationship (Granger and Newbold 1974). A combination of variables that contain a time trend or are non-stationarity may lead to spurious correlation. To avoid the problem of spurious correlation due to the presence of non-stationary variables in the regression model, the time series properties of the variables used in the model are investigated.

A series is referred as (covariance) stationary if it has constant mean, finite time-invariant variance and a covariance between any two-time period that depends only on the lag between them *(Enders, 1995:212; and Gujarati, 2003: 797)*. Non-stationarity, a property common to many macroeconomic and financial time series, means that a variable has no clear tendency to return to a constant mean or a linear trend. In the presence of non-stationary variables, there might be spurious correlation *(Granger and Newbold, 1974)*. Hence each series is checked for stationarity using the standard Augmented Dickey-Fuller (ADF) and the Phillips- Perron (PP) tests.

Augmented Dickey-Fuller (ADF)

A test of stationarity (or non stationarity) that has been become popular over the past several years is the unit root test. The DF and the ADF tests are the most usually used tests for unit root (Gujarati, 2004).

If the data generating process follows the first order autoregressive process, i.e. AR(1) the simplest form of the Dickey-Fuller (DF) test amounts to testing;

$$y_t = \mu + \rho y_{t-1} + u_t \qquad (4.4a)$$

or

$$\Delta y_t = \mu + \gamma y_{t-1} + u_t \quad \text{Where} \quad \gamma = \rho - 1 \quad u_t : IID(0, \sigma^2) \qquad (4.4b)$$

Then we test the hypothesis:

$H_O : \rho = 1$ (i.e. y_t series is non stationary)

$H_1 : \rho < 1$ (i.e. y_t series is integrated of order zero or stationary)

If there is a deterministic component (intercept, trend, dummies) in the data generating process, we must allow a time trend to enter in the regression model and it can be expressed as:

$$\Delta y_t = \mu + \gamma t + \beta y_{t-1} + U_t \qquad u_t \sim IID(0, \sigma^2) \quad . \qquad (4.5)$$

And we test the same set of hypothesis as in equation (5.10).

But the DF test assumes data generating process follows autoregressive (AR) of order one; AR (1), and residuals are 'white noise'. However, if data generating process is AR (p), where p>1, the error term will be autocorrelated due to misspecification of dynamic structure of the

concerned variable. In this case the DF test is no longer valid, and lagged differences of the dependent variable should be added or augmented to the test model in order to mitigate autocorrelation problem, in the disturbance term. This is incorporated in the augmented Dickey-Fuller test (ADF).

The ADF test can be captured by the following specification of an equation

$$\Delta y_t = \mu + \gamma t + \beta y_{t-1} + \sum_{i=1}^{k} \lambda_i \Delta y_{t-i} + u_t \qquad (4.6)$$

Where y_t is the variable of interest, t is the time trend, k is the lag length which is determined by a general to specific method where by a generous lag structure will be allowed and the insignificant lags will be eliminated sequentially based on Akaike Information Criterion (AIC) and u_t is a random variable assumed to be 'white noise'.

Then we test the set of hypothesis:

$H_o: \beta = 0$ (i.e y_t series is integrated of order one or unit root)

$H_a: \beta < 0$ (i.e y_t series is integrated of order zero or non-unit root)

Where, H_o and H_a are the null and alternative hypothesis respectively.

Phillips and Perron Test for Stationarity

An alternative stationarity test was suggested by Phillips and Perron (1988). This test is argued to be more robust to serial correlation and time-dependent heteroskedasticity, *(Nandwa and Mohan, 2007)* and improves over the ADF test on the finite sample

properties *(Deme, 2002)*. Instead of adding additional lags in the regressions to obtain an error term that has no autocorrelation, they stick to the original DF regressions but make nonparametric adjustment to the DF statistics to take into account potential autocorrelation pattern in the error. PP tests are nonparametric in nature and applicable to a wide class of dependent and heterogeneously distributed innovations (Enders, 1995).

4.3.2 Co-integration Analysis

When variables are found to be non-stationary at level, one option in order to get the short run dynamic is to estimate by differencing variables if their differences are stationary. However, this method will result in a considerable loss of long run properties of the data. Alternatively, economic variables may be combined together in levels provided that they are co-integrated.[1] The issue of cointegration applies when two series are I(1), but a linear combination of them is I(0); in this case, the regression of one on the other is not spurious, but instead tells us something about the long-run relationship between them (Wooldridge 2004). Non-stationary economic series are said to be co-integrated if they can be transformed into a single series that exhibit stationarity (Engle and Granger 1987).

[1] If {*yt*: *t* _ 0,1,…} and {*xt*: *t* _ 0,1,…} are two I(1) processes, then, in general, $Y_t - \beta X_t$ is an I(1) process for any number β . Nevertheless, it is *possible* that for some $\beta \neq 0$, $Y_t - \beta X_t$ is an I(0) process, which means it has constant mean, constant variance, autocorrelations that depend only on the time distance between any two variables in the series, and it is asymptotically uncorrelated. If such a β exists, we say that *y* and *x* are *cointegrated*, and we call β the cointegration parameter.(Wooldridge 2004)

We can use two ways to test for the existence of cointergation: the Engle-Granger (1987) two-step approach or the Johansen (1988) maximum likelihood estimation procedure. The Engle-Granger (1987) two-step approach, although simple, has several limitations. One important limitation of this method is that it has no systematic procedure to identify the existence of multiple cointegrating vectors.

Fortunately, the Johansen (1988) maximum likelihood estimators can be used to avoid the use of two step estimator. The Johansen (1988) maximum likelihood estimators overcome problems associated with the use of two step estimators. Most importantly it can detect the presence of multiple cointegrating vectors. Moreover, the test allows testing restricted versions of the cointegrating vector(s) and the speed of adjustment parameters (Enders, 1995). Hence the study uses the Johansen maximum likelihood for the analysis.

Johansen (1988, 1991) has shown that the test for co-integration can be expressed as a test of reduced rank of a regression coefficient matrix. The coefficient matrix can be estimated consistently using linear regression techniques and the test statistic can be computed from the solution to an eigenvalue problem. Moreover, linear restrictions on the co-integrating parameters can be tested by computing a likelihood ratio test statistic which follows a X^2 distribution *(Walls, 1993).*

We start the procedure by formulating a VAR model as follows. Considering K-lags of Z_t, a general P^{th}-order VAR representing the interrelationships among the *n* variables in the model; as given in Johansen and Juselius (1990) is of the form,

$$Z_t = \Omega + \partial_1 Z_{t-1} + \partial_2 Z_{t-2} + \ldots + \partial_p Z_{t-p} + \varepsilon_t$$

$$= \Omega + \sum_{i=1}^{p} \partial i \; Z_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4.7$$

Where, Z_t is an (n*x*1) vector containing the n-variables included in our model; ∂_1 is an (n*x*n) matrix of coefficients; Ω is a vector of deterministic terms like trends and intercepts; and ε_t are *iid*$(0,\sum)$ vector of error terms with $\sum$ representing the contemporaneous covariance matrix.

4.3.3 Vector Error Correction Model (VECM)

The Granger representation theorem includes both the long run equilibrium relationships and short run dynamics (adjustment process). If some variables are co-integrated, the vector error correction model (VECM), can be written as,

$$\mathbf{\Delta Zt = \beta_0 + \Pi Z_{t-1} + \theta_1 \Delta Z_{t-1} + \ldots + \theta p \Delta Z_{t-p+1} + \varepsilon_t}$$

$$\mathbf{= \beta_0 + \Pi Z_{t-1} + \sum_{i=1}^{p-1} \theta i \Delta Z t - i + \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots 4.8}$$

Where **ΔZ**t represents the first differences of the variables; $\theta_i = -\sum_{j=i+1}^{p} \partial j$ is an nxn coefficient matrix in the error correction term (which contains the short run parameters); and $\Pi = \sum_{i=1}^{p} \partial i - I$ is an nxn matrix of long run responses which contains information

about the long-run relationships. And εt, the error terms are assumed to be Gaussian or well-behaved.

4.3.3.1 Lag Length Selection Criteria

Before estimating the VAR, we have to decide the maximum lag length, to generate the white noise error terms. To determine the optimal lag length different information criteria can be used. The objective of the information criteria (IC) method is to select the number of parameters which minimize the value of the IC. The most popular ICs are the Akaike (1974) information criterion (AIC), Schwarz's (1978) Bayesian information criterion (SBIC) and the Hannan-Quinn information criterion (HQIC). The lag length which is selected by most of these criteria will be included in the VAR system.

The next concern in co-integration analysis is the determination of the rank (r) of the long run matrix (Π). This implies the determination of the number of different linear combinations of the variables (or the number of independent co-integrating vectors) that are stationary.

Here, we have three cases, i.e. when $r = 0$, $r = n$ or $0 < r < n$. In the first case, when $r = 0$, the short run dynamics depends only on the lagged changes of the variables; and the levels of any of the variables in vector *Z* have no long run relationship (i.e., there is no co-integration relation; all rows are linearly dependent, and the system is non-stationary). In the second case, when $r = n$, the matrix is termed to have a full rank

which implies that all the endogenous variables are I(0) , and all linear combinations would be stationary. In such case, estimating the level VAR and the VECM with unrestricted OLS will give identical results *(Davidson and Mackinnon, 1999: 630).*

However, when 0 < r < n, the system is non-stationary but there are *r* cointegrating relationships that are stationary; and that is said to have a reduced rank, and contains stationary long run equilibrium information. However, the rank determination must be supplemented by exogeneity and causality tests to get an economically interpretable linear relationship among the variables *(Badawi, 2005).*

We determine the rank of the long run matrix, that is, the number of co-integrating vectors by the two likelihood ratio tests which are the trace [λ_{trace}] and the maximal eigen value [λ_{max}] statistics.

The trace test statistic is given by:

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{n} \ln(1 - \hat{\lambda}_i) \quad \text{..... (4.9a)}$$

Here we test whether the (m-r) smallest eigen values are jointly zero or not.

The maximal eigenvalue or λ_{max} statistic which is based on the estimated $(r + 1)^{th}$ largest eigenvalue given by:

$$\lambda_{max}(r,r+1) = -T\ln(1- \hat{\lambda}_{r+1}) \quad \text{.....(4.9b)}$$

Where *r* is the number of co-integrating vectors under the null; $\hat{\lambda}$ is the estimated characteristic root (eigen values) from the Π matrix; and *T* is the number of observation.

The trace test (λ_{trace}) is a joint test where the null hypothesis is that the number of cointegrating vectors is less than or equal to *r*, against an unspecified alternative that there are more than r. On the other hand, the maximum Eigen value test (λ_{max}) tests the null hypothesis that the number of cointegrating vectors is *r* against the alternative of *r+1*.

4.3.4 Granger-Causality/Block Exogeneity Test

VAR model can be used to test Granger causality among the variables and also that an endogenous variable can be treated as exogenous. The Granger causality test is applied to investigate the direction of causality between the variables. This concept involves the effect of past values of one or more of the variables on the current value of the other. A chi-square (Wald) statistic is used to test for the joint significance of all other lagged endogenous variables in each equation of the model. The null hypothesis being tested is that for X and Y in the vector of endogenous variables of the VAR, X does not Granger cause Y; or Y does not Granger cause X. This is checked by testing whether lagged values of the variables in the unrestricted VAR are statistically significant or not.

4.3.5 VAR Diagnostic Tests

Once the VAR models are estimated we should make some diagnostic tests which are important in order to make sure that the results obtained from VAR estimation can be used for forecasting or policy purposes. These post-estimation tests are mostly

performed on the residual of the VAR and they include: the LM test for residual autocorrelation, Jarque-Bera test for residual multivariate normality, test for VAR stability and White test for the presence of heteroscedasticity in the VAR's residuals.

Residual Vector Normality Test

The Jarque-Bera normality test is used to determine whether the regression errors are normally distributed. It is a joint asymptotic test whose statistic is calculated from the skewness and kurtosis of the residuals as follows.

$$JB = S_3^2 + S_4^2 \quad \text{..... (4.10a)}$$

Where S_3^2 and S_4^2 are computed according to:

$S_3^2 = T b_1' b_1/6$ and

$S_4^2 = T (b_2 - 3_K)'(b_2 - 3_k)/24,$

b_1 and b_2 are the third and fourth non-central moment vectors of the standardized residuals $\hat{u}_t^s = \tilde{p}-(\hat{u}_t - \overline{\hat{u}_t})$ and $\tilde{p}$ is a lower triangular matrix with positive diagonal such that $\tilde{p}\,\tilde{p}' = \hat{\Sigma}u$; i.e., the Choleski decomposition of the residual covariance matrix. T is the number of observation, S_3^2 is multivariate skewness and S_4^2 is kurtosis test.

Error Vector Autocorrelation Test

Testing for autocorrelation helps to identify any relationships that may exist between the current values of the regression residuals and any of its lagged values (Brooks, 2002). The null hypothesis of the LM test for autocorrelation is that the residuals are not serially correlated, while the alternative is that the residuals are serially correlated. If the P-value

is less than 0.05 then we reject the null hypothesis (Harris, 1995). The test statistic is given by:

$$LM = (T - q)R_{\hat{\varepsilon}}^{2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.10b)$$

Where, q is the degrees of freedom and $R_{\hat{\varepsilon}}^{2}$ is the coefficient of determination obtained from the auxiliary regression; and the LM test statistic is chi-square distributed.

Stability Test

The test for stability checks whether the roots of the characteristic polynomial lies inside the unit circle. If all roots lie inside the unit circle then the VAR is considered as stable and can be used for policy analysis. We can also make use of variance decomposition and impulse response functions in our analysis if the VAR is stable.

Heteroscedasticity Test

The test for heteroscedasticity investigates whether the variance of the errors in the model are constant or not. White's test is used to check whether the residuals are homoskedastic.. It tests the null hypothesis that the residuals are both homoskedastic and that there is no problem of misspecification. The test regression is run by regressing each cross product of the residuals on the cross products of the regressors and testing the joint significance of the regression. If the White test statistic is significant, that is, P-value is less than 0.05; the null hypothesis of homoscedasticity and no misspecification will be rejected (Brooks, 2002: 445).

4.3.6 Impulse Response Function and Variance decomposition

Impulse Response Function

Impulse response functions provide information to analyze the dynamic behavior of a variable due to a random shock or innovation in other variables. The impulse response traces the cross effect on current and future values of the endogenous variables of one standard deviation shock to the variables. A shock to the i^{th} variable directly affects the i-th variable, and is also transmitted to all of the endogenous variables through the dynamic structure of the VAR (Stock and Watson, 2001). Thus, for each variable from each equation, a unit shock to the error is analyzed in order to determine the effects upon the VAR system over time. In this study we see the response of real per capita GDP to a shock in FDI.

There are two approaches that are commonly used to estimate impulse responses. These are the generalized impulse response and the Cholesky decomposition. The main advantage of the generalised impulse response is that it does not require orthogonalization of innovations and is invariant of the ordering of the variables in VAR (Pesaran and Shin, 1998 cited in Stulz, 2006). But, the cholesky decomposition in the base line model incorporates a small sample degrees of freedom adjustment when estimating the residual covariance matrix used to derive the Cholesky factor (Lutkepohl, 1991). As a result the cholesky decomposition was used in this study. However, we should note that in this approach the ordering of the variables in the VAR matters.

Variance Decomposition

Variance decomposition decomposes variation in an endogenous variable into the component shocks to the endogenous variables in the VAR. That is, it helps us to measures the proportion of forecast error variance in a variable that is explained by innovations in itself and the other variables. In other words, variance decompositions show the portion (or relative importance) of variance in the prediction for each variable in the system that is attributable to its own innovations and to shocks to other variables in the system.

Enders in Shan *et al.* (2006) proposed that the forecast-error variance decomposition permits inferences to be drawn concerning the proportion of the movements in a particular time-series due to its own earlier shocks vis-a–vis shocks arising from other variables in a VAR model. The technique breaks down the variance of the forecast error for each variance following a shock to a particular variable, and in this way, it identifies which variables are strongly affected.

Chapter Five: Empirical Results and Analysis

Based on the econometric frame given in the previous chapter, in this chapter, the results of the empirical analysis are presented and discussed.

5.1 Stationarity Test

While working with time series data, testing for stationarity is a prerequisite. As mentioned in the previous chapter, the results we get by using non-stationary time series may be spurious. That is, they may indicate a relationship between variables which does not exist. In order to obtain a consistent and reliable result, we must transform the non-stationary data into stationary data by differencing. In contrast to the non-stationary process that has a variable variance and a mean that does not remain near, or returns to a long-run mean over time, the stationary process reverts around a constant long-term mean and has a constant variance independent of time.

Prior to making a formal test for stationarity, a graphical sketch of each of the variables over time has been made. This helps to informally identify the presence of any trending behavior in the variables in question over time. The plots of the variables included in our model are provided in appendix.

Most of the variables have a trend, upward or downward. Therefore, all the series are examined for stationarity using the ADF test and the Philips and Peron test and the results are summarized in Table 5.1. The lag length for each variable is automatically selected by

Schwartz Information Criterion (SIC) and both intercept and trend are included in test equation for all variables.

Table 5.1 Unit Root Test

Variable	ADF		Phillips-Peron		I(d)
	Level	1st difference	Level	1st difference	Order of integration
RPCGDP	-1.3795	-3.4072	-1.1102	-3.4877	I(1)
FDI	-	-6.9335	-2.2562	-9.4115	I(1)
OPEN	-2.6566	-6.8520	-2.4520	-7.2144	I(1)
INFR	0.50480	-5.7304	0.4647	-5.7572	I(1)
LN_ HK	-2.1396	-3.5382	-1.7159	-3.5094	I(1)
LN_ GOVSIZE	-2.4539	-5.3077	-2.9057	-5.3967	I(1)
INF	0.3082	-5.4247	0.2892	-4.8863	I(1)

Note: critical values for ADF and PP tests are -3.4566 and -3.1593 at 5% and 10% level of significance respectively.

As can be seen from table 5.1 both tests show that all the variables are not stationary in their levels at 5% level of significance. Hence, we take the first difference of the variables and see if they become stationary. We can also determine the order of integration of the variables in the process. Looking at the results of ADF and PP tests conducted on the first difference of the variables, the null hypothesis of unit root is strongly rejected. Hence we can conclude that all the variables become stationary at their first difference and hence are I (1).

5.2 Results for Cointegration Test and Vector Error Correction Model

5.2.1 Co-Integration Test

VAR Lag Length Selection Criteria

The Johansen co-integration test result is very sensitive to the number of lags included for the endogenous variables in the estimation of the VAR. This necessitates the determination of an optimal lag order prior to the test of co-integration. The optimal lag order is determined with the sequential modified Likelihood Ratio test statistics [LR], the Final Prediction Error [FPE], the Akaiki Information Criterion [AIC], the Schwarz Information Criterion [SIC], and the Hannan-Quinn Information Criterion [HQ]). As shown in Table 5.2, LR, FPE, AIC, and HQ suggest an optimal lag of three, all at a 5% level of significance.

Table 5.2 VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-550.6900	NA	42590.40	30.52379	31.13332	30.73868
1	-382.0607	255.2228	70.94098	24.05733	26.80025*	25.02434
2	-343.9670	43.24145	182.7392	24.64687	29.52316	26.36599
3	-240.7375	78.11962*	28.07026*	21.71554*	28.72521	24.18678*

* indicates lag order selected by the criterion

Lag exclusion test

Even if the lag order selection criteria chose three lags to be included in the model, it may also be possible for some of the lags that are chosen as optimal to have insignificant

contribution in the model. Therefore, it should be checked whether the three lags (chosen as optimal) of all variables are jointly important and hence should be included in the estimation of the VAR model. This can be done by using the Wald lag exclusion test. And the result is presented in table 5.3.

Table 5.3 VAR Lag Exclusion Wald Tests

	RPGDP	OPPEN	LN_INFR	LN_HK	LN_GOVSIZE	INF	FDI	Joint
Lag 1	12.84822 [0.075894]	1.479373 [0.983015]	20.30513 [0.004947]	17.59026 [0.013962]	7.274888 [0.400831]	23.84605 [0.001213]	4.239654 [0.751797]	180.1412 [1.11e-16]
Lag 2	10.58040 [0.157998]	1.047378 [0.994028]	4.110406 [0.766977]	12.04477 [0.099096]	23.39418 [0.001455]	24.33498 [0.000995]	1.186349 [0.991238]	139.8316 [1.14e-10]
Lag 3	9.469864 [0.220658]	11.56655 [0.115745]	6.113413 [0.526571]	6.165238 [0.520593]	15.46451 [0.030485]	29.95600 [9.67e-05]	10.33273 [0.170489]	204.8469 [0.000000]
df	7	7	7	7	7	7	7	49

Note: Numbers in [ ] are p-values

Although the lag order selection criterion suggests 3 lags to be included in the model, we were forced to use only two lags due to insufficient data. The lag exclusion test also approves the inclusion of two lags in the model because it shows that the first and second lags of all the variables are jointly significant.

Granger causality:

Granger causality test was performed to examine the presence of bidirectional causality in the sense of Granger. The result presented below shows that the null hypothesis that

real per capita GDP granger causes FDI cannot be rejected but the reverse is rejected. As a result we can say that real per capita GDP is not granger caused by FDI in Ethiopia but FDI is granger caused by real per capita GDP. Therefore, we find that the direction of causality between foreign direct investment indicators and economic growth in Ethiopia is generally unidirectional (causality runs from economic growth to foreign direct investment). Similar results were found from India by Chakraborty and Basu (2002) who suggested that GDP in India is not Granger caused by FDI and the causality runs more from GDP to FDI. Duasa, (2007) didn't find any strong causal relationship between FDI and economic growth in Malaysia.

Table 5.4 Granger Causality

Null Hypothesis:	F-Statistic	Prob.
RPGDP does not Granger Cause FDI	5.25358	0.0105
FDI does not Granger Cause RPGDP	0.92308	0.4073

The Johansen Co-integration Test Result

The stationarity test results presented previously indicate that all the variables are not level stationary. This suggests that regression based on the level variables may produce an unreliable outcome. However, the Granger representation theorem states that it is possible for non-stationary variables to produce a stationary relationship if they are co-integrated. This would imply that there is a meaningful long run relationship among the variables. Thus, the presence and the number of such co-integrating relationships are checked using the trace and the maximum eigen value methods.

Table 5.5 Johansen Cointegration Test Results

Hypothesized No. of CEs	**Eigenvalue**	Trace statistic		Maximum eigenvalue statistic	
		t- statistic	Critical value	t-statistic	Critical value
None	0.899462	224.2854*	125.6154	84.99695*	46.23142
At most 1	0.731739	139.2884*	95.75366	48.68448*	40.07757
At most 2	0.664718	90.60393*	69.81889	40.43298*	33.87687
At most 3	0.522537	50.17094*	47.85613	27.35291	27.58434
At most 4	0.282643	22.81803	29.79707	12.29075	21.13162

Note: * indicates rejection of the null hypothesis at the 0.05 level

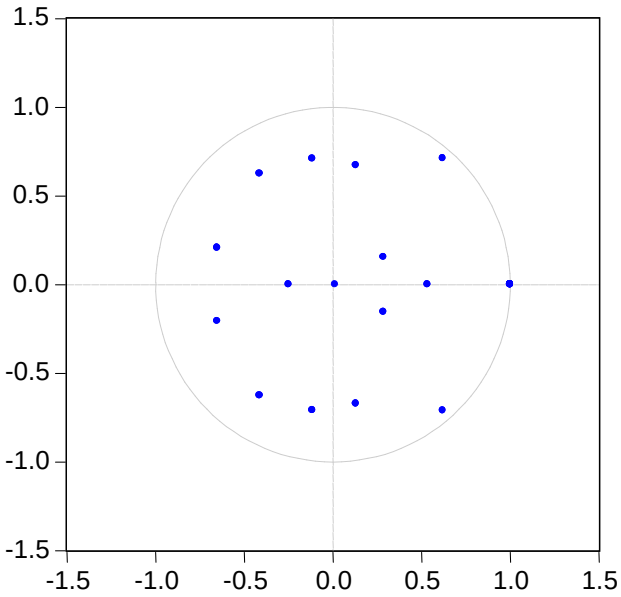
We can see from the above table that the trace test suggests that there are four cointegrating equations while the maximum eigen value test indicates that there are three cointegrating equations at the 0.05 level. Since the objective of this paper is to see the impact of foreign direct investment on real percapita GDP, we estimate the unrestricted cointegrating vectors with ad-hoc normalization on RPGDP.

Diagnostic Tests

The stability of the VAR model and the results of the post estimation diagnostics could affect the validity and robustness of the results of the impulse response functions and

other diagnostics, and thus should be tested prior to further analysis. As a result, first we have tested for VAR stability, and the result in the figure presented below shows that all roots of characteristic polynomial lie inside the unit circle which suggests that the VAR is stable. Stability of the system confirms that impulse response functions can be used in our analysis.

Figure 5.1 Roots of AR Characteristic Polynomial.



5.2.2 Vector Error Correction Model

The VECM consists of two parts: the long run cointegrating coefficients, which are used to see the long run relationship; and the short run coefficients. The results of the unrestricted estimates of the cointegrating relationship and the adjustment coefficients normalized on RPCGDP are given in table 5.6

Table 5.6 Estimated Long Run Model, Dependent variable: RPGDP

Varable	FDI	OPPEN	LN_INFR	LN_HK	LN_GOVSIZE	INF	Constant
Coeffici ent	0.004171	-0.231430	-0.18289	3.640247	0.459049	0.081303	-71.69331
	(0.00117)	(0.05536)	(0.06305)	(0.79707)	(0.65346)	(0.02061)	
t-stat.	[3.56231]	[-4.18055]	[-2.90085]	[4.56703]	[0.70249]	[3.94446]	

We can rewrite the long run equilibrium equation as follows:

RPGDP = 71.69331 - 0.004171 *FDI* + 0.231430 *OPPEN* + 0.182890 *LN_INFR*

- 3.640247 *LN_HK* - 0.45049 *LN_GOVSISE* - 0.081303 *INF*

The above equation shows that, in the long run, RPCGDP can be explained by foreign direct investment, openness to trade, infrastructure, human capital, and inflation in Ethiopia. The long run impact of FDI on real per capita GDP is found to be negative implying that it has an adverse impact on real per capita GDP in the long run. That is a one percentage increase in FDI will lead to a 0.004 percentage fall in real per capita GDP.

Similar result has been found from other studies as well. For instance, Falki, (2009), found a negative and insignificant relationship by studying the effect of FDI on economic growth in Pakistan. Akinlo (2004) also found negative influence of FDI on growth in Nigeria. He argued that FDI may influence growth negatively once there is an evidence of the foreign investors transferring profits, or other investment gains to their

home country. Bende-Nabendem *et al*. (2003) also found that FDI in some countries had a negative relation with economic growth.

There are various explanations for a negative influence of FDI on growth. Carkovic and Levine (2002) claim that FDI creates the crowding out effect on domestic capital and hence the effect of FDI on growth is either insignificant or negative. Agosin and Mayor (2000) have found a strong crowding out effect of FDI in Latin America, in their panel data analysis for the period 1970-1996. They have argued that "the effects of FDI on domestic investments are by no means always favorable and simplistic policies towards FDI are unlikely to be optimal.

Akinlo (2004) on the other hand argues that FDI may result in adverse impact on growth if there is profit repatriation, i.e., if the profit from FDI is transferred to their home countries. Another reason for this negative relationship could also be the level of human capital in Ethiopia, which is very low. Borensztein et al. (1998) argued that the interaction of FDI and human capital has an important effect on economic growth, and they suggest that countries may need a minimum threshold stock of human capital in order to experience positive effects of FDI. They also suggested that the differences in the technological absorptive ability may explain the variation in growth effects of FDI across countries.

On the other hand, Blomstrom et al. (1994) report that FDI exerts a positive effect on economic growth, but that there seems to be a threshold level of income above which

FDI has positive effect on economic growth and below which it does not. This was to imply that only those countries that have reached a certain income level can absorb new technologies and benefit from technology diffusion, and thus benefit from the advantages of FDI.

Exploring other elements that could explain the interaction between FDI and growth, we find the institutional development of Ethiopia, which is lagging behind. Olofsdotter (1998) submits that the beneficiary effects of FDI are stronger in those countries with a higher level of institutional capability. He therefore emphasized the importance of bureaucratic efficiency in enabling FDI effects.

Looking at the rest of the variables in our model, we find that openness has a positive and significant impact on real per capita GDP. This is expected and is consistent with previous results such as those Li and Liu (2004) who found a positive relationship between trade openness and economic growth in China. Flexner (2000) also reported the same result from Bolivia. This result indicates the importance of variations in export and import prices on per capita GDP growth. These variations are a major source of economic instability in less developed countries, especially in Ethiopia, where the majority of export earnings is from primary commodities.

Moreover, infrastructural development, which was captured by the amount of yearly electricity production, has a positive impact, and it is also statistically significant. This implies the importance of infrastructural development for economic growth. Inflation,

which was used as a proxy for macroeconomic instability is found to have an adverse impact on per capita GDP and it is statistically significant in explaining it. However, human capital, which was proxied by expenditure on education in this study, was found to have a negative and significant relationship with growth. This is contrary to our expectation as it is wrongly signed.

Short Run Relationships

Table 5.6 shows the results of the D (RPCGDP) equation in the error-correction model, from which the short-run impact of FDI, openness, infrastructure, human capital, inflation and government size on economic growth (real per capita GDP) can be analyzed.

Table 5.7 Short Run Coefficients

	Dependant variable: D (RPCGDP)		
Error correction	Coefficient	Standard Error	t- value
CointEq1	-0.745690	0.31760	-2.34786
D(FDI)	38.51231	21.6508	1.77879
D(OPPEN)	-1.140929	0.37959	-3.00569
D(LN_INFR)	0.741122	0.33722	2.19773
D(LN_HK)	-0.023897	0.01777	-1.34492
D(LN_GOVSIZE)	-0.014055	0.03446	-0.40790
D(INF)	1.360043	0.70670	1.92451
DUM	8.864076	3.06215	2.89472

The coefficient of the error correction term for the equation is negative and significant as expected. This tells us that there is a reasonable adjustment towards the long run steady state. This guarantees that although the actual real per capita GDP may temporarily deviate from its long-run equilibrium value, it would gradually converge to its equilibrium. The error correction term of -0.745690 shows that about 74.5 percent of the deviation of the actual real per capita GDP from its equilibrium value is eliminated every year; hence, full adjustment would require a period of less than two years.

As can be seen from the above result in the short run, FDI is insignificant indicating that it doesn't have a major impact on real per capita GDP in the short run. Openness to trade has a negative and significant coefficient indicating that it has distortionary impact in Ethiopia in the short run. On the other hand infrastructure has a positive and significant coefficient implying that it is directly related to real per capita GDP. The coefficients of human capital, government size and inflation were also found to be statistically insignificant.

When the error-correction model was estimated, a dummy variable was included in order to capture the effect of liberalization of trade and the macroeconomic regime. The positive and significant coefficient of dummy for liberalization suggests that the policy liberalization positively affected real per capita GDP growth.

Post estimation diagnostics

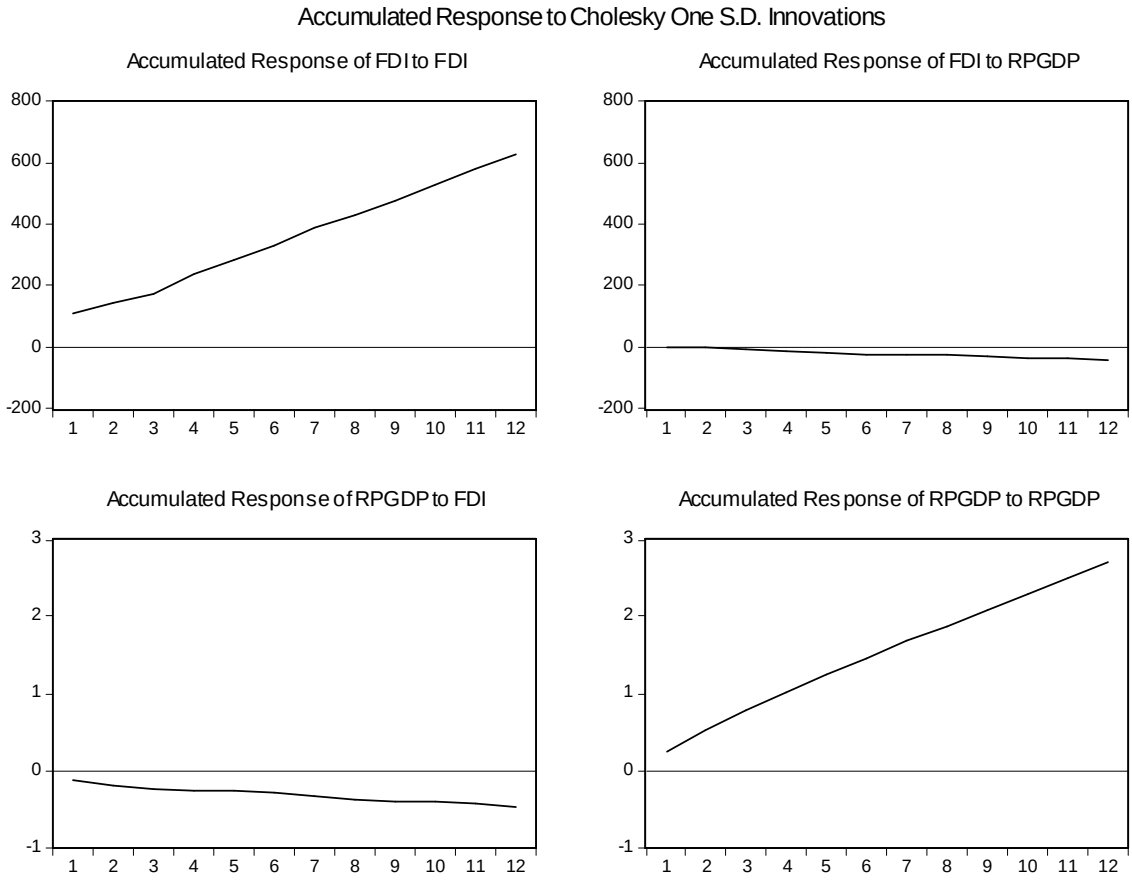
We have also tested for autocorrelation, normality and heteroscedasticity and the results are reported in the Appendix. The LM test for serial correlation indicates that the model is free from autocorrelation problem while White test for heteroscedasticity fails to reject the null hypothesis of homoskedastic variance. In addition, the Jarque-Bera test rejects the null hypothesis that the residuals are multivariate normal.

Impulse Response Functions and Variance Decomposition Analyses

Impulse Response Functions

Impulse response functions may supplement the short run analysis because it shows us the dynamic impact of changes or impulses in the variables in the model on real per capita GDP, given the model is stable. In other words, impulse response functions could tell us how real per capita GDP may respond, at a given time, to a one standard deviation innovation (impulse) generated from any of the variables in earlier times and how that effect may be multiplied. We can see from the figure below that a positive shock in FDI results in a positive response of FDI but a negative response of the real per capita GDP for the whole forecast period. FDI responds to a shock in real per capita GDP after the 2nd period. We can also see that a positive shock in real per capita GDP leads to a positive response of real per capita GDP and a negative response of FDI.

Figure Response of RPCGDP to FDI



Variance Decomposition Analysis

Variance decomposition (VD) indicates the percentage contribution of the different shocks to the variance of the T-step ahead forecast errors of the variables. Hence, the variance decomposition will give us information about the relative importance of each random innovation (shocks) to the variables in our model. Table 5.7 presents the variance decomposition of RPCGDP since we are concerned with the contribution of FDI to real per capita GDP.

Table 5.8 Variance Decomposition of RPGDP

Period	S.E.	FDI	INF	INFR	LN_EDUC	LN_GOVSIZE	OPPEN	RPGDP
1	0.414684	8.215163	2.138357	6.061350	36.39862	12.52053	2.825031	31.84095
4	1.540459	0.988320	2.000380	3.921545	51.24975	29.87223	1.014463	10.95331
8	2.632951	0.402440	1.824271	2.774986	55.90584	32.17157	0.451293	6.469603
12	3.456500	0.251165	1.737285	2.356531	57.46089	32.65891	0.314362	5.220856
16	4.132424	0.191677	1.678610	2.127471	58.23976	32.84920	0.257399	4.655885
20	4.715519	0.159418	1.642297	2.003718	58.71339	32.89715	0.229154	4.354871

We can see on the above table that on the first period 8.21% of the forecast error variance of real per capita GDP is explained by FDI but it dies out throughout the whole forecast period. In the 20^{th} period only 0.15% of real per capita GDP is explained by FDI. This implies that FDI doesn't have a great influence on real per capita GDP.

Chapter Six: Conclusion and Policy Implications

6.1 Conclusion

It was acknowledged in the literature that over the last two decades, enormous efforts have been made by developing countries to attract foreign direct investment (FDI). FDI is seen as vital ingredient for the globalization efforts in the world economy. Due to change in foreign policy and investment regime post reform era, the Ethiopian economy has been experiencing a steady growth in FDI during past few years. It is commonly assumed that, by accelerating economic growth, FDI is a determining feature in poverty reduction. However, there is mixed empirical evidence regarding the relationship between FDI, growth and poverty reduction.

This study aimed at identifying the impact of foreign direct investment on poverty reduction and whether there exists a causal relationship between FDI and economic growth and poverty reduction in Ethiopia. The study was based on time series data which were collected from secondary sources and cover the period from 1970-2009. Co-integration and Vector Error Correction approaches have been applied for the growth model. The study also made use of innovation accounting (variance decomposition and impulse response) in order to analyze the response of real per capita GDP to FDI.

Estimation results reveal that real per capita GDP responds negatively to FDI in the long run in Ethiopia. This may be a result of profit repatriation of foreign firms, crowding out of domestic investment because of FDI or low level of human capital in the country.

However, in the short run, FDI was found to be insignificant in explaining real per capita GDP. The finding also indicates that, in the long run, openness to trade; which implies that increasing trade openness is a useful tool for economic growth and poverty reduction. In addition, infrastructure and government size contribute positively to real per capita GDP while inflation contributes negatively.

The dynamic analysis of the short term Vector Error Correction Model showed that in the short run FDI is insignificant in explaining real per capita GDP. Moreover, openness to trade was found to contribute negatively to real per capita GDP while infrastructure contributes positively in the short run. It has also confirmed that policy liberalization positively contributes to real per capita GDP growth. The error correction estimates gave evidence that the Error-Correction Term is statistically significant and has a negative sign, which confirms that there isn't any problem in the long-run equilibrium relation. The pair wise Granger causality test between foreign direct investment and real per capita GDP suggested that Granger causality runs one-way from real per capita GDP to FDI and not the other way.

Results from the impulse response functions indicated that FDI responds positively to a shock in itself but it responds negatively to a shock in real per capita GDP. In addition, a positive shock in FDI results in a positive response of FDI but a negative response of the real per capita GDP for the whole forecast period. From the variance decomposition analysis it was found that FDI contributes very little to the forecast error variance of real per capita GDP.

6.2 Policy Implications

Openness to foreign investment is a strategy that has many potential benefits for poverty reduction. As has been pointed out, many countries have indeed been able to reap many of these benefits. However, currently FDI is contributing negatively to poverty reduction in Ethiopia. As a result, there are a number of policy implications.

Care should be taken when attracting FDI to Ethiopia and it should be directed to more productive sectors of the economy. Particularly, these investments should be able to create jobs, develop local skilled labor and stimulate and transfer new technologies. The government should also provide incentives in order to encourage foreign investments into labor intensive and pro poor sectors.

The benefits from FDI tend to be maximized when foreign investors operate in an even and competitive environment. Exposure to effective competition on an even playing field is an important incentive for foreign and domestic companies to upgrade their management and technology. Existence of significant market power may result in reducing the incentives of foreign investors to improve productivity and to exploit consumers or workers in the markets. Free entry will also encourage the establishment of effective linkages between foreign investors and domestic buyers or suppliers so that best practice can be diffused in the economy.

While a competitive and even environment creates incentives to upgrade productivity throughout the economy, countries also need domestic actors to be capable of

responding to these incentives. Various studies suggest that higher quality of labor force and infrastructure in a country helps exploit the potential benefits from FDI (Borenzstein, De Gregorio and Lee, 1998; Caves, 1999; Djankov and Hoekman, 1998; Mody and Wang, 1997). As a result measures should be taken to improve education and infrastructure in the country.

Finally, although the stated objectives in this study have been addressed, there are still important areas for further research concerning FDI in Ethiopia. For instance, this study is based on aggregate macro level data. However, a sectoral analysis of FDI might give us a clearer idea as to how the different sectors respond to FDI in the country. In addition, through industry level studies, one can study the existence of technological spillovers and productivity gains from FDI. Other important areas are whether FDI crowds-in domestic investment in Ethiopia and FDI and Employment in Ethiopia.

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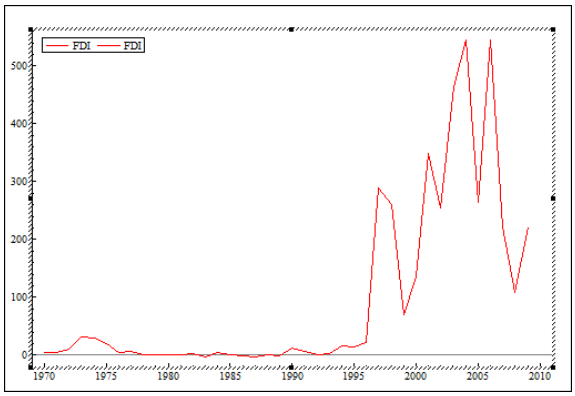
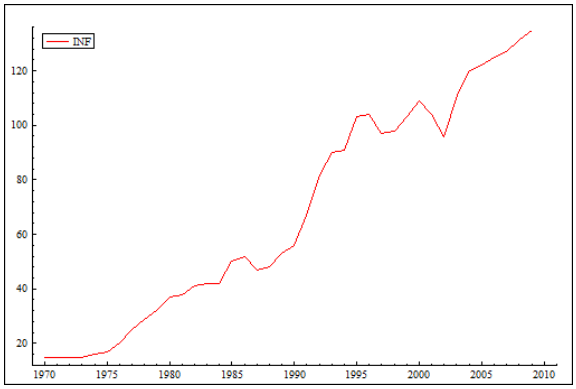
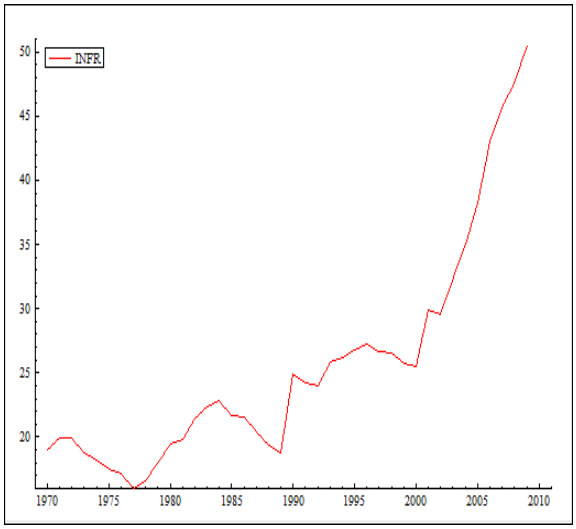
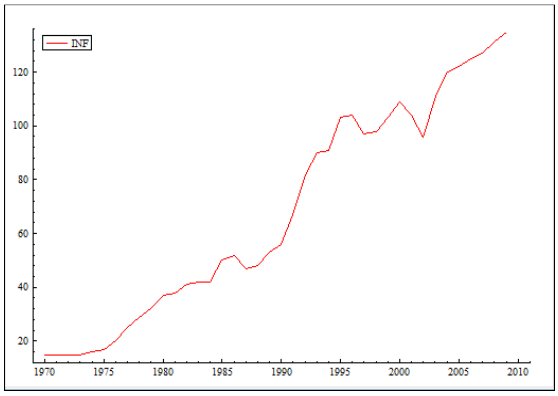
Appendices

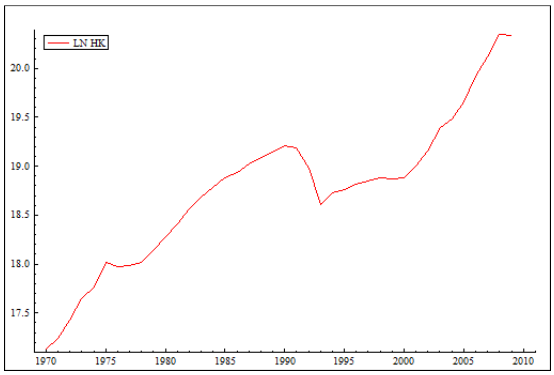
Appendix A: Time Series Plots

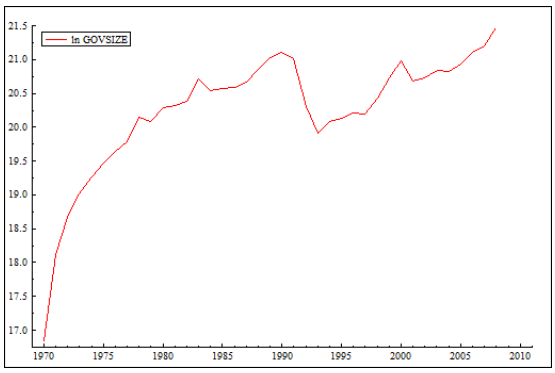


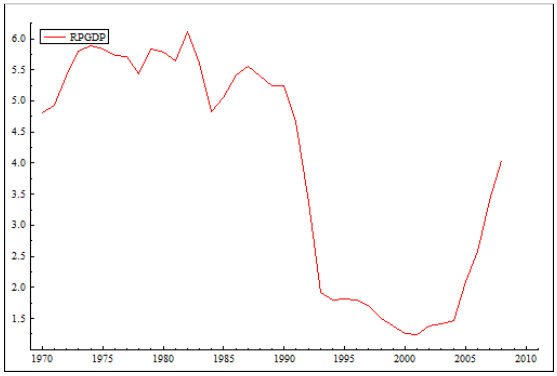





INF
120
100
80
60
40
20
1970
1975
1980
1985
1990
1995
2000
2005
2010


LN HK
20.0
19.5
19.0
18.5
18.0
17.5
1970
1975
1980
1985
1990
1995
2000
2005
2010


ln GOVSIZE
21.5
21.0
20.5
20.0
19.5
19.0
18.5
18.0
17.5
17.0
1970
1975
1980
1985
1990
1995
2000
2005
2010


RPGDP
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1970
1975
1980
1985
1990
1995
2000
2005
2010

Appendix B: diagnostic tests

Stability Test

Root	Modulus
1.000000	1.000000
1.000000	1.000000
1.000000	1.000000
1.000000	1.000000
1.000000	1.000000
1.000000	1.000000
0.620640 + 0.711331i	0.944026
0.620640 - 0.711331i	0.944026
-0.412417 + 0.624538i	0.748422
-0.412417 - 0.624538i	0.748422
-0.114913 - 0.709247i	0.718496
-0.114913 + 0.709247i	0.718496
0.130363 - 0.672167i	0.684692
0.130363 + 0.672167i	0.684692
-0.651535 - 0.207244i	0.683702
-0.651535 + 0.207244i	0.683702
0.534169	0.534169
0.285395 + 0.153967i	0.324278
0.285395 - 0.153967i	0.324278
-0.249894	0.249894
0.012468	0.012468

2. Test for Residual Autocorrelation

Null Hypothesis: no serial correlation at lag order h

Lags	LM-Stat	Prob
1	37.88883	0.8753
2	50.76467	0.4039

Probs from chi-square with 49 df.

3. Test for Residual Normality

Component	Jarque-Bera	df	Prob.
1	0.293533	2	0.8635
2	116.8192	2	0.0000
3	14.51470	2	0.0007
4	1.078872	2	0.5831
5	9.307060	2	0.0095
6	0.076012	2	0.9627
7	9.370951	2	0.0092
Joint	151.4603	14	0.0000

4. Test for Residual Heteroskedasticity

No Cross Terms (only levels and squares)

Joint test:

Chi-sq	df	Prob.
878.0321	868	0.3990

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all source of materials used for the thesis have been duly acknowledged.

Declared by:

Name: _____

Signature: _____

Date: _____

Confirmed by Advisor:

Name: _____

Signature: _____

Date: _____

Place and date of submission: Addis Ababa University, December, 2012.