



Ethiopian Civil Service University



COLLEGE OF FINANCE, MANAGEMENT AND DEVELOPMENT

DEPARTMENT OF PUBLIC FINANCIAL MANAGEMENT

**THE EFFECT OF FOREIGN DIRECT INVESTMENT ON
ECONOMIC DEVELOPMENT: IN CASE OF FEDERAL
DEMOCRATIC REPUBLIC OF ETHIOPIA**

BY

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**A Thesis Submitted in partial fulfillment of the Requirements for the Award of a Master's
Degree in Public Financial Management Submitted to College of Finance, Management
and Development Department of Public Financial Management**

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DECLARATIONS OF ORIGINALITY OF WORK

I **TIZETA DEGU**, Registration Number/I.D. Number **ECSU 1802889**, do hereby declare that this Thesis is my original work and that it has not been submitted partially; or in full, by any other person for an award of a degree in any other university/institution.

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This Thesis has been submitted for examination with my approval as University supervisor.

Name of Advisor.....**Signature**.....

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DEDICATION

This Thesis work is fully dedicated to my late father Ato Degu Abebe who passed away when I am undertaking my post graduate program in August 2019. He was my inspiration and he was also my close life guiding advisor to my long trip a head. May GOD rest his soul in peace.

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THESIS APPROVAL

The undersigned certify that they have read and hereby recommend to the Ethiopian Civil Service University to accept the Thesis submitted by **TIZETA DEGU ABEBE**, and entitled “**Effect of Foreign Direct Investment on Economic Development: In Case of FDRE**” ,In partial fulfillment of the requirements for the award of a Master’s Degree in Public Financial Management.

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LIST OF ACRONYMS/ABBREVIATIONS

AC	-----	Autocorrelation
ADF	-----	Augmented Dickey Fuller test
AIC	-----	Akaiki Information Criterion
APA	-----	American psychological Association
CE	-----	Co integration Equation
COVID	-----	Corona Virus Disease
CSA	-----	Central Statistical Authority
CV	-----	Critical Value
ED	-----	Economic Development
EEA	-----	Ethiopian Economic Association
EIA	-----	Ethiopian Investment Authority
EIB	-----	Ethiopian Investment Board
EIC	-----	Ethiopian Investment Commission
EIR	-----	Ethiopia Investment Report
EO	-----	Employment Opportunity
EPRDF	-----	Ethiopian Peoples' Revolutionary Democratic Front
FDI	-----	Foreign Direct Investment
FEX	-----	Foreign Exchange
FPE	-----	Final Prediction Error
FY	-----	Fiscal Year
GCF	-----	Gross Capital Formation
GDP	-----	Gross Domestic Product
GTP	-----	Growth Transformation Plan

HO	Heckscher-Ohin model
HQ	Hannan-Quinn Information Criterion
IDP	The investment development path theory
IMF	International Monetary Fund
INF	Inflation
IRFs	Impulse Response Function
LOS	Level of Significance
LQ	Labor Quality
LSDV	Least-squares dummy variables
M & As	Merger & Acquisition
MIDROC	Mohammed International Development Research and Organization Companies
MNC	Multinational Corporations
MNE	Multinational Enterprise
MoFED	Ministry of Finance & Economic Development
NBE	National Bank of Ethiopia
NOI	Net Outward Investment
OECD	The Organization for Economic Co-operation and Development
PDC	Planning and Development Commission
R & D	Research and Development
SIC	Schwarz Information Criterion
SSA	Sub-Saharan Africa
TFP	Total Factor Productivity

TNE-----Transnational Enterprise

UNCTAD-----United Nations Conference on Trade and Development

USA-----United States of America

USD-----United States Dollar

VAR-----Vector Auto regression

VEC-----Vector Error Correction

(3SLS) -----Three-stage least squares

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ABSTRACT

This Study examined the effect of foreign direct investment on economic development of Ethiopia by using yearly time series analysis ranging from 1974 to 2019. This Thesis used Vector Error Correction model to estimate long-run co-integration among variables after checking for stationarity by unit root test by ADF test type. In order to analyze data, both Descriptive & econometrics analysis were used with the help of e-view 11 statistical software package . By econometrics analysis to test stationary test, unit root test by ADF type was checked for Data series and found that no series were stationary at original data. However the data series became stationary at first difference $I(1)$. After stationarity test, the causality test were made by Granger causality test and found that at the $I(1)$ only 1st difference of Log GDP causes GCF in one way unidirectional. The findings by VEC revealed that GDP as a proxy for economic development has a positive long-run association with NET_FDI, & LQ. From unrestricted VAR model the study confirmed that NET_FDI strongly predicts GCF and have a strong positive relationship with NET_FDI. Therefore, Government should focus to attract FDI in highly labor-intensive sectors & should stimulate job holding FDI and also increasing diversified FDI projects whose benefit lasts long in increasing capital formation to have effect to economic development.

Keywords: Gross Domestic Product (GDP), Federal Democratic Republic of Ethiopia (FDRE), Vector Error Correction (VEC), Unrestricted VAR model

CHAPTER ONE

1. INTRODUCTION

1.1. Backgrounds of the study

As shown in one worldwide journal that FDI is stated as a division of a global investment in which 'a resident entity in one economy interested in achieving a lasting interest in an enterprise resident in the other economy'. In addition to that the benefit of the foreign direct investor is possessing 'the existence of a far-lasting coordination between the direct investor and the enterprise, and act as independently to have an effect on the management of the organization, and it is deemed to exist when 'a Direct investor possesses 1/10th or greater than of the ordinary shares or the right for voting (for an incorporated enterprise) or the equivalent (for an unincorporated enterprise)'(Artero, 2018).

Foreign direct investment (FDI) is considered as one of the constitute of the world and part of the economy as well. Employment, technological progress, productivity improvements, and ultimately economic development is a fruit of FDI. It plays the critical roles of filling the development, foreign exchange, investment, and tax revenue gaps in developing countries (Abdulghader, 2014). Foreign Direct investment benefits the world economy, as well as investors and recipients. Capital goes to the businesses with the best growth prospects, anywhere in the world (Kimberly .A, 2020).

As revealed by one international study by the World Investment Report (2019), World foreign Direct investment (FDI) diffusion dramatically shown to diminish in 2018, by about more than of 13 percent amounting to \$1.3 trillion at that particular year FDI Flows to under developed countries remained stable, increasing by more than 1 percent amounting to more than of \$706 billion.

Smith (1976) observed that as foreign direct investment is becoming more important for developing countries; which are often based on the assumption that greater inflows of (FDI) would bring certain benefits to their economy. FDI has great social, cultural, economic and political effects for the host countries. Foreign direct investment as a development-enhancing component has received greater attention of developed countries in general and less developed countries in particular in recent decades. It has been a matter of great concern for many

economists that how FDI affects economic development and capital accumulations of the host country. In a closed economy, with no access to foreign saving, investment is financed solely from domestic savings. However, in open economy investment is financed both through domestic savings and foreign capital flows, including FDI. The investments in form of FDI enable investment-receiving (host) countries to achieve investment levels beyond their capacity to save. Over the last couple of decades, FDI has remained the largest form of capital flow in the developing countries far surpassing portfolio equity investment, private loans, and official assistance (cited in Abdulghade, 2014).

Developing countries have experienced a sharp rise in the inflow of FDI in the last two decades since 1980s, most of which are Asian firms establishing footholds in other Asian countries and Africa (Aykut and Ratha, 2003, and UNCTAD, 2004). Total investment by developing countries rose from about 1 percent of total foreign investment flows in the late 1990's to 6 percent in the mid-1990's and 8 percent by 2004, and thereafter peaked in the 2000's before the Asian crisis, and has since remained around 6-8 percent of the total FDI in the world. The rise has been due to reduction in protectionism by developed countries and economic liberalization by developing countries. As specified by one study the rise of the flow to South-South is about more than 5 percent of total FDI flows in 1994 to greater than 30 percent in 2000 (Aykut and Ratha, 2003). Worldwide FDI have shown increment moderately to more than \$ 1.24 trillion, which is about 15 percent less than pre-crisis average but predicted to indicate increment to USD of 1.4 to 1.6 trillion in 2011 and the highest limit recorded in 2013, whereas worldwide output has increased back to its pre-crisis level (UNCTAD, 2011).

In Africa, FDI might play an important role in the continent's development efforts, including: additions to local savings, creation of new employment generation and development, in line with the world-wide economy, adoption of new modern technologies', increment of efficiency, and scaling up of skills of local manpower. More than half of African countries have been setting a lot of critical measures (sometimes called "softeners") to ensure that their economies remain attractive to FDI. This has been through liberalization of the economy, offering fiscal incentives, easing restrictions on foreign investment and permitting profit repatriation (Graham and Spaulg, 2004 as cited in Maxwell 2012).

Further the study indicated that, countries in Africa have revived and kept macroeconomic stability by means of devaluating their overvalued currencies, and deductions of inflation and budget deficits (UNCTAD, 2008). To increase the confidence of investors, they have created Investment Promotion Agencies (IPAs) and affiliated to multilateral agencies such as World Association of Investment Promotion Agencies (WAIPA) among others, some of which are widely respected as successful agencies that adopt state-of –the-art practices in all areas of promotion (UNCTAD, 2011: p42).

Though several efforts have been made to attract foreign investors, the flows of FDI to some African states have been found to be decreasing (Asiedu, 2002 and UNCTAD, 2011). At USD 55 billion, the share to Africa in the total global FDI inflows decreased to 4.4 percent in 2010, from 5.1 percent in 2009, which is about 9 percent decrease. However, it should be noted that, whereas, anti-trade oriented FDI inflows to Africa is decreasing, natural resource- oriented (Greenfield) and trade oriented FDI has continued to dominate the continent, especially in the oil industry (UNCTAD, 2011).

As a result of the increase and the anomalous fall in FDI in developed countries, the share of developing countries in global FDI increased to 54 percent, a record. Unlike the global flows, FDI flows to Africa indicate a growth by 11 percent to \$46 billion, despite declines in many of the larger recipient countries. The increase was supported by continued resource seeking inflows, some diversified investments .but this is even lower than what the yearly average of the past 10 years (at about \$50 billion) (UNCTAD,2019).

There is also need to examine some of the macroeconomic and institutional characteristics of Ethiopian’s economy which makes it peculiar from other African economies in attracting FDI. It is therefore of great importance to understand for policy purpose, the short and long term effect of FDI on Ethiopia’s economic development and the factors that influence its inflows to Ethiopia.

In Ethiopia ,the flow of FDI even if it had been slow down in the year 2018, as a result the flow of FDI come to decline to USD 3.3 billion which is less than of the last year in 2017 which was recorded to USD of 4 billion as reported by UNCTAD World Investment Report (2019). even if declined , it is leading from the flow of East African region. Generally, the stocks of

overall FDI were predicted at about \$22.2 billion, representing 27.7% of GDP in 2018. According to the latest data from UNCTAD, despite a 24% fall in investments to USD 3.1 billion in 2018, Ethiopia kept its top rank in the horn of Africa, with investments in petroleum refining, mineral extraction, real estate, manufacturing and renewable energy (UNCTAD,2019).

The motivation of the study behind this thesis was to analyze the continuous and divergent flow of foreign direct investment (FDI) that come from worldwide, multilateral and bilateral countries from 1974 to 2019 and to see its real effect to the overall economic development on FDRE either negatively or positively by using time series analysis through estimating long run association by VEC model and unrestricted VAR model.

Therefore, the rationale and the purpose of the thesis was critically to assess the flow of FDI on economic development and giving more focus on the variable of interest on capital formation which is measured and proxy by the total value of the Gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables for a unit or sector and which in turn had have an effect to economic development on FDRE.

1.2. Statements of the Problem

According to UNCTAD's World Investment Report (2020), FDI inflows to Ethiopia decreased to USD 2.5 billion in 2019, compared to USD 3.3 billion in 2018 (-24%). In total, FDI stocks were estimated at USD 25 billion in 2019. FDI has been negatively impacted by instability in some parts of the country, including regions with industrial parks. The gap in filling the economic development in terms of FDI inflow are due to vulnerability to climate conditions ,changes in world commodity prices ,the isolation of the country, which is landlocked ,insufficient level of foreign exchange reserves ,the unstable regional context, and the exchange rate volatility.

A one international study on Ethiopian economy by Singh (2018) believed to be that the GDP growth is estimated to have picked up to 10.9 percent in fiscal Year of 2017. The expectation to this achievement would be due to a recovery in agricultural production after 2016 drought and Gross Domestic Product of Ethiopia grew 7.7% in 2018 compared to 2017.

Additionally, that study observed on the Ethiopian economy and had written as, Ethiopia was ranked 69 in the GDP list in 2018 from the total of 196 countries by registering \$80,289 million. It is an increase in GDP by \$4,544 million as compared to 2017 FY. The GDP per capital of Ethiopia in 2018 was \$735, \$23 less than in 2017, when it was \$712. Ethiopia's economy has

experienced strong, broad-based growth. The economy of Ethiopia demonstrated as there were strong difficulties to grow in the last ten years. This happened because of El Nino, political disability, unrest and a decline of the global commodity prices and the global economy as well. Even if this difficulty, the growth of GDP reached on average of about 1/10th over the last 10 years to a regional average of 5.4%. In 2016/17 the GDP had shown increment by 10.9% from that of 8.0% recorded in 2015/16. In 2017, the record in terms of USD amount of the Gross domestic product (GDP) and the per capital GDP of Ethiopia were \$80, 561,496,134 and 768 USD respectively (Singh, 2018).

World Bank (2019) observed the economic difficulties of Federal Democratic Republic of Ethiopia was the core challenges to sustaining its positive economic growth and speed up poverty reduction, which both required the significant progress in job creation as well as improved governance. The Bank pointed out that government was dedicating a huge amount of its budget to pro-poor programs and investments.

The study further pointed out that there was a belief in continuing support by large scale donor to provide a vital contribution in the near-term to finance the cost of pro-poor programs. Limited competitiveness were the core difficulties in the development of manufacturing, creation of jobs and the increment of exports. A developing private sector that restrict the country's competitiveness of trade and resilience of shocks. The purpose of government in expanding the role of private sectors by means of foreign investment and industrial parks was sustaining the growth of Ethiopia. Political instability, in connection with social unrest, could adversely affect growth through by slowing down foreign direct investment, tourism and exports (World Bank, 2019).

As acknowledged by Yu, Tu & Tan, (2011), FDI is widely considered to play an important role in the economic development of host countries. Growth is boosted by encouraging FDI by adoption of capital stock and injects new technology to the economy. In addition to this, spillover effect of technology by developing the existing skills, better employee training and adaption of new processes and products by foreign firms (Zhu, 2010).

United Nations Conference on Trade and Development [UNCTAD] (2019) stated that global foreign direct investment (FDI) flows continued their slide in 2018, coming down by 13 percent to \$1.3 trillion from a revised \$1.5 trillion in 2017. The decrease – the third consecutive time fall

in FDI – The reason behind this decrease was to large accumulations of foreign earnings of repatriations by United States multinational enterprises (MNEs) in the first two quarters of 2018, following tax reforms introduced at the end of 2017, and insufficient compensation from upward trends in the second half of the year. The fall took place despite an 18 percent rise in cross-border merger and acquisitions (M&As) (from \$694 billion in 2017 to \$816 billion in 2018). Further the organization showed that negative trend is also in contrast to a 41 percent jump in announced Greenfield investment values (from \$698 billion to \$981 billion). FDI flows declined sharply in developed countries and economies in transition. As a result, developing economies accounted for a growing share of global FDI, at 54 percent, from 46 percent in 2017 (UNCTAD, 2019).

United Nations Conference on Trade and Development [UNCTAD] (2019) further confirmed that the flow of FDI to under developed countries economies stayed stable, increasing by 2 percent to \$706 billion, with significant differences among regions. As the organization provide evidence in its report that Developing Asia and Africa recorded higher FDI inflows in 2018, whereas FDI shrink in Latin America and the Caribbean.

Further the study revealed by United Nations Conference on Trade and Development {UNCTAD} (2019) confirmed that the flow of FDI to the continent of Africa had expanded by 11 percent to \$46 billion, still below the annual average of the last 10 years (at about \$50 billion). The increase in inflow was mainly because of the continuation of resource seeking investments, slowly expanding diversified investments in a few economies, and a more than doubling of FDI flows to South Africa (from \$2 billion to \$5.3 billion).

Ethiopia has succeeded in becoming one of the world's fastest growing economies. The country recorded a real Gross domestic product (GDP) growth rate of 7.5% in 2018, and has averaged 9.9% GDP growth between 2008 and 2018, making it the fastest growing economy in sub-Saharan Africa (SSA) and in the world (World Bank 2019).

Despite the country's rapid economic expansion, it remains one of Africa's low income countries, with a GDP per capita of US\$790 in 2018. As Africa's second most populated country, the agricultural sector employs over 65% of the population. The country aims to become a low middle-income country by 2025 and has implemented the Growth Transformation Plan II (GTP II) – its national plan for economic and structural transformation – towards realizing its

2025 vision through a sustainable average GDP growth of 11% with about 109 million people (2018), Ethiopia is the second most populous nation in Africa after Nigeria, and the fastest growing economy in the region. However, it is also one of the poorest, with a per capita income of \$790. Ethiopia aims to reach lower-middle-income status by 2025 (World Bank 2019).

To this end, Ethiopia has started encouraging the inflow of FDI by improving the investment climate and by providing different incentive packages. However, Ethiopia's Gross domestic savings as proportion of GDP is quite low, and it is unlikely to achieve this development rate by mobilizing domestic savings (Ethiopian Economics Association, 2019).

In addition, government expenditures have been increasing from year to year over above government revenue and domestic savings, thereby creating a domestic imbalance (resource gap) that would in effect spillover into an external imbalance of imports exceeding exports hence foreign exchange gap and balance of payment problems (Ministry of Finance and Economic Development, 2019).

To overcome shortage of resources, concerns of international financial intermediations and FDI in particular have assumed vital as a stopgap measures among policy makers in their effort to ensure high and sustainable economic development (UNCTAD, 2019).

Furthermore, Ethiopian Investment Commission (EIC) has been established to service investors and streamline the investment procedures. As a result, Ethiopian's performance in attracting foreign investors has been fairly good in relation to other Sub Saharan African countries. For instance, FDI inflows peaked to USD 260 million in 2015 and since then the trend has been rising (UNCTAD, 2019).

Even if the increase in GDP, the population of Ethiopia assumed more than 109 million people in FY of 2018 that the fast increase of the population would not be in line with the increase of the GDP, The population is the second most populous nation in Africa next to Nigeria, and growing of the high in the region. It is also one of the poorest, with a per capita income of \$790. There is the expectation to join lower-middle-income status by 2025 (World Bank, 2019).

Therefore ,the benefits of FDI remain unforeseeable and how much could it fill the gap of the high population increase to match with slow increment of GDP for Ethiopia's case especially in

generating economic development ? Due to this fact, It was vital to see the FDI's effect on economic development in FDRE.

In Ethiopia, research in the area of effect of FDI on major economic development had been studied only few in number. Much of those studies focused on the economic growth. However this particular study focused on Ethiopia as a case, assessing critically and offering insight into extensively-disputed FDI-Development nexus. Therefore this thesis was uniquely different from other studies in that, the study used time series data by estimating VEC model and unrestricted VAR model considering the dynamic effect of FDI on economic development over a long period of time observing about for 46 years data touching the last three regimes ranging from Derg regime to the current Prosperity regime; whereas previous studies like Chanie (2017) used a simultaneous equation econometric model and 3SLS estimation technique and even the data covered till 2014 and therefore my study covers the gap from 2014 to 2019 as recent as possible.

Secondly, Unrestricted VAR model used in this study incorporating long-run dynamics through critical analysis of Impulse response functions and variance decompositions to show up what effect does FDI brought to Ethiopian Gross capital formation and which in turn to economic development. Neglecting these dynamics in the Unrestricted VAR model function and development model may produce various estimation biases, giving rise to misleading analytical results.

Thirdly there is little or no study which investigated and assessed giving particular interest on FDI's effect on its economic development at earlier studies emphasizing for causality among the variables. Due to inadequacy to check the existence of two-way causation among variables might lead to the simultaneity problems. Therefore, my study examined the causality relationship between GDP and FDI, Inflation rate, Creation of Employment, and labor Quality in Ethiopia. Therefore the study tried to explore whether there was evidence of FDI's and those variables having a long-term relationship with economic development or not in Ethiopia.

Finally, variables used in this study to examine the effect of FDI inflows to economic development are recent enough in Ethiopia ranging from 1974 to 2019 annually.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of the study was to analyze the effects of Foreign Direct Investment on economic development in Ethiopia.

1.3.2. Specific Objectives

The specific objectives of the study would be: -

- To assess the trends of Ethiopian FDI as a percentage of the share of GDP from 1974 to 2019
- To investigate the short run and long run effects of FDI on economic development in Ethiopia
- To investigate the relationship between effect of FDI on increasing capital formation through expansion of production capacity

1.4. Research Hypothesis

Hypotheses' of study were presented below:

1. H_0 : There was no relationship between GDP and FDI inflow in Ethiopia.
2. H_0 : There were no causality relationship between all independent variables and GDP in Ethiopia.
3. H_0 : There was no short run and long run effect of FDI to economic development in Ethiopia.
4. H_0 : There was no relationship between capital formation and FDI inflow in Ethiopia.

1.5. Significance of the Study

FDI to the developing countries like Ethiopia through capital formation is the vital one. Capital formation is the process of building up the capital stock of a country through investing in productive plants & equipment's to add value to the economic development. This would be achieved by means of increasing capital assets by efficient utilization of available human resources of the country that is diffused through FDI. Therefore, the study on effects of FDI on economic development by means of capital formation makes this research an important one to give directions of policy edge matters. The Thesis would also be a crucial input to those who are interested to see the short run and long run effect of FDI to the Ethiopian economic development.

Additionally, the paper would be used as a reference for those who are motivated to see the FDI's effect on the economic development issues in Ethiopia. At last this thesis would pave the way to inculcate further research studies for those who are interested in the subject.

1.6. Scope of the Study

The scope of the research delimited to itself on the areas of study that is particularly to the variable of interest of Capital formation through the effect of FDI to economic development of Federal Democratic Republic of Ethiopia. It was also limited itself only by assessing the year back of 1974 till 2019 in the flow of FDI in the country. The economic development parameter were many to measure the development but the study focused only to see two response variables such as GDP growth and Gross capital formation for their respective models specified, and the reason why the former response variable used as a parameter to indicate economic development here was the GDP's power of ability to give overall picture of the state of the economy and also detects policy makers and national bank of Ethiopia to decide either the economy contracting or expanding and the latter response variable why did it have been included was because it makes large scale production with greater specialization by expanding output and productivity & which in turn creates employment opportunity, safety of life, country's economic freedom & etc and finally contributing to economic development.

The Thesis was also restrained itself on the quantitative research approach aiming to develop econometric relationship only using secondary data sources and also limited on main variable of interest of explanatory variable of NET_FDI to see short run and long run effect & taking other control variables including Employment opportunity, labor quality and inflation rate. The study would further be confined in that geographical boundary of Ethiopia in which FDI diffused in the economic development of Ethiopia.

1.7. Limitation of the Study

The research thesis would have a time limitation, and a critical problem that encountered was also unavailability of raw data including FDI data which would occur in the previous government of Derg regime to study the flow to the country consistently by using time series data analysis and failure to collect sufficient data from secondary sources of Net foreign direct investment from 1974 to 1979, Employment opportunity from 1974 to 1991 and Labor Quality from 1974 to 1991 and the other limitation of this thesis was fail to collect raw data source to

cross check from Central Statistical Authority due to the data officer work permit at the time of data collection but the gap was filled by collecting from National bank of Ethiopia and further limitation that encounter was that the findings were not based on full range the study period of 1974 to 2019 except variables of GDP, Annual inflation and Gross capital formation.

As a result, some raw data for the empirical model had been collected with e-mail contact as alternatively due to shortage of data to mitigate problem of the unavailability of data of FDI at Derg regime was instead data collected and utilized from data base of UNCTAD.

1.8. Organization of the Study

The thesis was being organized into five chapters. The first chapter was organized as Introduction, background of the study, statement of the problem, objectives of the study, significance of the study, scope of the study, and organization of the study. The second chapter would deal with review of related literature; the third chapter would discuss Research methodologies', the fourth chapter would see the results and discussions-data presentations, analysis & interpretation and the last but not the least of chapter five would deal about the conclusions and recommendation.



CHAPTER-TWO

2. REVIEW OF RELATED LITRAURE

2.1. Introduction

In this Chapter, the researcher focused on reviewing both Theoretical and Empirical Literature in which to assess the theoretical aspects of FDI on economic development so that the intention of theoretical literature would be assessing theory of effect of FDI on economic development and the empirical literature would also be reviewed to deal with original researches such as scientific experiments, surveys and research studies of FDI on Economic development. The researcher also reviewed the economic development theory issues and how they are correlated with the flow of FDI to the economic development.

In this part, role of FDI in terms of capital formation, spillover effects on capital accumulations and technological progress that led to the development of theoretical and empirical literatures deeply assessed. In addition to this the possible determinants of FDI discussed. Finally, the conceptual framework depicted to show the Direction of the paper.

2.2. Theoretical Literature

2.2.1. Main Concepts and Definitions of FDI

As one international organization and one national governmental institution pointed out that “foreign direct investment reflecting the objective of establishing a lasting interest by a resident enterprise in one economy (“Direct investor”) in an enterprise (“Direct investment enterprise”) in other words resident in one economy other than that of particular direct investor”. The “lasting management interest” indicates having a long lasting engagement between the investor how directly invested and a significant degree of influence on the management of the enterprise OECD (1996) and Ethiopian Investment Agency (2008). One journal observed that what makes of FDI unique from portfolio investment is that, in that the former has “Significant degree of influence” and “long-term relationship” whereas the latter are short term activities undertaken by the institutional investors through the equity market. A “lasting interest” in foreign entity gives attention to the difference to other structure of capital flows and happened in the form of know how or management-skill transfer (Lipsey, 2003).

Smitha .F (2010) investigated in his Article that for a number of times, different scholars studied the influence of foreign direct investment (FDI) inflows into underdeveloped economies have

been the issue that affecting holding of foreign Direct investors and the consequences of FDI for those countries who entertain the investment from abroad go far beyond that is captured by national FDI statistics.

One theory proposes that as there are major issues that add value to host countries by the injections of FDI. Such as: (1) foreign firms inject financial asset ; (2) market opportunity created by companies; and (3) the industry improvement that is expected to achieve by means of technology transfer. From the many FDI injection modules to host countries, most of the modules expected to bring to overall growth and development to host countries. The first two aspects are usually examined by analyzing: (1) the shares of FDI in total external capital inflows into a host economy and Gross domestic capital formation; (2) the extent and pattern of foreign ownership in various sectors in terms of the industrial composition of FDI inflows and sources of FDI; and (3) the export-orientation of foreign-invested firms (Smitha .F, 2010, P.1).

As pointed out by World Bank, FDI is defined as the inflow of net investment to have a title of a lasting management interest (greater than or equal to 10 % voting right) in the invested and more over in the balance of payment in that economy showed sum of equity capital firm, reinvestment of earnings, other long term capital, and short -term capital as shown in the balance of payments in that economy(OECD, 2008).

2.2.2. Historical Perspective of FDI theories

One international theory in 1776 reviewed by Smith on FDI was not fully explained that Although there FDI theory dates as far back as the early work of [as cited in Smith, 1937] and In Smith's theory of absolute advantage expressed that transactions between two nations would occur if one country is able to produce and export goods using a given amount of capital and labor, more than its closest competitor (absolute advantage). Despite Smith's theory on absolute advantage of trade, he was not made clear how the trade transact among nations where a country was not in the trade of production. It is then that the work of Ricardo (1817) emerged, to explain FDI using the theory of comparative advantage (as cited in Patricia, L. M, 2015, p. 78). As stated by Denisia 2010, (as cited in Patricia, L. M, 2015, p. 78) in if markets were effective, with no barriers to transaction or competition nations; Global transaction on trade would be the only mode of involvement in the global markets. In contrast this theory that when Hymer (1976)

published his 1960 thesis, (as cited in Patricia, L. M, 2015, p. 78). he laid the foundation for other authors to come up with more plausible theories of FDI. In his arguments, he found that FDI was motivated by the need to reduce or eliminate international competition among firms, as well as Multi-National Corporations' (MNCs) wishes to increase their returns gained from using special advantages. Mundell 1957 (as cited in Patricia ,L. M, 2015, p. 78) came up with a 2-sector model of international capital flows whereby capital flows were considered to be a substitute to international trade, resulting in factor price equalization between countries. Mundell 1957 (as cited in Patricia ,L. M, 2015, p. 78) extended Ricardo's theory of comparative advantage by developing a model encompassing two countries, two products, two factors of productions and two identical production functions in both countries (Denisia, 2010).

2.3. Categories of Foreign Direct Investment

As wrote in one publication, FDI have more than two classifications from investor's perspective: vertical, horizontal and conglomerate FDI (Caves, 1971). For Caves, Horizontal FDI refers to undertaking for the purpose of horizontal expansion to produce goods and services roughly similar to those the firm produces in its home market. This category of FDI is called "horizontal" because the multinational duplicates the same activities in different countries (Lipseay 2003 cited in Alexander 2003).

Horizontal FDI arises because it is too costly to serve the foreign market by exports due to transportation costs or trade barriers. Vertical FDI, on the other hand, refers to those multinationals that fragment production process geographically for the purpose of providing input goods to parent company (backward vertical FDI) or to draw inputs from parent company for own production (forward vertical FDI) (Alexanader,2003: p91). It is called "vertical" because MNE separates the production chain vertically by outsourcing some production stages abroad. The third type of FDI, conglomerate, involves the former two types of FDI's. From the host country perspective, FDI can be classified in to three;

2.3.1. Import Substituting FDI

It involves the production of goods previously imported by host country, necessarily implying that imports by the host country and export by the investing country would eventually decline. This kind of FDI is likely to be determined by the size of host country market, trade barriers and transportation costs (Moosa 2002 cited in Remila, 2012).

2.3.2. Export Oriented FDI

The study pointed out by Reuber (1973) as the type of investment that reflects a wide range of consideration such as the design to develop secondary and more diversified sources of supply by way of obtaining low-cost products to be used either as inputs or for sale elsewhere. Export increasing FDI is motivated by firm's design to seek raw material and intermediary products. Host countries would increase its export of raw material and intermediary products to investing country or other countries where the firm has other subsidiaries. Examples of this type of investments are found in the raw material sector. Generally, such foreign investors are mainly interested in extracting products from the host country and selling them abroad through established market channels. In making such investments, firms sometimes also create a supporting infrastructure such as housing, hospitals and schools. This investment focuses on the needs of a particular market which is largely or entirely relies outside the host country (Reuber, 1973:73 cited in Teka, 2014).

2.3.3. Government Initiated FDI

It involves government's action to attract more FDI in order to eliminate its balance of payment deficit (Moosa 2002). Government may provide the necessary investment incentive to attract foreign investment into its economy. These are accepted by investors whereas market as ill as cost conditions may have precluded them from investing in the host country under normal or no-incentive conditions.

For example, According to Teka (2014), stated that in Ethiopia the incentives take the following forms: 100 percent exemption from customs duties and import taxes on all capital equipment and up to 15 percent on spare parts; exemption from export taxes (except for coffee); income tax holidays varying from two to eight years (depend on the sector and region within Ethiopia); tax deductible R&D expenditure; no taxes on the remittance of capital; the carrying forward of initial operating losses; and investor choice in depreciation models, full repatriation of capital and profits encompassing not only profits, dividends and interest payments on foreign loans but also on asset sale proceeds and technology transfer payments (EIA 2012a cited in Mulatie,2017).

Finally, FDI may be classified into expansionary and defensive types. Expansionary FDI seeks to exploit firm specific advantage in the host country. This kind of FDI benefited MNCs in increasing sales both in host and investing country. Defensive FDI seeks for cheap labor or

materials with the objective of reducing cost of production (Chen and Ku, 2000).

2.4. Determinates of Foreign Direct Investment

Nowadays the issue of foreign direct investment has got more attention at global and national levels. Different theoretical literatures have been done to explain the issue of FDI and the motivation underlying FDI. The popular conceptualization of, and theoretical framework for, FDI determinants is the “eclectic paradigm” attributed to (Dunning, 1993 cited in Teka,2014). It provides framework that group micro and macro-level determinants in order to analyze the reason for MNCs investment abroad. The framework posits OLI framework that firms invest abroad to look for three types of advantages: Ownership (O), Location (L), and Internalization (I) advantages (discussed below). The Micro level determinants explain the motivation for multinational companies/MNCs/ to open foreign subsidiaries. It also examines the consequences to investors, to the country of origin and to host country, of the operations of the MNCs rather than the investment flows and stocks. The Macro level determinants entirely explain FDI inflows from the host countries point of view. It tries to explain FDI as a particular form of capital flows across borders, from the countries of origin to host countries, which are found in the balance of payment which is the variables of interest are: capital flows and stocks, revenue from investment (Vinita, 2010).

The first theoretical explanations of international trade are related with the traditional theories of international trade which is based on the Ricardo’s model of Comparative advantage and factor proportion or factor endowments theory which is by comparative advantage theory which is based on two countries, two products and single factor i.e. labor (2-2-1 model) explain that international trade or export, that is an option to FDI, undertaken if one nation has a comparative privilege in making a particular item (Krugman and Obstfeld, 2006).

This theory entirely forgot to explain FDI and fails to provide an answer as to why firms choose to operate outside their country of origin. HO model of international trade which involves two countries, two products and two factors of production such as capital and land and, also fails to explain FDI than focusing on international trade. Other scholars of international trade such as Robert Mundell 1957, developed a model which involves two countries, two goods, two factors of production and two similar production functions in both countries, where production required

for a higher proportion of factor than the other, fails to explain the international production of goods through the flows of investment across countries.

2.5. The Effect of FDI in Economic Development Theory

The Direct and Indirect effect of FDI are not limited with productivity and economic development which has several effects on macroeconomic variables thereby on ill-being of economic agents. However, in this study I limit myself with the effects of FDI on productivity and economic development, thus my discussion below is constructed on economic development theory. In this respect, I discuss two anticipated effects of FDI on capital accumulation and productivity (technology spillover) which ultimately affect the economic development. The following two effects are widely and deeply discussed in the FDI-development nexuses therefore I keep the discussion short (Cem, 2010).

2.6. The Effect of FDI on Capital Accumulation vs. Capital Widening

Since FDI is a type of physical investment, it is expected to lead to an increase in the stocks of physical capital in host countries. Nonetheless, the effect might change regardless of the type of FDI. When FDI leads to an establishment of a totally new facility (Greenfield investment), the increase in the stocks of capital would be significant. According to the neoclassical development model of Solow (1956), this increase in physical capital, which stems from FDI, would increase per capita income level both in the short and long-run in the host economy by increasing the existing type of capital goods, but it would only enhance the development rate of the economy during the transition period due to the existence of diminishing returns to capital. Nonetheless, the longevity of the transition period differs across countries but it still lasts for many years (Aghion & Howitt, 2009, p.59). Therefore, in capital-scarce developing countries “capital widening” effect may imply important fair gains for the economic agents. In this regard, FDI can be seen an important development enhancing factor for these countries which leads to pro-FDI policies.

On the other hand, a Brownfield type of FDI would not lead to a considerable increase in the existing capital stock. In contrast, generally Brownfield type of FDI changes the ownership status of the existing capital stock therefore its effect on per capita income level and development might be limited (Johnson, 2006). Formally, in the Solow development model GDP equation can be written as $Y=K\alpha(AL)^{1-\alpha}$ with a Cobb-Douglas type production function.

Per effective labor GDP is given by $\phi = K\alpha$; in where ϕ (per effective labor income) and K (per effective labor capital). In a similar manner, per capita income and per capita capital can be defined as $y = Y/L$, $k = K/L$ respectively. When I write $Y/L = \phi = AK$, then the development rate can be expressed as; $g = A/A + \alpha k/k$. In the Solow development model, due to the existence of diminishing returns, the long-run development rate of the economy equals to the development rate of technology (A/A) whereas during the transition period the development rate is also designated by (k/k) . It is worth mentioning that in here I assume FDI does not affect development rate of technology and I relax this assumption in the following section (Cem,2010). As a summary, during the transition period (which can last many years); $FDI \uparrow \rightarrow K \uparrow \rightarrow \uparrow \rightarrow y \uparrow$ and $g \uparrow$. In the long-run, $FDI \uparrow \rightarrow K \uparrow \rightarrow \uparrow \rightarrow y \uparrow$. All in all, FDI is seen as an important stimulus to the productivity and development in economic development theory, even though there are differences in the transmission mechanism.(Cem Tintin , 2010).

2.7. The Effect of FDI on Productivity: Capital Deepening

The second effect that I consider is known as “capital deepening” which implies the transfer of knowledge and technology together with FDI into the host economy. It is supposed that TNE (transnational enterprises) do not only bring physical capital into the host economy, but also they transfer the technology and managerial skills since they want to maximize their profits. This basic reasoning implies that as FDI takes place productivity levels tend to increase which ultimately enhances per capita income levels and development rate of per capita income. Unlike capital widening effect, capital deepening effect triggers both short and long-run development rates. It explains this effect mechanism with economic development models in turn.

As showed in the previous section, the neoclassical development model of Solow (1956 cited in Cem Tintin,2010) assumes that capital falls into diminishing returns thereby the long-run development rate equals to the development rate of technology. Since capital deepening argument assumes that FDI triggers productivity (technology) hence the long-run development rate increases with FDI. Per capita GDP growth rate evolves According to $g = A/A + \alpha k/k$. Due to the existence of capital deepening effect it is expected that $FDI \uparrow \rightarrow (A/A) \uparrow \rightarrow y \uparrow$ and $g \uparrow$ in the short and long-run. In words, economy can be prevented from falling into diminishing returns due to increased development rate of technology which stems from FDI.

The AK development model of Frankel (1962) and Romer (1986) is known as the first wave of endogenous development models. Because the proponents of the AK development model assume that during capital accumulation, externalities may help capital from falling into diminishing returns. In here, externalities are created by “learning-by-doing” argument of Arrow (1962) and knowledge spillovers effect. Therefore, According to the AK model as a country continues to attract FDI; not only its capital stock enlarges but also productivity increases. Put differently, in existence of learning by doing externalities country would keep growing both in the short and long-run since its productivity (technology) grows as it goes on attracting FDI.

The product variety model of Romer (1990) argues that “productivity development comes from an expanding variety of specialized intermediate products” (Aghion& Howitt, 2009, p.69). Therefore, in a closed economy the only way of increasing the variety of intermediate products is conducting research and development activities in a productive manner. By opening the economy, however, the economy can reap the benefits of research and development activities which are conducted in foreign countries. The country may transfer different types of intermediate goods either by import or through FDI in open economies. Thus, it is expected that FDI induces economy-wide productivity and economic development by expanding the variety of intermediate products. In this respect, technology spillover Broda et. al (2006) empirically show that international trade increases TFP levels on average 10 % by applying Romer model to a panel dataset of 73 countries over the period 1994-2003 externalities, which stem from FDI, would also increase the knowledge stock of researchers and productivity of research activities in the host country. As a result, researchers might become more likely to invent new intermediate products which again trigger the economic development.

The Schumpeterian model of Aghion and Howitt (1992) constitutes the second wave of endogenous development models together with the product variety model of Romer (1990). Basically, both models point out the importance of research and development activities for sustained long-run development rates and they explicitly explain the mechanisms how research and development activities affect economic development. The key difference between the product variety and Schumpeterian models lies in their assumption how capital goods enhance the economic development. As mentioned above, in the Romer model, invention of “new” capital goods triggers productivity and economic development. Nonetheless, the Schumpeterian

model concentrates on the improvement of the quality of the existing types of capital goods. In other words, by conducting research and development activities, firms would become able to improve the quality of existing capital goods which makes old ones obsolete.

This process is called as “creative destruction” by Schumpeter (1942 cited in Cem, 2010: p77). Therefore, the economy can sustain long-run development as it innovates by carrying out research and development activities. By using a similar argument above, in an open economy, the country would transfer the innovative technology with FDI inflows and new quality improving mechanisms which would give rise to productivity and economic development.

2.7.1. Direct Effects of FDI on Capital Formation

The most common view considers FDI as a financial flow contributing to capital stock accumulation, by adding up to domestic investment. As such, the effect of FDI largely depends on the entry mode of MNEs. Greenfield investments – i.e. brand new domestic subsidiaries of foreign firms – have a direct effect on capital formation as they create new capital assets, whereas M&As are a partial or total transfer of existing capital assets through a change in the nationality of existing domestic firms, but do not add to the capital stock. Nor is it certain that the acquisition of a domestic firm by a foreign firm would lead to more investment than the acquiring firm would have made without the acquisition Mencinger, 2003; Agosin & Machado, 2005; Herzer, 2012 (as cited in Alessia. et al 2017).

Although the literature has regularly acknowledged a differential effect of FDI on capital formation depend on the entry mode of MNEs, most empirical studies rely on macro data that cannot disentangle between different entry modes. One research demonstrated by Ashraf & Herzer (2014) have proved the influence of Greenfield investment and M&A on domestic investment, with aggregate data from UNCTAD; their results confirm that M&A do not have a significant effect on domestic investment, whereas (estimated) Greenfield flows report a positive effect, even if this seems to happen at the cost of domestic investors (crowding-out effect). The literature has also invariably overlooked the fact that FDI as an aggregate measure from the BOP statistics represents just a financing flow, and not necessarily investment (Calderon et al, 2004). FDI includes any financial transfers from a multinational's headquarters to its subsidiary. As they are measured in net terms, aggregate FDI flows can be either positive or negative, but that does not relate at all to the amount of investment in the host economy. Moreover, aggregate FDI

statistics do not allow for industry-level breakdown on a bilateral basis, nor include information about different entry modes of MNEs into foreign markets. All in all, such broad FDI statistics do not allow exploring the potential complementarities between domestic and foreign investments, calling for more disaggregated analysis Arndt et al., 2009 (as cited in Alessia et al 2017).

2.7.2. Indirect Effects of FDI on Capital Accumulation

In the host economy can take place through the effect of foreign capital on domestic capital formation, as the entry of foreign firms may alter the incentives to invest by domestic firms.

Theory has pointed out a number of mechanisms through which FDI can increase the profitability of domestic investment. First, FDI can act as a catalyst for domestic investment because multinationals usually have greater access to information and financial resources than most private investors do in developing countries. Hence, they are able to both identify and take advantage of profitable opportunities more quickly than domestic investors, so that the entry of foreign firms in a developing country signals the existence of unexploited profitable business opportunities that domestic investors might not be capable of identifying to seize by themselves. Moreover, foreign firms entering a developing country often bring about the need for more efficient infrastructure facilities (roads, telecommunications, ports, railways, etc.), which they can also contribute to finance (Cardoso & Dornbusch, 1988). As poor or insufficient infrastructure is often bring constraint to business development in developing countries, improved infrastructure can open up new business opportunities that would not have been profitable otherwise, thus increasing the profitability of overall domestic investment. A further mechanism through which foreign firms can contribute to capital formation is through the supply of scarce inputs (Helleiner, 1988), which they can vehicle by importing human and physical capital, technology, and other intangible assets (as cited in Alessia.A et al 2017).

The literature has also emphasized the existence of potential negative effects on the profitability of domestic investment due to the presence of foreign firms. Different mechanisms may be at work. Foreign owned firms can acquire the domestic market shares to the detriment or the disadvantage of domestic firms Aitken & Harrison, 1999 (as cited in Alessia.A et al 2017).

Foreign firms can crowd out domestic investment if they increase the host country's interest rate by borrowing on the domestic market (Harrison & McMillan, 2003). Foreign firms entering a

developing country in sectors with relatively underdeveloped productive capacity may sensibly increase the cost of locally supplied inputs, especially wages (Lall & Streeten, 1977). Moreover, FDI have uncertain effects on the degree of competition in host economies, as foreign firms, usually more efficient and productive than domestic firms, can boost competition among the latter, but at the same time could acquire the market power, with a potentially negative effect on domestic investment (Markusen and Venables, 1999). FDI can have negative effects on overall capital formation in developing countries, when the entry of foreign-owned firms pushes the less efficient domestic firms out of the market and therefore reduces domestic production capacity (Gorg and Greenaway, 2004). Finally, foreign firms could also have a negative effect on the demand for local inputs, if they rely less on domestic inputs than domestic firms (Rodriguez-Clare, 1996 as cited in Alessia.A et al 2017).

2.8. Exchange Rates and Foreign Direct Investment

In one study as pointed out by Kohlhagen 1977; Cushman 1985) on about FDI-exchange rates linkages that begun in the 1970s and 1980s as Two theories that had been greatly influential are Blonigen (1997) and Froot and Stein (1991). In the study as used by Froot and Stein those exchange rates in the imperfect capital markets operate on Wealth to impact on FDI. To the reason that the assumption of imperfect capital markets, sources from external for borrowing are more costly than a firm's internal cost of capital. So that, host currency depreciation is estimated to have an encouraging normal effect on inbound FDI (IFDI), as it immediately scale up the Wealth of foreigners, permitting them to act higher auctions for assets. As studied by Blonigen (1997) focuses on acquiring FDI: a special case for exchange rate effects as the acquisition of a foreign target firm can provide firm specific assets. The theory presume goods market segregation, and suggest that internal and external enterprises have the similar chance of purchasing, but unique chances to have positive returns on assets in foreign markets. The opportunities of positive returns of all sectors of multinational enterprises might be scaled up after the acquisition of a foreign firm. For this reason, currency movements may affect relative asset valuations, and a depreciation of the host's currency increases IFDI (Simpson, Stahl, & Francis, 2004, as cited in Shauna & Fredoun , 2008).

2.9. Economic Development

In one study as demonstrated that the economic development parameters included all of the different strands of economic development. Uniquely, economic development defined in terms

of objectives. These are most frequently interpreted as the creation of jobs and Wealth, and the improvement of quality of life. Economic development misinterpreted as a process that has an effect on development and reorganizing of an economy to widen the economic well-being of a social status. Generally, economic development incorporate inflation control, Gross capital formation, increasing employment, and sustainable development, technology transfer, real estate development and others. The core aim of economic development is upgrading and stimulating the economic Well-being of a community through scaling up that increase job creation, job retention, tax base enhancements and quality of life (Ovidiu , 2011).

2.10. The Narula Model of Five Stages of Investment in Development Path

According to the concept's basic proposition, the inward and outward investment positions of a country are tied to the country's economic development. Changes in the volume and structure of FDI lead to different values in the country's net outward investment (NOI) position, defined as the difference between the Gross outward direct investment stock and the Gross inward direct investment stock. The changing NOI position passes through five stages intrinsically related to the country's economic development So, a country experiences five stages of economic development characterized as having different pattern of inward and outward investment. Outward FDI is expected to take place in later stages when a country has accumulated a certain amount of ownership advantages among firms. According to the IDP theory, countries evolve through five stages of development (Ovidiu, 2011).

Stage 1 is associated with pre industrialization. Inward and outward FDI flows are almost nonexistent because domestic markets are very small, infrastructure is inadequate, the labor force is poorly educated and commercial and legal frameworks are undeveloped (Ovidiu, 2011).

Stage 2 is associated with the development of some location specific advantages (for example, basic infrastructure, eventually as the result of government policies) would give rise to stage 2. This leads to more inward direct investment, mostly targeting the emerging domestic market in consumer goods and infrastructure, but too little outward investment, because domestic firms lack ownership advantages. Consequently, the net stocks of outward investment would become increasingly negative. In this stage, inward FDI stocks rise faster than GDP (Ovidiu, 2011).

Stage 3 is associated with less spectacular development rates of inward FDI. This is eventually overtaken by outward direct investment, and the net FDI stock would for the first time start to

increase despite remaining negative for some time. Behind this change are the domestic firms' growing ownership advantages, which become also more firm specific and less country-specific. Stronger domestic firms would be more competitive in the domestic market, while engaging in resources seeking investment in less developed countries and in market and strategic asset-seeking investment in more developed countries. The deepening of these trends would eventually turn countries into net outward investors (Ovidiu , 2011).

Stage 4, Location advantages become almost entirely based on created assets, and the firms' ownership advantages that result from managing and coordinating geographically dispersed assets become far more important than those based on the host country's specific characteristics. Intra industry production is a consequence of the growing similarity in the advantages of countries at this stage, and it generally follows prior development in intra-industry trade. It results from an increasing propensity by TNC to internalize trade and production (Ovidiu , 2011).

Finally, Dunning and Narula postulate the existence of a stage 5 in the IDP, corresponding to today's situation in the leading developed countries. With permanently high stocks of both inward and outward FDI, the net outward investment (NOI) position of stage 5, countries would revolve around zero, alternating between positive and negative balances, depend on the short-term evolution of exchange rates and economic cycles (Ovidiu, 2011).

2.11. Empirical Literature Perspective

There are many empirical studies carried out among FDI, economic growth and economic development across the world with different methodological frameworks. Many empirical studies used time series econometrics models where as few other countries used a cross-country method to investigate the association among variables.

In the world economies, FDI plays a crucial role, in which even acting as a catalyst of economic development. foreign investment would be facilitating by minimizing the gap between the required new capital formation and saving, and which in turn contributing in the host country's economic development.

Hassen and Ochianis (2012) investigated the association between foreign direct investment and economic development in Tunisia by help of a co integration method. A time series analysis over the period 1975 to 2009 is used for the analysis using a co integration Error Correction Model.

The research result suggests that FDI could help boost the process of long-term economic development.

Khun Sokang (2018) found in his empirical results that there was positive relationship between economic growth and FDI in contrast with the officials in charge of growth and development. The study investigated impact of foreign direct investment (FDI) on economic growth in Cambodia. The study had used data from 2006 to 2016 by using Two-Stage least squares method of simultaneous equations.

The empirical works by Olayiwola & Okodua (2007) investigated the dynamic interaction among FDI, non-oil exports, and growth of the Nigerian economy. Macaulay (2009) assessed how FDI had an effect on economic growth in Nigeria and the finding of the study indicated that there exist a positive relationship between FDI and economic growth.

The other empirical done by Adeniyi, Omisakin, Eqwaikhide & Oyinlola (2012) pointed out that the causal linkage between foreign direct investment(FDI) and economic growth - in Cote' d'Ivoire, Gambia, Ghana, Nigeria and Sierra Leone -with financial development accounted for over the period 1970-2005, within which applied granger causality tests in a vector error correction(VEC) setting. It was found that the extent of financial sophistication matters for the benefits of foreign direct investment to register on economic growth in Ghana, Gambia and Sierra Leone depending on the financial indicator used. Nigeria, on the other hand, displays no evidence of any short- or long-run causal flow from FDI to growth.

Oyatoye, Arogundade, Adebisi & Oluwakayode (2011) examined the possible impact and relationship between foreign direct investment, and economic growth in Nigeria from 1987 to 2006. The study revealed that there is a positive relationship between foreign direct investment and gross domestic product (GDP).

Siabu, Wosa & Agbeluyi (2011) examined the effects of financial development and foreign direct investment on economic growth in Nigeria. The study modified the standard endogenous model to incorporate foreign direct investment and financial development as the determinant of growth in the long run using time series data from 1970 to 2009. The result shows that financial development and foreign direct investment had negative effects on economic growth in Nigeria.

Imoudu (2012) investigated the relationship between foreign direct investment (FDI) and economic growth in Nigeria between 1980-2009 through the application of Johansen Co integration technique and Vector Error Correction methodology in which FDI is disaggregated into various components.

In Ethiopia, Empirical findings shown different outcomes as effect of FDI to economic growth and development. Among the more important studies, the following studies might be mentioned. Selamawit. B (2015) found in her empirical study in Ethiopia on the analysis conducted indicated that the development effect of FDI in real GDP growth was positive and statistically significant and the relationship is from foreign investment to economic growth. In the case of export performance and spillover effect, the analysis conducted found a moderate positive relationship between FDI and export growth as well as a negative and insignificant relationship between FDI and spillover effects.

Dejene Gizaw(2015) found that the short-run analysis of vector error correction model suggested that, in the short- run FDI has an insignificant contribution to economic growth. The impulse response analysis suggested that a positive shock to FDI results in a positive response to itself in the whole forecast period but results in a positive response of economic growth only after five years. The variance decomposition analysis further showed that FDI influenced very little to the forecast error variance of economic growth in the short run but its contribution increases to a little bit in the long-run.

The foreign direct investment is a most reliable income generating of foreign funds for all countries, irrespective of its development level. The intense periods of economic development are characterized by the process of attracting some important FDI flows (Lipsey, 2000). Studies reveal the influence of foreign direct investment upon economies, and this stimulates economic development. The effect of foreign Direct investment also depends on the economic potential of the country, regulations on the foreign direct investment, the way in which these investments build up, as new investment or foreign capital increase (as cited in Zoica, 2016, P.12).

Table 2. 1 The causality link between Economic development and FDI

Authors	Purpose of the research	Results and conclusions
Bloomstorm, Lipsey and Zajjan,1994	FDI-Effects Upon Economic Development	Positive but depends on revenue per capital in the host country
Balasubramanyam, Salisu and Sapsford,1996		Positive if the country has an export-oriented strategy and negative if the country has a substitution import oriented strategy
De Mello,1997		Positive for countries with high revenue
Borensztein,Gregorio and Lee,1998		Positive, but depends on education level
Bosworth and Collins,1999		Positive
Carkovic and Levine,2002		Positive, if economies have developed financial market
Bengoa and Sanchez-Robles,2003		Positive, but depends on economic conditions in host country
Alfaro,2003		Effect depends on investment :positive for production, negative for primary sector ,and Non conclusive for service sector
Hansen and Rand,2004		Positive
Khholdy and Sohrabian,2005		No effect

Source: Moraru C. 2013 (as cited in Zoica, D.2016, P: 1). Foreign Direct investment and economic development in Romania Volume XX, No. 5(582), p. 126

In a widely cited work, Borensztein et al. (1998) examine the effect of FDI on economic development in cross country regression framework, using data on FDI outflows from OECD countries to sixty-nine developing countries over the period 1970-1989. They find that FDI is an important vehicle for adoption of new technologies", contributing relatively more to

development than domestic investment. In addition, they find, through the relationship between FDI and the level of human capital, FDI has a significant positive effect on economic development. However, they qualify their results in as much as the higher productivity of FDI only holds if the host country has a minimum threshold stock of human capital (as cited in Abdul, 2007).

Within a new development framework, Bulasubramanyam et al.(1996) examined the relationship between FDI and development in the context of differing trade policy regimes, i.e. export promoting and import substituting countries. Using cross section data to analyze forty-six developing countries over the period 1970-1985, they find support for Bhagwati's hypothesis that FDI would increase development in countries which adopt export promotion policy (as cited in Abdul, 2007).

Li and Liu (2005) observed in their study that applying both single equation and simultaneous equation system techniques to carry out endogenous interaction between FDI and economic development. applying a panel of data for more than 84 countries over the data time series of 1970-1999, they find positive effect of FDI on economic development through its interaction with human capital in developing countries, but a negative effect of FDI on economic development via its interaction with the technology gap. Bengoa et al. (2003) estimated the relationship between FDI and economic development using panel data for eighteen Latin American countries over the period 1970-1999. They show that FDI has positive and significant effect on economic development in the host countries (as cited in Abdul, 2007).

According to Alessia et al., (2017) investigated in their empirical research result that different types of FDI have diverse effect on domestic investment; foreign affiliates with productive activities are more beneficial to host economies. Instead, foreign affiliates performing trade-related activities, such as sales, marketing, client support, are less likely to have a positive effect on total investment and they could even contribute to reduce the overall size of the investment in the industry. This suggests that FDI attraction policies by developing economies should better consider linking incentives to the business activities of foreign affiliates. However, this increase in total investment goes along with a crowding out of domestic investment in each recipient industry, i.e. the amount of FDI inflows displaces domestic investment more than proportionally.

This displacement effect seems to be dramatically large in the case of trade-related FDI, i.e. FDI that entails no productive activities in the domestic economy (as cited in Richard, 2019).

2.12. FDI and Technology Transfer

Richard Angelous Kotey (2019) investigated some empirical studies of FDI effect on technology spillover occurring as a result of labor mobility or worker turnover. Thus the idea that when workers leave organizations for another (in this case from an MNC to a local firm), there is a high probability that they will spillover technology they have absorbed from the previous employers. Other studies have gone around this same idea but used a different approach. For example wage differentials to measure mobility from MNCs to local firms. Researcher samples employer-employee data from Brazil and found a positive relationship between the wages of workers and their prior experience with multinationals. Again found a significant relationship between worker mobility and technology transfer. Another empirical researcher sampled data from manufacturing firms based in South Korea. He found a significant transfer of technology into local firms when production managers who previously worked with multinationals left them to work in domestic plants. Pack also found the same results using data from the Taiwanese chemical industry. He discovered in the data period he used (in the mid- 1980s), the number of engineers and specially trained workers who left MNCs to work in domestic firms was 50 percent and 63 percent respectively. These skills will be absorbed by the domestic firms that hire them. Authors like also support technology spillover through worker mobility. However, an older study found insignificant labor mobility of workers from MNCs to domestic firms using data from Kenyan firms.

Artero (2018) find in his empirical research that FDI has a positive effect on the output of host countries, in line with the mainstream economic theory. The estimation results based on the LSDV model and the data for Ireland during the period 2000-2015 indicate that one percentage point increase in the number of FDI operations increases the country's output approximately by 0.03 to 0.13 percent, with a 95% confidence level. However, from a spatial perspective, the researcher fails to find positive spillover effects between regions within country borders. All the FDI spillover effects are rather self-contained in a single spatial unit. Thus, the analysis delivers the results that the growth of a region depends on the number of FDI operations within that same

territory, while those of the neighboring regions do not promote, and rather dampen, its economic growth (at least in the year in which the FDI operation takes place).

2.13. Empirical Findings on Short Run and Long Run Effect of FDI

Economic development in this thesis is measured in terms of GDP growth, employment opportunity, Gross capital formation, stable inflation rate and labor quality as FDI is said to affect economic development through these channels that is why we reviewed empirical research on economic growth.

An empirical research made on in one country by Koojaroenprasit (2012) assessed the effect of FDI on economic growth in Korea over 1980–2009 periods by using multiple regression. The study result indicated that as there was a tight positive effect of FDI on Korea's economic growth, and the other control variables also had resulted the same like human capital, export, and employment which were stimulating and scaling up growth. Indistinguishable study was also found in one particular country of Pakistan with a positive long-term association between the flow of FDI capital & the growth of the economy (Shahbaz & Rahman, 2010).

As one international Empirical study found that capital flows of FDI had have a negative effect on the economic growth in the short run, but also have an influential growth effect in the long run for emerging and developing economies. The models used to estimate the equation were VECM and FMOLS techniques to examine FDI impact on economic growth. The empirical study further strengthened that there is a strong linkage between FDI and growth in developing countries, with a focus on this relationship in both the short and long run during the important of 2000 to 2014 period, which includes the global financial crisis (Dinh et al., 2019).

In spite of positive association of the empirical research result between FDI and economic growth above, a negative association was also found. In one journal studied by Jyun-Yi and Chih-Chiang (2008) resulted as no association between FDI and economic growth in the study period of 1975–2000. As the study further pointed out that FDI alone couldn't bring an economic growth by using the LS and GMM regressions. At the same fashion on the empirical study by Lyroudi et al. (2004) found no FDI effect on the growth economy for emerging markets during 1995–1998 and the result indicated that FDI does not exhibit any significant relationship with economic growth for the transition countries and the empirical research mainly focused on the US and the western European countries.

Table 2. 2 The Core Conclusions on Findings of the Empirical Literature Reviewed

S/N	Researcher	Type of data	Countries sampled and time period	Statistical techniques used	Results
1	Borensztein et al. (1998)	using data on FDI outflows from OECD countries	sixty-nine developing countries over the period 1970-1989		<ul style="list-style-type: none"> ➤ FDI is an important in adoption of new technologies', contributing relatively more to growth than domestic investment ➤ relationship between FDI and the level of human capital, FDI has a significant positive effect on economic growth ➤ the higher productivity of FDI only holds if the host country has a minimum threshold stock of human capital
2	Bulasubramanyam et al. (1996)	cross section data	forty-six developing countries over the period 1970-1985		<ul style="list-style-type: none"> ➤ FDI will increase growth in countries which adopt export promotion policy.
3	Li and Liu (2005)	a panel of data	84 countries over the period 1970-1999	both single equation and simultaneous equation system	<ul style="list-style-type: none"> ➤ positive effect of FDI on economic growth through its interaction with human capital in developing countries, but a negative effect of FDI on economic growth via its interaction with the technology gap
4	Bengoa et al. (2003)	panel data	18 Latin American countries over the period 1970-1999.		<ul style="list-style-type: none"> ➤ FDI and economic growth show that FDI has positive and significant impact on economic growth in the host countries

5	Alessia.A A. et al.,(2017	-	-	empirical research	<ul style="list-style-type: none"> ➤ different types of FDI have diverse impact on domestic investment; foreign affiliates with productive activities are more beneficial to host economies ➤ FDI attraction policies by developing economies should better consider linking incentives to the business activities of foreign affiliates
6	Richard Angelous Kotey (2019)			Empirical research	<ul style="list-style-type: none"> ➤ when workers leave organizations for another (in this case from an MNC to a local firm), there is a high probability that they will spillover technology they have absorbed from the previous employers
7	PABLO DE LLANOS ARTERO (2018)	the output of host countries, in line with the mainstream economic theory	Ireland during the period 2000-2015	LSDV model	<ul style="list-style-type: none"> ➤ FDI has a positive effect on a single spatial unit positive spillover effects between regions within country borders.
8	Dinh et al., 2019	Panel data	30 Developing countries	VEC Model , and Fully Modified OLS	<ul style="list-style-type: none"> ➤ FDI stimulate economic growth in the long run, although it has a negative impact in the short run

Source: My Own summarization (2019) based on empirical research reviewed

2.14. Empirical Research Gap

Even if there have been many research studied on the effects of foreign direct investment on economic growth in recent years in which limiting studies to investigating the impacts of FDI on economic growth by applying different statistical methods either using cross sectional or panel data method for various countries in one study. This thesis however uniquely different

from previous empirical studies in which investigating the effects of FDI on economic development in Ethiopia by plugging two response variables and many explanatory variables including creation of employment opportunity ,labor quality, stable inflation rate and gross capital formation and relating effects of FDI to the country's development level. At the same circumstance, this thesis tried to provide a wholesome picture of FDI as a share of GDP in the country by investigating economic growth, gross capital formation and employment opportunity and which resulting the flow of FDI to the development of the economy in the country.

In the empirical studies most of results shown that effect of FDI on economic growth that had taken variables on GDP growth parameters but didn't consider how the FDI contribute to the economic development aspects on Gross capital formation and through in flow of FDI effects on creating employment opportunity. Therefore, this thesis would be interested to fill the gap in the empirical research that was not covered on the area of prior studies.

2.15. FDI distribution in Ethiopia by Country of Origin

According to Ethiopian Investment Authority (2012) of the total 6235 FDI projects in Ethiopia, more than 900 projects inflows are from Chinese investors (though exclusively Chinese owned firm accounted for 773 where as others are joint-ventures). The second largest source is Sudan, accounted for the total of 717 projects (only 622 are exclusively owned by Sudanese). 939 FDI projects are from USA (only 484 are exclusively owned by US citizens). Britain, Italy Germany, France, Sweden Netherlands and turkey are the major source of FDI from Europe. Other developing countries such as India, Saudi Arabia, Egypt, UAE, South Korea, South Africa and Kuwait etc are also source of FDI in Ethiopia (ibid). There are also significant investments coming from African countries such as Sudan, Nigeria, Egypt, South Africa and Somalia (Teka, 2014).

Worldwide basis, developed countries are the major source of inflows; However, one can note that the majority of FDI inflows to Ethiopia are from developing countries such as china, India and Saudi Arabia (Saudi Arabia's investment is dominated by a single company by the name MIDROC-group, whose owner is of both nationals; Ethiopian and Saudi Arabia). This trend might indicate that Ethiopia could not provide an attractive business environment for FDI originated from developed economies. Few economists argued that this failure of Ethiopian government is the consequence of its policy choice i.e. the government paid more attention to

economic development at the expense of political development and democratization in which the developed world are not lured to this processes (Teka,2014).

2.16. Conceptual Frame Work

The conceptual framework depicted on figure 2.1.below for this study was structured from various Directions that have either Direct or indirect effect to the economic development through injections of FDI to Ethiopia. Furthermore the frame considered theoretical and empirical bases and from models formulated that were expected from the researcher to be answered to the problem of statement. From theoretical point that FDI has two effect such as directly on productivity and economic development and indirectly on ill-being of economic agents. In this respect, two positive effects of FDI would be creating capital accumulation and increasing productivity (technology spillover) which assures economic development. When FDI leads to an establishment of a totally new facility (Greenfield & Brownfield investment), the increase in the stocks of capital would be significant. From empirical perspective positive if the country has an export-oriented strategy and negative if the country has a substitution import oriented strategy. Therefore I realize that FDI contribute greater share in economic development by bringing different results.

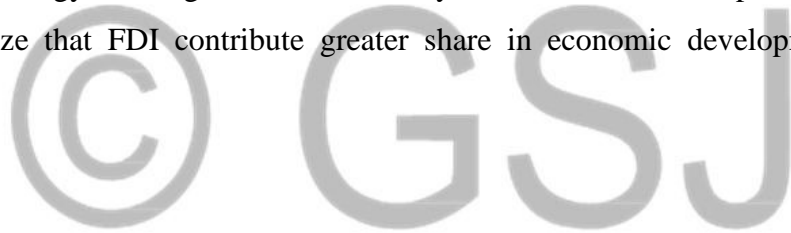
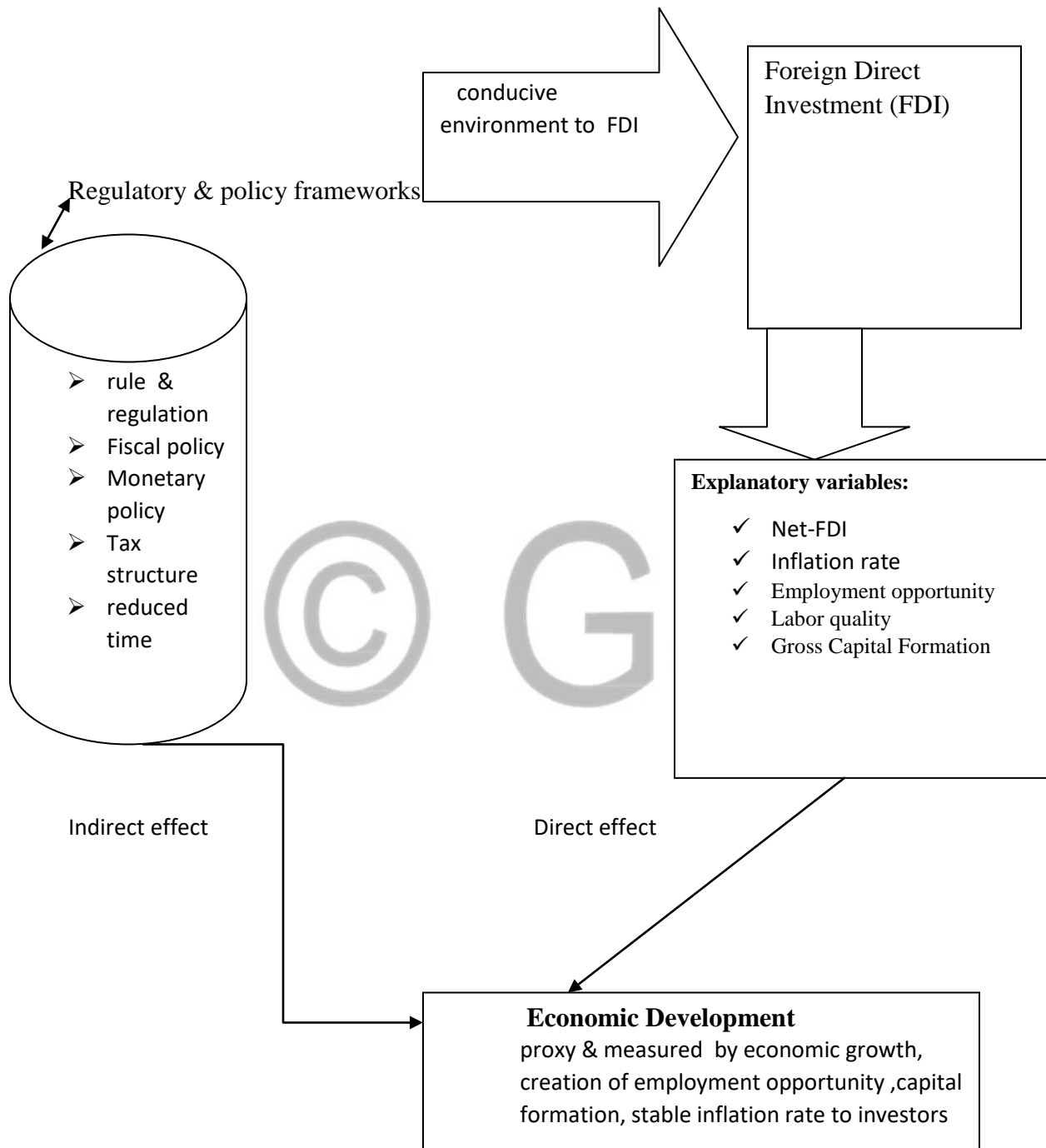


Figure 2. 1 The Effect of FDI On Economic Development



Source: Own Source based on Reviewed Literature, 2020

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introductions

In this part the Researcher indicated the overall research design and methods which the thesis would follow for result discussions and analysis and to come to recommendation on the effect of FDI on economic development by using time series analysis of the period back from 1974 till 2019 and the econometrics models applied in the thesis, the E-VIEW 11 Software applications which would be in use to interpret the data, the Research methods that would be used both descriptive and inferential statistical technique applied to test the hypothesis, the linear regression would be used to modeling the relationship between a scalar response (or dependent variable) and explanatory variables (or independent variables) and the error terms.

3.2 Research Design

Quantitative research approach is used since it helps to conduct systematic empirical study of observable phenomena via statistical or mathematical techniques (Kothari, 2004). The reason behind using quantitative type in the thesis is to develop and employ econometrics models that is application of statistical methods to analyze data in order to give empirical content to economic relationships between variables. Therefore the process of measurement is critical to quantitative research because it provides linear relationship between the dependent and explanatory variables and in line with this a deductive reasoning in describing the flow of the analysis would follow from general to specific. As a result, in this thesis, the researcher would assess the trends of FDI effect as a percentage of the share of the GDP from 1974 to 2019 which in turn test its impact on the overall economic development of Ethiopia and investigate short run and long run effect of FDI on economic development and then evaluate the effect of FDI on increasing capital formation through expansion of production capacity in Ethiopia by using a time series analysis to test the effect of FDI to economic development in Ethiopia.

3.3. Target Population

The target population in this study covered the major data sources for the research problem under investigation in the publications of National Bank of Ethiopia (NBE), Ethiopian investment Commission, Central statistics Authority (CSA), Ministry of Finance and Economic Development (MoFED), Planning Development Commission and Statistical data base of

Ethiopian Economic Association (EEA) and statistical data base of UNCTAD and International Monetary Fund (IMF) from 1974-2019 fiscal year.

3.4 Data Collection Instrument

To comply with the research objectives, the researcher focused on secondary data, which would be obtained from publications of National Bank of Ethiopia (NBE), Central statistics Authority (CSA), Ministry of Finance and Economic Development (MoFED) and Statistical data base of Ethiopian Economic Association (EEA), Ethiopian investment Commission, and statistical data base of UNCTAD and International Monetary Fund (IMF).

3.5. Method of Data Analysis

3.5.1. Data Presentation Techniques'

There are two types of data presentation techniques utilized in the thesis including tables which was used for detailed demonstration of raw data on tables that raw data which was used to portray a message about central tendency and dispersion of the secondary data and time series line graph which was used to show data points over the study time by help of e-view 11 statistical software package.

Whatever a good quality of data one have, it could be senseless unless appropriate method of analysis is used. In the world of statistical data, there are two classifications of statistics including both descriptive and inferential statistics.

Accordingly, with the secondary data both descriptive statistics and inferential method of analysis would be made either to reject or not to reject the hypothesis which formulated in the first chapter.

In a nutshell, descriptive statistics just used for describing and summarizing the raw data collected from secondary sources both by Measures of central tendency such as mean, median, and mode and measures of dispersion which including variance, standard deviation, and range by help of tables and line graphs.

In the inferential analysis that used in this thesis allow us to draw conclusions and in this thesis we used Multiple linear regression Analysis which show a relationship between the response variables and the explanatory variables with a linear algorithm.

Since the data used in this study involves a time series one, a brief explanation of some of econometric concepts forwarded by time series analyst is helpful like stationary and co integration to see much impacts of a time series analysis for this paper, it is a mandatory to understand a time series econometrics concepts.

A *time series* is a sequence of observations on a variable taken at discrete intervals in time. it would be indexed the time periods as $1, 2, \dots, T$ and denote the set of observations as

$$(Y_1, Y_2, Y_3, \dots, Y_T)$$

we often think of these observations as being a finite sample from a *time-series stochastic process* that began infinitely far back in time and would continue into the indefinite future:

$$Y_{-3}, Y_{-2}, Y_{-1}, Y_0, Y_1, Y_2, \dots, Y_{t-1}, Y_t, Y_{t+1}, Y_{t+2}, \dots$$

Pre-sample sample post sample

Each element of the time series is treated as a random variable with a probability distribution. Time series regression models are especially suited for evaluating impacts of time varying factors and the most vital and common assumption in time series analysis is stationary. The basic idea of stationarity is that the probability laws governing the process do not change with time. The process is in statistical equilibrium Broadly speaking, a stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two-time periods and not the actual time at which the covariance is computed. In general we consider a time series of observations on some variable, e.g. flow of FDI, Gross capital formation and the unemployment rate, denoted as Y_1, \dots, Y_T . These observations will be considered realizations of random variables that can be described by some stochastic process (Verbeek, 2007).

If a time series is stationary, its mean, variance, and auto covariance (at various lags) remain the same no matter at what point I measure them; that is, they are time invariant. Such a time series would tend to return to its mean (called mean reversion) and fluctuations around this mean (measured by its variance) would have broadly constant amplitude. If a time series is not stationary in the sense just defined, it is called a non-stationary time series. In other words, a non-stationary time series would have a time-varying mean or a time-varying variance or both.

In order to model a time series, the series has to be stationary. Unit root tests are tests for stationarity in a time series. A time series has stationarity if a shift in time doesn't cause a change in the shape of the distribution; unit roots are one cause for non-stationarity. In statistics, a unit root test tests whether a time series variable is non-stationary and possesses a unit root. The null hypothesis is totally explained as the presence of a unit root and the alternative hypothesis is either stationarity, trend stationarity depending on the test used. Most frequently used test that is valid in unit root test is the augmented Dickey–Fuller test (Gujarati, 2004).

Therefore, with help of time series regression model, where GDP has been regressed on the major variable of interest to this paper "FDI", after making both the non-stationary series (FDI and GDP) stationary through differencing of Augmented Dickey-Fuller Test.

The theoretical considerations and the empirical model specifications of this study would be as follow:

3.5.2. Empirical Models

3.5.2.1. What Effect does FDI have on Economic Development?

The model Specified for this research would be based on the research questions and objectives that need to be answered so that the researcher developed a model to research questions that would be estimated by econometric analysis. The empirical models concerning the main objective of the effect of FDI on economic development and its second specific objective of long run and short run effect of FDI on economic development that the thesis used in the analysis. To test empirical models, first I start with a Cobb- Douglas production function. By using the framework of Barro (1991) and Mankiw, Romer, and Iil (1992) by following Neuhaus (2006).

The model specified as follows:

$$Y = K_D^\alpha K_F^\beta (AL)^{1-\alpha-\beta} \text{-----} \quad (1)$$

Where; **Y** is output, **K_D**: capital stock held by domestic investors, **K_F**: capital stock held by foreign investors (FDI stock), **A**: technology, **L**: labor.

The model employed the function of the form $Y = F (FDI)$. By expanding this function, the model specification or equation estimation is done based on dependent variable followed by list of regressors in Method of VEC model. Thus, the model specification of this study has the form :

$$\mathbf{GDP}_t = \mathbf{F (FDI}_t) + \mathbf{e}_t \text{-----(2)}$$

by rewriting equation (2) into Log testable linearity form:

$$\mathbf{Log(GDP}_t) = \mathbf{\beta_0 + \beta_1 Log(FDI}_t) + \mathbf{e}_t \text{-----(3)}$$

Where; GDP: Gross Domestic Product, FDI: inward NET_FDI as a percentage of GDP, t refers the time taken from 1974 to 2019. This model aims to analyze the effect of NET_ FDI on GDP in isolation. Even if I omit other relevant explanatory variables of economic development such as technology development, by running this model I can see the “pure effect” of Net-FDI on Log (GDP). In the literature, some authors use FDI inflows data instead of FDI stock data (e.g. Herzer et.al, 2008; Johnson, 2006) as a proxy of the rate of FDI stock. Therefore, I then add the second independent (explanatory) variable into model 4 as creation of employment opportunity as follows:

$$\mathbf{Log(GDP}_t) = \mathbf{\beta_0 + \beta_1 Log(FDI}_t) + \mathbf{\beta_2 LogEO}_t + \mathbf{e}_t \text{-----(4)}$$

Here, EO is number of employment opportunity that would be injected in the economy through diffusion of FDI flows to the country.

High amount of inflation (hyperinflation) implies price instability which decreases FDI attractiveness of the country (Neuhaus, 2006). In other words, high inflation distorts the macroeconomic stability, expectations, and investment decisions of foreign investors in a country (Fischer, 1993; Bleaney, 1996). Therefore, Adding in the Model 4 Inflation is a crucial one to specify model (5) to check macroeconomic stability to entertain foreign direct investment and including as a third explanatory variable in the time series linear regression form as follows:

$$\mathbf{Log(GDP}_t) = \mathbf{\beta_0 + \beta_1 Log(FDI}_t) + \mathbf{\beta_2 Log EO}_t + \mathbf{\beta_3 Log INF}_t + \mathbf{e}_t \text{-----(5)}$$

In this section I would add inflation expectations influence to detect the actual pricing decisions by investors (as well as wage demands) and therefore have a tendency to become self-fulfilling. It is arguably the vital indication of national banks which is determined by credibility of monetary policy success in anchoring long-run inflation expectations. In this paper FDI-

development context, I used annual inflation rate as a third independent variable to model macroeconomic instability.

The fourth explanatory variable that were included in the model is "labor quality" as an independent variable into model (5) and I reach to model (6).

$$\text{Log(GDP}_t) = \beta_0 + \beta_1 \text{Log(FDI}_t) + \beta_2 \text{LogEO}_t + \beta_3 \text{LogINF}_t + \text{Log LQ} + e_t \text{-----(6)}$$

It is expected that as Ethiopia raise its labor quality through the diffusion of FDI and then assure its economic development.

Together with absorption, it is commonly used as an additional explanatory variable in FDI-led development studies (e.g. Neuhaus, 2006).

The last independent variable in this linear regression model included as the main variable of interest was Gross capital formation (*GCF*) which is measured by the total value of the Gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables for a unit or sector. Infrastructure covers many dimensions ranging from roads, railways and telecommunication systems to the level of institutional development. Taking this into account Gross fixed capital formation has been included to proxy infrastructure development because fixed infrastructure development would have positive effect for sustainable development.

$$\text{Log(GDP}_t) = \beta_0 + \beta_1 \text{Log(FDI}_t) + \beta_2 \text{LogEO}_t + \beta_3 \text{LogINF}_t + \beta_4 \text{LogLQ}_t + \beta_5 \text{LogGCF}_t + e_t \text{-----(7)}$$

The basic models have been transferred and treated in linear model by logarithmic conversion to show the responsiveness of the variables and tested by Johansen co-integration test to show their long run and short run relationships. However VEC model would be applied if Johansen test confirms having their long-run association unless it would be applied Unrestricted VAR model. Generally the presentation of models aimed to analyze the effect of FDI on economic development.

3.5.2.2. Does FDI have an effect on capital formation in Ethiopia?

After specifying empirical models for main objective of this paper one effect of FDI on economic development, few additional models would follow to analyze the specific objectives of

the paper by setting new response variables of Gross capital formation measures rather than as the previous dependent variable. To answer to the question of effect of FDI on increasing capital formation through expansion of production capacity, the model specified to test hypotheses formulated whether FDI contributes to the economic development of Ethiopia. The study aimed to investigate the effects of Gross capital formation factors on economic development in Ethiopia. The study adopted unrestricted VAR model to variables that were tested as not co-integrated by Johansson co-integration technique, therefore I used unrestricted VAR model to estimate the equation. Capital stock accumulation in an economy depends on several factors in an economy. This study therefore specified the model to include effect of FDI to capital formation.

$$\text{Log (GCF}_t) = \alpha + \beta_1 \text{Log (FDI}_t) + e_t \text{----- (8)}$$

Where GCF =Gross capital formation by adding one extra explanatory variable of quality of labor on model (8), I developed model (9) as follows:

$$\text{Log (GCF}_t) = \alpha + \beta_1 \text{Log (FDI}_t) + \beta_2 \text{Log (LQ}_t) + e_t \text{----- (9)}$$

Where, LQ is Quality of labor productivity, t is the time index, LQ =Labor Quality, α indicates the constant term in the regression

β 's indicates coefficient of correlation which measures a unit changes in these in the Explanatory variable leads to a more than one unit change in the dependent variable.

K_t is stock of capital held by both by domestic & foreign investors and L_t is labor input respectively,

A_t is the level of technology, which can be seen as an index of knowledge available. FDI_t and

e_t is stock FDI and the error term of other determining factors, respectively.

3.6. Definitions of Operational Variables:

Here the thesis have two main response variables and other more explanatory variables to analyze the data and it is also vital to delineate each of expected sign for all independent variable's coefficient whether it is positive or negative. Therefore, response variables are Gross Domestic Product, and Gross Capital Formation.

1. **Short run in the error correction term** means the speed of adjustment to return to equilibrium. in other words the coefficients of the error correction term that the parameters come to equilibrium.
2. **Long run in the error correction term**
3. **Horizontal FDI** : under this type of FDI, a business expands its inland operations to another country. The business undertakes the same activities but in a foreign country.
4. **Vertical FDI**: in this case, a business expands into another country by moving to a different level of the supply chain. Thus business undertakes different activities overseas but these activities are related to the main business.
5. **Conglomerate FDI**: under the type of FDI, a business undertakes unrelated business activities in a foreign country. This type is uncommon as it involves the difficulty of penetrating a new country and an entirely new market.
6. **Economic development(ED)** is a wider meaning than the growth of economic and development which indicates economic progress and requires economic growth. Therefore, Economic development in this thesis is proxied and measured in terms of GDP growth, NET_FDI, Inflation, Employment opportunity, Labor Quality and Gross capital formation and through flow of FDI which in turn to have an effect on economic development.
7. **GDP** : it is the dependent variable and fully write as Gross domestic product and serve as a proxy measure in the model to indicate how it is useful in the economy and total value of services produced within Ethiopia's borders. It is the main variable of interest in this study.
8. **Foreign Direct Investment (FDI)**: A foreign direct investment (FDI) is an investment made by a firm or individual in one country into business interests located in another country and which is measured and proxy by Log of Net-FDI in international currency by USD at time t
9. **EO_t**: Employment opportunity created by diffusion of FDI measured and proxy by the number of employees working at time t
10. **INF_t** : Inflation rate calculated annually by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

11. **Labor Quality (LQ)** is measured by educational level which plays an important role in deciding the distribution of inward FDI, and therefore labor quality is measured by educational certificate handling. Education level facilitates to improve labor quality and thus attract FDI. In this paper we used secondary education level that is Grade 10 and above as a proxy for labor quality at time t since under secondary education level indicates illiteracy.

12. **Gross capital formation in millions of dollar of Ethiopia:** Gross capital formation is measured and proxy by the total value of the Gross fixed capital formation, changes in inventories and acquisitions less disposals of valuables for a unit or sector.

3.7. Expected Signs

Table 3. 1 Expected Signs of the Coefficients of Independent Variables

S/N	Dependent and Independent variables	Expected sign	Source/Remark
1	Gross Domestic Product	+/-	MoFED
2	Log Net Foreign Direct Investment (FDI):	+	EIC
3	LogEO	+	EIC
4	LogINF _t	-	CSA
5	LogLQ:	+	
6	Log GCF _t	+	

3.8. Ethical Consideration

In this chapter the researcher delineated the way of the methodology where the thesis would go throughout the paper until the final recommendation part by considering any ethical issues. The works of others are acknowledged by use of APA citation format both in cite citation

and referencing at the end of the last chapter. I therefore genuinely put all the necessary research methodological aspects which would lead to finalize my thesis.

3.9. Reliability and Validity of Research Strategy

Validity is defined as the extent to which a concept is accurately measured in a quantitative study. Bond (2003, p. 179) comments that validity is foremost on the mind of those developing measures and that genuine scientific measurement is foremost in the minds of those who seek valid outcomes from assessment. From this above quote, validity can be seen as the core of any form of assessment that is trustworthy and accurate (Bond, 2003, p. 179). Validity, According to Messick(1989, p. 6) always refers to the degree to which empirical evidences and theoretical rationales support the adequacy and appropriateness of interpretations and actions based on test scores.

Reliability test is seen as being reliable when it can be used by a number of different researchers under stable conditions, with consistent results and the results not varying. Reliability reflects consistency and replicable over time. Furthermore, reliability is seen as the degree to which a test is free from measurement errors, since the more measurement errors occur the less reliable the test (Fraenkel & Wallen, 2003; McMillan & Schumacher, 2001, 2006; Moss, 1994; Neuman, 2003). In the same way, Maree and Fraser (2004) ask how far the same test would produce the same results if it was administered to the same children under the same conditions. This helps the researcher and educator to make comparisons that are reliable. The more errors found in an assessment the greater its unreliability, and *vice versa*. Reliability is a very important factor in assessment, and is presented as an aspect contributing to validity and not opposed to validity.

Therefore to assure the thesis reliable and validity issues to be achieved, secondary data sources would be collected from concerned government institutions of Ethiopian investment commission, CSA and international organizations and checked by a number of diagnostic tests of the VEC model by using VEC residual serial correlation LM test, VEC Residual Normality Tests (Jarque-Bera test), and VEC Residual Heteroskedasticity tests whether other researchers' use it under stable condition , frequently or not . Therefore the three tests indicate that the model to know the effect of FDI to economic development mainly through capital formation is reliable enough that other researchers can use consistently as stable condition and I am confident that my thesis validity achieved accurately to fit the objective of my research.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1. General Structure of FDI Situation in Ethiopia

As Reported by Ethiopian Investment Report (2017) , Opportunity for Investment in Ethiopia is so ample in various economic sectors more likely open in Manufacturing, Agro processing, basic and import substitution, strategically important sectors and agricultural sectors as well. The priority areas given due emphasis for foreign direct investment open in investing in the manufacturing sector is because of bringing optimistic contributions for economic growth and which in turn lead in creating job, technology learning structural shift in Ethiopia's export and address trade imbalance.

4.2. Policy and Regulatory Framework for Investment in Ethiopia

As An Investment Guide to Ethiopia (2017) revealed that Ethiopia follows a civil law legal system in which civil, commercial and other laws coded. The constitution of Ethiopia is the supreme law that governs the investment law. The investment laws include proclamation No. 769/2012, amendment proclamation No.849/2014, investment regulation No.270/2012, amendment regulation No.312/2014, the Ethiopian investment Board and the Ethiopian investment commission Establishment Regulation No.313/2014.

The first investment promotion opened in Ethiopia in 1993 just after EPRDF took power. The office first established under investment proclamation No.15/1992 as Ethiopian Investment Agency which later reorganized as Ethiopian Investment Authority by proclamation No.37/1988 and subsequently reorganized with two proclamations No.280/1994 and 471/1998. And then reestablished as Ethiopian Investment Commission since August 2014 till now by regulation No.313/2014 EIR(2017).

One National Working paper observed the policy of FDI in Ethiopia passed changes at different times starting since 1992/93. The economic sectors that are opened for FDI include all manufacturing, mining, and others. However a few investment areas exclusively reserved to Ethiopian national like banking ,insurance, and broadcasting sectors Worku Gebeyehu (2004).

The Foreign Capital Requirement for every investment projects is required to meet a certain criteria in which to register with EIC. The minimum capital requirement for a project wholly

owned by a foreign investor is US \$200,000. and if the project is owned commonly with domestic investor, the capital declines to a minimum of \$150,000 EIR (2017).

The Ethiopian Investment Commission (EIC) is the principal government organ responsible for promoting, coordinating and facilitating domestic and foreign investment in Ethiopia. EIC is established under investment proclamation No.769/2012 and the council of Ministers Regulation No.313/2014. EIC in turn supervised by Ethiopian Investment Board (EIB) which is a governing body led by the prime minister EIR(2017).

4.3. Descriptive Analysis

In this section, the results of the secondary data collected were presented by descriptive statistics by using e-view 11 statistical software package and the results presented by using various statistical forms as follows:

4.3.1. Trends of FDI in Ethiopia

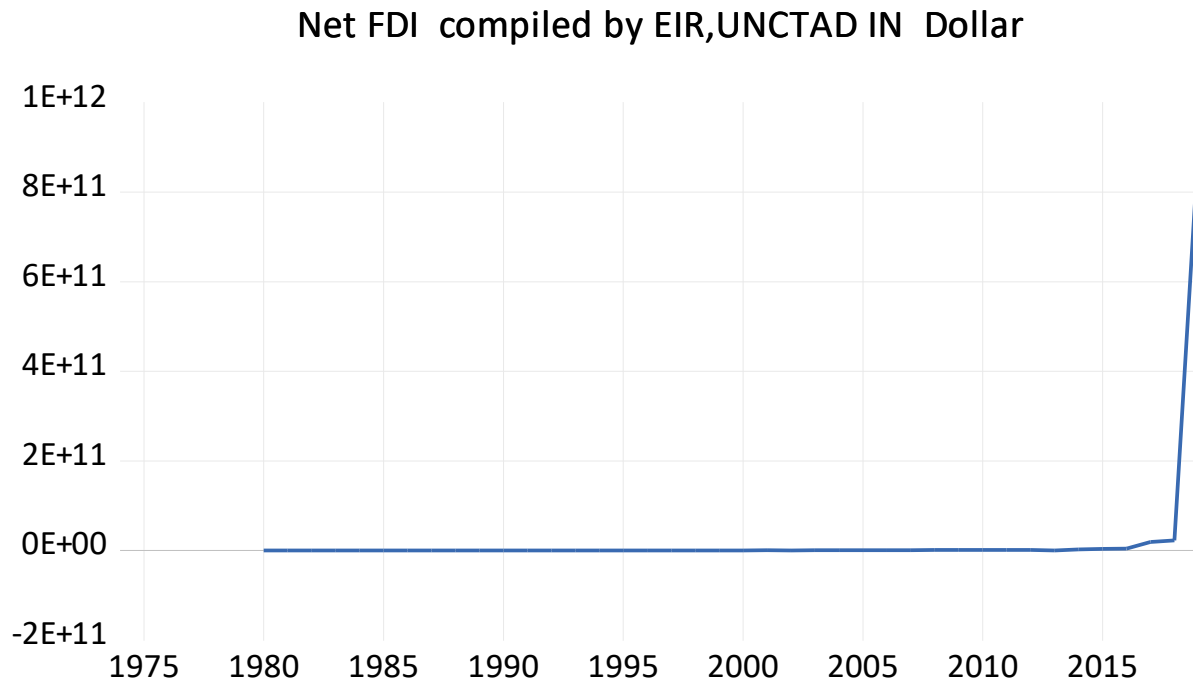
Ethiopian Investment Report (2017) observed that the performance of FDI in the country has begun from low track record for instance, from the year 2009-2013 the record showed a normal growth trend in domestic savings that initiated increase in GDP from 5.2% to 17.7%.

However, the investment gap remained wide. similarly, FDI inflows to Ethiopia during the five years preceding the start of GTP I showed very limited increase for instance in 2012, the FDI inward stock as a percentage of GDP was as low as 11.8%. In 2014, Ethiopia emerged as 8th largest receipt of FDI projects in Africa, up from 14th position in 2013 EIR (2017).

When we see the FDI stock from the year back starting 1980, it was \$109.6 million and it was peaked to \$ 2752.5 million in year 2005 UNCTAD Database (2019). In 2015/16 and 2016/17, FDI flows peaked high amounting US dollar of 3.3 and \$4.2 billion respectively comparing with USD of 344 million annual average for 2005-2007 and accounting for more than 11.1 % and 8.8 % of Gross capital formation in 2014 and 2015 respectively EIR (2017).

In the Derg Regime especially in the year back from 1974 to 1979, there were no sufficient data availability which is due to the Command economy and absence of well-organized data. However, the trend in net FDI to the country described in the following Figure 4.1:-

Figure 4. 1 Net Foreign Direct Investment By Million of Dollar



Source: own compilation by E-View 11 output Analyzed data,(2020)

As we see the figure 4.1. above the data in the y-axis is the output made by e-view 11 statistical software package due to large digit, and expanded as $1E+12= 1000000000000$, $8E+11=800000000000$, $6E+11= 600000000000$, $4E+11= 400000000000$, $2E+11=200000000000$ and the net inflow of FDI from the inception of 1980 up to 2017 it is almost stable inflow. However it is accidentally started to increase during the year 2018 and started to increase upward to reach its peak.

4.3.2. FDI Distribution By Sector

EIR report (2017) indicate that manufacturing and service sector stood out as the primary recipients for instance in 2013/14, the manufacturing received greater than 70% of the total capital outlay followed by service and agriculture. Over all, the manufacturing sector accounts 68% of the total FDI stock beginning from 1992.

The following table indicates to describe summarized analysis of the data since 1974 to 2019 as the first step in this research. It assists to describe most important directions of phenomena of

foreign direct investment and provide detailed information about each variable. E-Views 11 statistical software package has been used for analysis of the different variables in this study.

Table 4. 1 Descriptive statistics of variables

	GDP	NET_FDI	EO	INF	LQ	GCF
Mean	4.68E+11	2.43E+10	24123.75	0.001002	15121.61	113872.8
Median	5.02E+10	2.01E+08	16029.00	0.000830	8808.000	8493.490
Maximum	7.79E+12	9.12E+11	131277.0	0.004440	74560.00	948865.9
Minimum	8.71E+09	-2600000.	428.0000	-0.000910	252.0000	743.5167
Std. Dev.	1.26E+12	1.44E+11	28684.64	0.001008	17160.38	230637.0
Probability	0.000000	0.000000	0.000000	0.000753	0.000010	0.000000
Sum	2.15E+13	9.72E+11	675465.0	0.046110	423405.0	5238150.
Sum Sq. Dev.	7.15E+25	8.09E+23	2.22E+10	4.57E-05	7.95E+09	2.39E+12
Observations	46	40	28	46	28	46

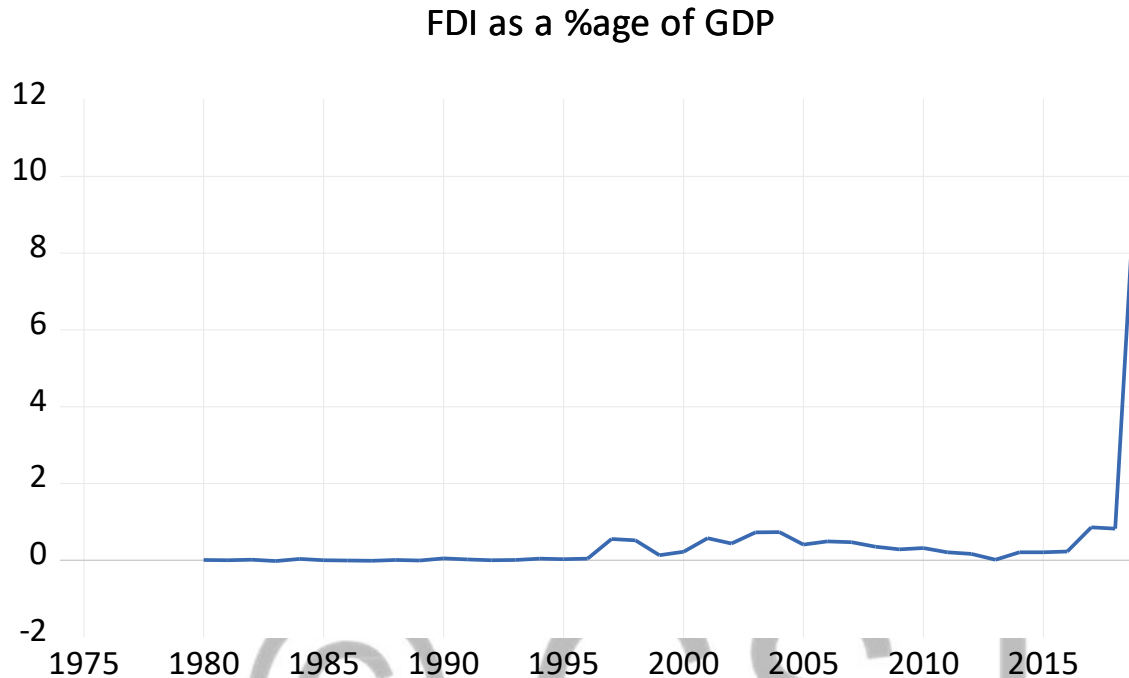
Source: Author's compilation from 1974-2019 with E-VIEW 11 output

The table 4.1 presented the central tendency and deviation of the independent variables for instance the highest mean observed in GDP which recorded $4.68E+11 = 468,000,000,000$. However the highest maximum value in the descriptive analysis is NET_FDI which is $9.12E+11(912,000,000,000)$ and the minimum value recorded in NET_FDI which is -2600000 as we from table 4.1 and the highest standard deviation is recorded in NET_FDI which is $1.44E+11$ but the lowest standard deviation is in inflation which is 0.001008 which is presented in percentile however the other data presented in table 4.1 in number.

From the table one can understand that the observation reveals that the availability of data is not pretend the same as shown in the table that is the maximum observation found in Gross Domestic Product ,Gross Capital Formation and Inflation whereas the minimum observation found in Labor Quality And Employment opportunity which is 28.

4.3.3. Trends of FDI as a percentage of GDP

Figure 4. 2 Trends of FDI as a percentage of GDP



Source: own compilation with E-view 11 software (2020)

To achieve the first specific objective of this paper how much of FDI share had gone to GDP of the country, E-VIEW 11 statistical software package utilized. As the output of E-view 11 in line above indicated that the Trend of FDI as a percentage shares to GDP in Ethiopia since 1974-2019. Due to unavailability of raw data of FDI from 1974-1979, I couldn't show in the line above.

Starting from 1980-1996, almost the share of FDI close to Zero . Since the inception of 1997 and 1998, the share as a percentage of GDP were 0.6% and 0.5% respectively and then after it came down to contribute to GDP but in the year 2017 the percentage share recorded to 0.9% and reached its peak in 2019 to 11.7% as a percentage share to GDP.

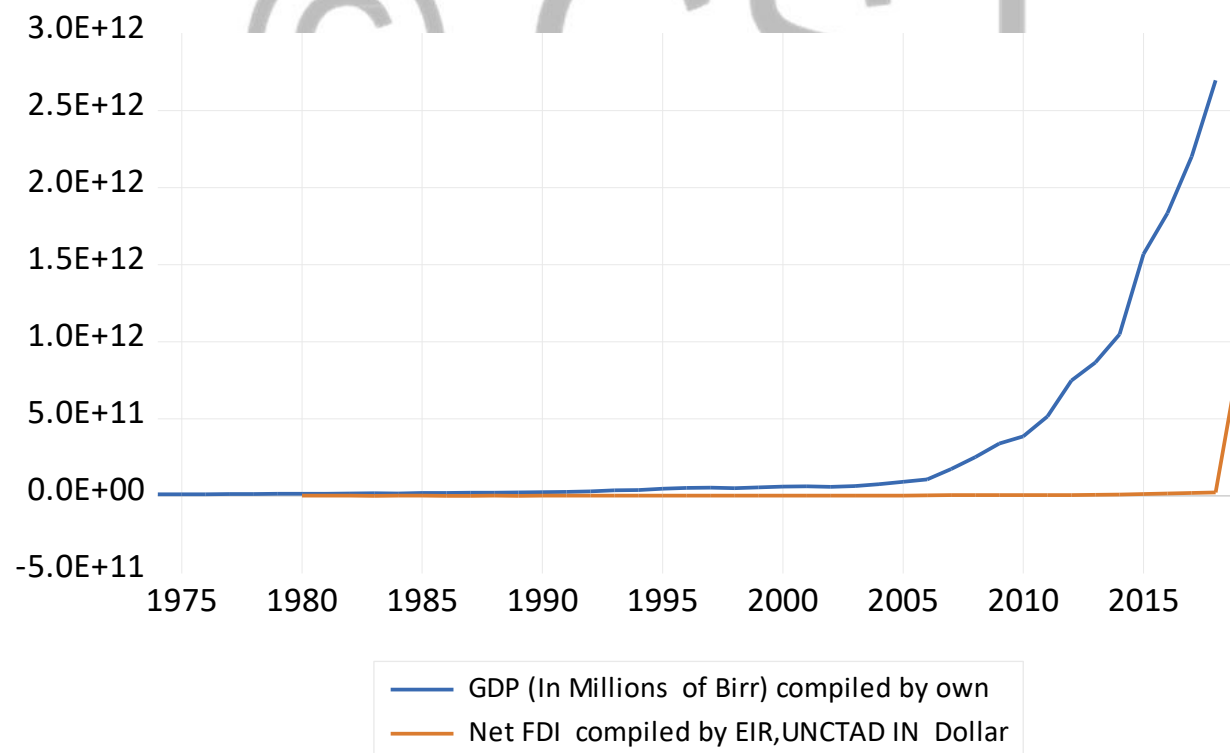
4.4. Inferential Analysis

This part of the analysis would be analyzed that had already been modeled in chapter three. The estimation of parameters had been applied by VEC model for co-integrated coefficients and unrestricted VAR model for those variables which were not co-integrated by Johansson co-

integration test and the results were presented as follows: The variables presented below included Gross domestic product, net foreign direct investment, Annual inflation rate, number of employment, labor quality, and Gross capital formation in Ethiopia and data included from 1974 to 2019 for about 46 years. First I need to check whether a series of data is stationary or not by using Augmented Dicker Fuller test. There are many ways that detect whether the data series is stationary or spurious before we check by using statistical test in unit root like ADF test in e-views. Therefore I checked each variable by using different method in eview11 to see the nature of the data in the series.

To start with this, the dependent variable of GDP and with variable of interest of FDI which are both time series data, and in order to see their relationship between them first it is better to check whether both the series are stationary or not. Why do I need the data set to be in Stationary? It is because unless we check for stationary, it would expose the series of the data to ‘spurious regression or to non-sense in other word inflated R^2 therefore it couldn’t catch up the actual value.

Figure 4. 3 GDP and Net FDI Trend



Source: own compilation with E-view 11 software (2020)

The Line 4.3. Revealed that both the dependent variable of GDP and the explanatory variable of Net FDI indicated the trend in the series and the GDP turns up from the year 2005 as shown in the line and they are not reverting to their mean and therefore they are non-stationary. This is because their series of mean and variance are not constant in the time sequence as shown in the line.

To check further the series of GDP and NET_FDI stationary or not, it is vital to plot corrolgram. Therefore from e-view 11 output below the corrolgram output depicted indicated that the AC is gradually going down since the series are outside 95% confidence interval and even the spike are outside the line and which probably tells us that the series is not stationary.

Hypothesis formulated from e-view 11 outputs:

H0: series is stationary

H1: series is not stationary

From p-value of corrolgram is less than of the standard 5% level of significance, therefore we reject the null hypothesis and the series is not stationary.

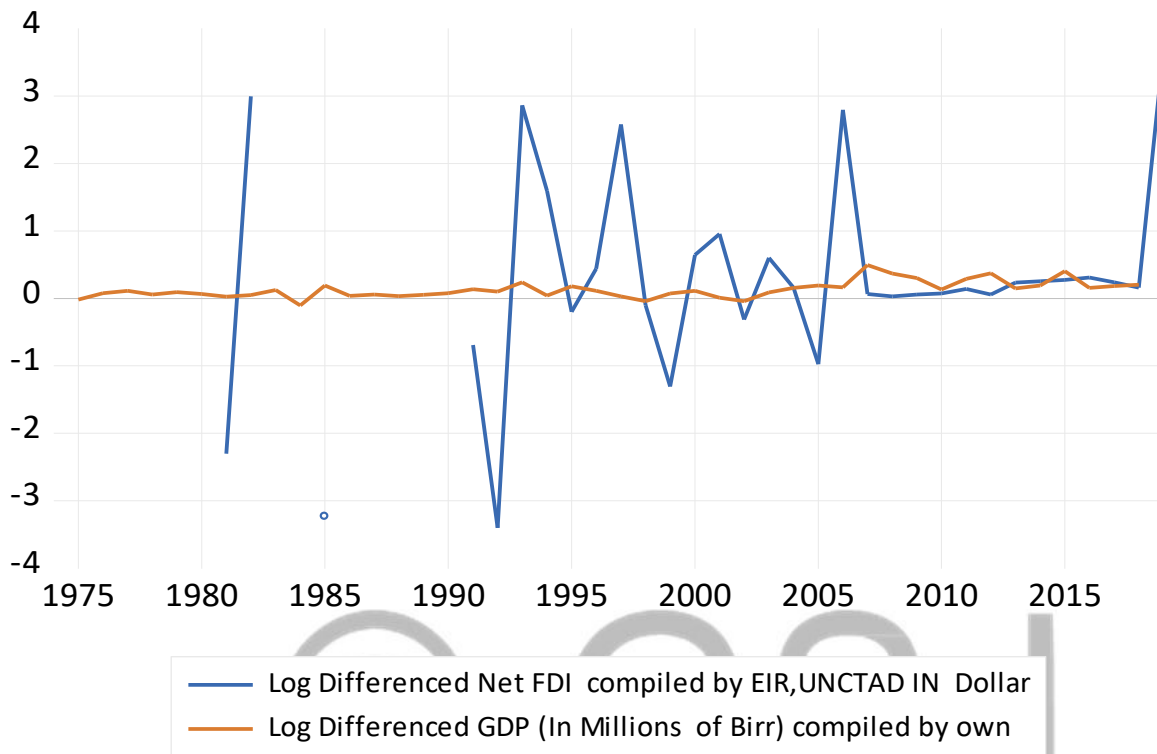
© GSJ

Table 4. 2 Stationarity check by corrolgram

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. ***	. ***	1	0.437	0.437	9.3786	0.002
. **	. .	2	0.351	0.198	15.565	0.000
. **	. .	3	0.282	0.094	19.659	0.000
. **	. .	4	0.225	0.042	22.313	0.000
. .	. .	5	0.153	-0.015	23.569	0.000
. .	. .	6	0.118	-0.002	24.332	0.000
. .	. .	7	0.089	0.001	24.783	0.001
. .	. .	8	0.054	-0.016	24.954	0.002
. .	. .	9	0.032	-0.012	25.014	0.003
. .	. .	10	0.018	-0.007	25.034	0.005
. .	. .	11	0.002	-0.012	25.034	0.009
. .	. .	12	-0.012	-0.013	25.044	0.015
. .	. .	13	-0.023	-0.014	25.078	0.023
. .	. .	14	-0.028	-0.009	25.131	0.033
. .	. .	15	-0.033	-0.009	25.206	0.047
. .	. .	16	-0.037	-0.010	25.305	0.065
. .	. .	17	-0.040	-0.011	25.427	0.086
. .	. .	18	-0.043	-0.011	25.572	0.110
. .	. .	19	-0.046	-0.013	25.745	0.137
. .	. .	20	-0.050	-0.014	25.955	0.167

Source: own compilation by E-view 11 output (2020)

Figure 4. 4 GDP and Net FDI Stationarity check



Source: own compilation by E-view 11 output (2020)

The Figure 4.4.revealed that the dependent variable of GDP is stationary and the explanatory variable of in Log difference of Net FDI indicated also that the series are stationary. As we see from the line that the net FDI revolves around the mean .The Net FDI's and GDP series of their mean and variance are constant in the time sequence as shown in the line.

4.5. Model estimation

After just watching the nature of the data series through graph, line and corrolgram above ,it is mandatory to check Stationarity statistically, I therefore go to unit root test by using *Augmented Dickey Fuller Test(ADF)*.

4.5.1. Unit Root Test of Stationarity

As wrote by Wang (2006), unit root test is reliable statistical method to check the Stationarity of the data included in any time series analysis. The other advantage is also used in applications of

modeling studies. It was developed by Dickey-Fuller (DF) in 1979. Furthermore, Augmented Dickey-Fuller (ADF) tests the presence of difference Stationarity in unit root in the series.

Below I checked each of the series of dependent and independent variables for Stationarity by help of Unit Root Test and with the help of 'Augmented Dickey Fuller Test', I started with the first response variable of Gross Domestic Product as shown below in the E-Views 11 output; I tested the following hypothesis for Stationarity of data set for all variables as follows:-

H₀: $\rho=0$ (Presence of unit root in all data set)

H₁: $\rho \geq 0$ (At least one unit root in the data set do not have a unit root)

4.5.1.1. Results of unit root test

Table 4. 3 Log GDP unit root test

Null Hypothesis: D(LOGGDP) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.651516	0.0367
Test critical values:		
1% level	-4.180911	
5% level	-3.515523	
10% level	-3.188259	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Source: own Computation by E-View 11 output from ADF unit root test (2020)

As shown in the above ,the probability value of the variable of Log of GDP is 0.0367 less than 0.05 level of significance and also the ADF test statistic value with absolute value $|3.651516|$ test statistic $> |3.515523|$ of the test critical value . Therefore, we reject the null hypothesis and as a result the series of the variable ' Log GDP is stationary at test for unit root in 1ST Difference in the Trend & Intercept data series.

Before proceeding with the econometrics results and estimating of the model, I checked all the rest variables for Stationarity status and the output of e-view 11 of the Augmented Dickey Fuller test to determine their order of integration were summarized into 2 major components into table as follows:

Table 4. 4 OUTPUT OF ADF UNIT ROOT TEST AT LEVEL

Variables	INTERCPT		INTERCEPT & TREND		Critical value at 5 %	ASSESSMENT
	ADF test statistic	p- value	ADF test statistic	P-value		
Log Net_FDI	-0.472390	0.8829			-2.967767	Not stationary
Log Net_FDI			-3.477715	0.0590	-3.557759	Not stationary
Log GDP	4.938071	1.0000			-2.928142	Not stationary
Log GDP			3.739884	1.0000	-3.540328	not stationary
Log GCF	1.738014	0.9996			-2.928142	Not stationary
Log GCF			-1.425123	0.8398	-3.513075	Not stationary
Log INF	-2.265401	0.1897			-2.976263	Not stationary
Log INF			-2.822013	0.2020	-3.587527	Not stationary
Log EO	-2.265401	0.1897			-2.976263	Not stationary
Log EO			-2.822013	0.2020	-3.587527	Not stationary
Log LQ	1.959444	0.3018			-2.976263	Not stationary
Log LQ			-2.231717	0.4544	3.587527	Not stationary

Source: own Computation by E-View 11 output from ADF unit root test (2020)

One can see from the different level of output that the dependent variable of Log GDP and each of the 5 explanatory variables in their Log form tested for Stationarity and the output in the e-view 11 indicated that no variable stationary at the original Log series at Level .Therefore I checked variables for Stationarity by using the 1st difference until the null hypothesis of unit root is rejected and obtained a Stationarity in the series as summarized in the following consecutive table at 5% level of significance :

Table 4. 5 OUTPUT OF ADF UNIT ROOT TEST AT 1ST DIFFERENCE

Variables	INTERCPT		INTERCEPT & TREND		Critical value at 5 %	ASSESSMENT
	ADF test statistic	p- value	ADF test statistic	P-value		
Log EO	-5.896349	0.0001			-2.986225	stationary
Log GCF	7.044295	0.0000			-2.929734	stationary
Log GDP	-2.051707	0.2646			-2.929734	not stationary
Log GDP			-3.651516	0.0367	-3.515523	stationary
Log INF	-5.896349	0.0001			-2.986225	stationary
Log LQ	-6.596575	0.0000			-2.981038	stationary
Log net_FDI	-6.475588	0.0000			-2.967767	stationary

Source: own Computation by E-View 11 output from ADF unit root test (2020)

As we see from Table 4.5. above all variables were checked stationary at first difference in unit root test at the probability value of 5% level of significance at intercept in their series except Log GDP which become stationary in intercept and trend level at 5% LOS.

4.5.2. 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 VEC model. It is vital to have required level of lag order before testing of co-integration. The optimal lag order is determined with, the Akaike Information Criterion [AIC], the Schwarz Information Criterion [SIC], and the Hannan-Quinn Information Criterion [HQ]). As shown in Table 4.6. Below LR, FPE, AIC, and HQ suggest an optimal lag of ONE, level of significance.

Table 4. 6 VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria

Endogenous variables: LOGGDP LOGNET_FDI LOGEO LOGINF LOGLQ

Exogenous variables: C

Date: 06/16/20 Time: 18:02

Sample: 1974 2019

Included observations: 23

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-156.1558	NA	0.838981	14.01354	14.26039	14.07562
1	-60.66467	141.1607*	0.001942*	7.883884*	9.364964*	8.256372*

Source: Own computation by E-View 11 output (2020)

Testing of Hypothesis formulated in chapter one whether there is Causality relationship between Variables to check a causality relationship. I therefore, in my study examined the causality relationship between GDP and each of explanatory variables. By using Granger causality tests whether the dependent variable of GDP as a proxy of economic development causes other independent variables and vice versa to show their long run causation through the help of e-view11 software. Before causality test undertaken, the Stationarity of the series had been checked earlier in this chapter, therefore I directly went to test Granger Causality .

4.5.2. Granger Causality Tests

Testing of Hypothesis formulated in chapter one:

H0: There was no causality relationship between all independent variables and GDP in Ethiopia.

H1: At least one independent variable had causality relationship with GDP in Ethiopia

The dependent and each explanatory variables in the respective Log form of the model specified in chapter 3 were tested for Granger causality to find out whether there exist any relationships among themselves after checking for Stationarity after the first difference. Since the Log of variables of their series is not stationary at level and therefore I took their first

difference of Log to test those variables whether there were two way causality by using granger causality tests So that the output from e-view 11 presented below from model as follows:

Table 4. 7 Granger Causality Test at 1st difference

Null Hypothesis:	Lags	F- Statistic	Prob.
D(LOGEO) does not Granger Cause * D(LOGGDP)	2	1.67072	0.2133
D(LOGGDP) does not Granger Cause D(LOGEO)	2	1.39724	0.2704
D(LOGGCF) does not Granger Cause D(LOGGDP)	2	0.26772	0.7666
D(LOGGDP) does not Granger Cause D(LOGGCF)	2	3.41819	0.0431
D(LOGINF) does not Granger Cause D(LOGGDP)	2	0.53064	0.5953
D(LOGGDP) does not Granger Cause D(LOGINF)	2	0.21096	0.8114
D(LOGLQ) does not Granger Cause D(LOGGDP)	2	0.43500	0.6532
D(LOGGDP) does not Granger Cause D(LOGLQ)	2	5.79902	0.6532
D(LOGNET_FDI) does not Granger Cause D(LOGGDP)	2	0.24038	0.7884
D(LOGGDP) does not Granger Cause D(LOGNET_FDI)	2	0.42480	0.6592

* D=1st difference

Source: own Computation by E-View 11 output (2020)

From Table 4.7.of Granger causality test above only the first difference of D (LOGGDP) does cause the 1st difference of Log of Gross capital formation D (LOGGCF). Because the p-value 0.0431 < 5% of level of significance in statistical terms the decision of the Null hypothesis was rejected and therefore Log of Gross capital formation was caused by Log of Gross domestic product however the reverse is rejected as a result, I found that the direction of causality between economic development indicators of GDP and Gross capital formation in Ethiopia is generally unidirectional that is one way causality that run from GDP growth to capital formation. This

implies that GDP directly causes Gross Capital Formation in stimulating the economic development in the country but GDP is not an effect of Gross Capital Formation. In other words, the occurrence of in the past values of GDP in Ethiopia causes GCF.

However all other variables as seen from table 4.7 their null hypothesis had not been rejected due to their p-values were greater than 5% level of significance so that there had no causation among other variables.

4.5.3. Co-integration Test

Testing of Hypothesis of any relationship between GDP and FDI formulated in Chapter one, I used co-integration test

H₀: There was no relationship between GDP and FDI inflow in Ethiopia.

H₁: There was relationship between GDP and FDI inflow in Ethiopia.

Before estimating the model, it would be mandatory to perform Stationarity test and other tests like Granger causality and then a co integration test for which time-series data often appear no stationary. Why am I in need of my data series to be co integrated? It is because to check whether set of series that are co integrated had have whether a long-run equilibrium relation. If such a long-term relationship does not exist, then the apparent is spurious and not have meaningful interpretation.

Engle and Granger (1987) indicated that the use of analyzing multiple non stationary time series that are co integrated provides useful insights about their long-run behavior. If series integrated of order 1, then the series is said to be first difference and performing a co-integration test is necessary to establish a long run relationship .There are Two prominent co-integration tests for I(1) series in the literature. They are Engle Granger co-integration test and Johansen co-integration test. However I focused to see only the Johansen Co-integration test only which is relevant to my paper.

4.5.3.1. Johansen Co-integration Test

As one study by Gerald P. Dwyer (2015) stated that as there are different mechanisms to co-integrate Time series, with trends assuming some importance because asymptotic distributions depend on the presence or lack of such terms.

Co-integration and Eigen values

Augmented Dickey-Fuller test could be seen as the same fashion as multivariate generalization by the Johansen test. The generalization is the examination of linear combinations of variables for unit roots is being tested. The Johansen test and estimation strategy maximum likelihood makes it possible to estimate all co-integrating vectors when there are more than two variables. If there are three variables each with unit roots, there are at most two co-integrating vectors. More generally, if there are n variables which all have unit roots, there are at most $n - 1$ co-integrating vectors. The Johansen test provides estimates of all co-integrating vectors. For the test of the ADF, the presence of unit roots indicates that standard asymptotic distributions do not apply (Gerald P. Dwyer 2015).

If series are co-integrated then they exhibit a long-term relationship which implies the series are related and can be combined in linear fashion and even if there are shocks in the short run, which may affect movement in the individual series and they would converge with time in the long run. Whether there exists a long-term co-integration among variables in my model specified in chapter three above, I tested each of the model starting from model 1 to check the co-integration in their respective Log form.



Table 4. 8 The Johansen Co-integration Test Results from Trace Test

Series of Variable under test	Hypothesis No. of CE(s)*	Trace statistics	Critical Value at (5%)	p-value	Lag
Log GDP and Log Net_FDI	None	15.74517	15.49471	0.0458	1
	At most 1	7.263367	3.841465	0.0070	1
Log GDP, Log Net_FDI &Log EO	None	26.36923	29.79707	0.1180	1
	At most 1	10.74424	15.49471	0.2277	1
	At most 2	1.715881	3.841465	0.1902	1
Log GDP, Log Net_FDI , Log EO &Log INF	None	49.02548	47.85613	0.0386	1
	At most 1	24.18874	29.79707	0.1926	1
	At most 2	8.542332	15.49471	0.4094	1
	At most 3	0.833983	3.841465	0.3611	1
Log GDP, Log Net_FDI , Log EO ,Log INF &LogLQ	None	99.82781	69.81889	0.0000	1
	At most 1	51.08356	47.85613	0.0241	1
	At most 2	27.88149	29.79707	0.0818	1
	At Most 3	10.69461	15.49471	0.2310	1
	At Most 4	1.251656	3.841465	0.2632	1
LOGGDP NET_FDI LOGGCF	None	15.75339	29.79707	0.7295	1
	At most 1	7.448275	15.49471	0.5261	1
	At most 2	0.008508	3.841465	0.9262	1
Log GCF &LogNet_FDI	None	7.136658	15.49471	0.5618	1
	At most 1	0.759910	3.841465	0.3834	1
Log GCF ,LogNet_FDI &Log LQ	None	15.76607	29.79707	0.7286	1
	At most 1	7.868937	15.49471	0.4379	1
	At most 2	0.601792	3.841465	0.4379	1

Source: own Computation by E-View 11 output (2020)

*= co-integrated equations

Table 4. 9 The Johansen Co-integration Test Results from Eigen Test

Series of Variable under test	Hypothesis No. of CE(s)*	Eigen statistics	Critical Value at (5%)	p-value	Lag
Log GDP and Log Net_FDI	None	8.481803	14.26460	0.3318	1
	At most 1	7.263367	3.841465	0.0070	1
Log GDP, Log Net_FDI &Log EO	None	15.62500	21.13162	0.2475	1
	At most 1	9.028355	14.26460	0.2838	1
	At most 2	1.715881	3.841465	0.1902	1
Log GDP, Log Net_FDI , Log EO &Log INF	None	24.83674	27.58434	0.1081	1
	At most 1	15.64641	21.13162	0.2462	1
	At most 2	7.708349	14.26460	0.4091	1
	At Most 3	0.833983	3.841465	0.3611	1
Log GDP, Log Net_FDI , Log EO ,Log INF &LogLQ	None	48.74425	33.87687	0.0004	1
	At most 1	23.20207	27.58434	0.1650	1
	At most 2	17.186888	21.13162	0.1634	1
	At Most 3	9.442952	14.26460	0.2511	1
	At Most 4	1.251656	3.841465	0.2632	1
Log GCF &LogNet_FDI	None	6.376748	14.26460	0.5654	1
	At most 1	0.759910	3.841465	0.3834	1
Log GCF ,LogNet_FDI &Log LQ	None	7.897132	21.13162	0.9099	1
	At most 1	7.267146	14.26460	0.4580	1
	At most 2	0.601792	3.841465	0.4379	1

Source: own Computation by E-View 11 output (2020)

*= co-integrated equations

From the above table 4.8. and 4.9 one can understand the results of a co-integration both from Trace test value and Max.Eigen value to each models specified earlier and to each of the model based on the result of the test provided as follows and first I hypothesized from e-view 11 output of Log GDP and Log Net_FDI as follows :

H₀: r =0 (No co-integration equation in the model)

H₁: r ≤ 1 (At most one co-integration equation)

From table 4.8. The value of Trace test statistics for "None" result shows 15.74517 which is greater than 15.49471 of the critical value and also the probability (p-value) is 0.0458 which is

less than 5% of level of significance. As a result by trace test, I reject the null hypothesis and From Alternative hypothesis (H_1) there is at most one co-integration equation.

From table 4.9. The value of Max.Eigen test value is 8.481803 less than of 14.26460 of the critical value and also 0.3318 of p-value greater than 0.05 of level of significance and therefore it is insignificant at 5% LOS and therefore I fail to reject the null hypothesis by Max.Eigen test.

However from tests by using Trace statistics the value of Trace test statistics result, there is co-integration between LOGGDP and LOGNET_FDI.

Hypothesis of model 2:-

H_0 : $r = 0$ (No co-integration equation in the model)

H_1 : $r \leq 1$ (At most one co-integration equation)

From equation 4, I tried to check the co-integration of LOGGDP, LOGNET_FDI and LOGEO and as we see the output manipulated in table 4.8. Above, the trace statistic is 26.36923 less than of 29.79707 of the critical value at 5% and p-value is 0.1180 > 5% LOS. From Max.Eigen test value 15.62500 < 21.13162 and p-value is 0.2475 > 5% LOS.

The decision from both result is therefore I do not reject the null hypothesis and as there is no co-integration among variables.

From model 4 variables of LOGGDP, LOGNET_FDI and LOGEO are therefore there is no long-term association to each other.

Equation 5 of Log variables are **Log GDP, Log Net_FDI , Log EO &Log INF**

H_0 : $r = 0$ (No co-integration equation in the model)

H_1 : $r \leq 1$ (At most one co-integration equation)

The output from table 4.8 indicates that the trace statistic value at none is 49.02548 > 47.85613 critical value and also the p-value is 0.0386 < 0.05 LOS.

The decision is therefore we do reject the null hypothesis and There is at most one co-integration among variables by Trace statistics.

From model 6, I checked the Johansen co-integration of LOGGDP, LOGNET_FDI and LOGEO, Log INF and Log LQ as we see the output Extracted from table 4.8. above.

$H_0: r = 0$ (No co-integration equation in the model)

$H_1: r \leq 1$ (At most one co-integration equation)

From the trace statistic of "None" Co-integrating equation of 99.82781 greater than of 69.81889 of the critical value at 5% and p-value is $0.0000 < 5\%$ LOS. From Max.Eigen test value 48.74425 > 33.87687 and p-value is $0.0004 < 5\%$ LOS. From both test I achieved the same result and therefore the null hypothesis is rejected and not rejecting the alternative hypothesis as there is a Co-integrating equation among variables.

To test a long-term relationship to my main variable of interest and From the model specified on Log variables of LOGGDP ,NET_FDI and LOGGCF, **Hypothesis formulated as follows:**

I. $H_0: r = 0$ (No co-integration equation in the model)

$H_1: r \leq 1$ (At most one co-integration equation)

From Null hypothesis the p-value of Trace statistics is $15.75339 < 29.79707$ and 0.7295 of the p-value > 0.05 of LOS and also cross checking by using Max Eigen test the p-value is $0.8841 > 0.05$ of LOS. The same result is reached with both method and based on the guide line we cannot reject the null hypothesis.

We therefore, reached same decision result that not rejecting the H_0 means there is no co-integration among the variables.

II. $H_0: r = 0$ (No co-integration equation in the model)

$H_1: r \leq 1$ (At most one co-integration equation)

From model 8 of Log GCF &Log NET_FDI testing for long-term co-integration by checking by Johnson Trace statistics CE's OF None Value Of Trace result is $7.136658 < 15.49471$ of CR and also the p-value is $0.5618 > 0.05$ LOS and also the Eigen Probability is $0.5654 > 0.05$ of

LOS. The same result is reached from both tests that the Null hypothesis is failed to Reject So that there is no co-integration between Log GCF & Log NET_FDI.

From Model 9 of Log GCF ,Log NET_FDI & Log LQ hypothesis is as follows :

$H_0 : r = 0$ (No co-integration equation in the model)

$H_1 : r \leq 1$ (At most one co-integration equation)

The p-value of None Trace statistics value is $0.7286 > 0.05$ of LOS thus we fail to Reject H_0 and also the Eigen p-value is $0.9099 > 0.05$ of Appropriate level of significance. The same result showed that there is no long term association among Log GCF, Log NET_FDI & Log LQ.

Generally from Johnson co-integration test for availability of long -run association among variables of interest to each of models to be estimated to analysis is tested both by Trace and Max Eigen statistics which confirmed that :-

Variables of models specified as confirmed that they are co-integrated to each other means that there is a long-term relationship among themselves and this enables that the model estimated in this study would pass all the diagnostic tests.

The output From Johansen co-integration above indicated that two distinct results that are the variables both co-integrated and no long term association to models specified above. Therefore I estimate VEC model to those the long run co-integrating coefficients and I run unrestricted VAR model for those variables which had not been integrated as indicated above.

4.6. Interpretation And Discussion

4.7. Vector Error Correction Model

In the VECM, I discussed both long run co-integrating coefficients, which are used to see the long run relationship; and the short run coefficients. The output from e-view 11 of the restricted estimates of the co-integrating relationship and the adjustment coefficients normalized on GDP are given below.

Table 4.10 Estimated Long Run Coefficients using the VEC Model, Dependent variable: GDP

Co-integrating Eq:	Log FDI	Logeo	Log INF	LogLQ	Constant
Coefficient	-1.999474	9.157567	-5.064793	-5.853922	-55.88666
Standard errors	(0.18476)	(1.01028)	(0.39391)	(0.68427)	
t-statistics	-10.8222	9.06436	-12.8576	-8.55500	
Probability	0.0000	0.5727	0.6688	0.6888	

Source: own Computation by E-View 11 output (2020)

The signs of the coefficient are reversed in the long-run and the equilibrium equation of the fitted regression of VEC model is as follows:

$$\text{GDP} = 55.88666 + 1.999474 \text{ Net-FDI} - 9.157567 \text{ LogEO} + 5.064793 \text{ LogINF} + 5.853922 \text{ LogLQ}$$

$$(0.18476) \quad (1.01028) \quad (0.39391) \quad (0.68427)$$

The output from e-view 11 of table 4.10 depicts that some of variables entered in the ECM model have both expected and unexpected signs. For instance EO has different expected sign. As we see from the result in the regression above foreign direct investment, Inflation and labor quality have positive effect on Ethiopian economic development while creation of employment opportunity has an a negative effect in Ethiopian economic development .It is based on the output of e-view 11. The reason to the negative sign of employment opportunity might be that investment that flow into the country mostly holding few incumbents (job holders) that their potential holding focusing mostly their profits.

The model specified as a Log form, therefore the interpretations would be made in elasticity form as follows:

In the long run as specified in the model in a logarithm form, the coefficients can be interpreted as there is a positive long term association between GDP and foreign direct investment. This indicates that, in the long run, holding other things constant, a change in one percentage change on average net foreign direct investment brought 1.999474 % increase in GDP holding other variables constant and statistically significant at 1 and 5 percent significance level.

Next to FDI, Employment opportunity however has a negative long run effect on the Ethiopian economy development and the findings of this research concerning the long run negative effect on Ethiopian economic and statistically insignificant at 5 percent significance level . As a result a one percentage change on average join in a post increase in the employment opportunity has resulted in 9.157567 % decrease in GDP under the study period holding other variables constant.

The third variable in the long run as specified in the model is Inflation in a logarithm form, the coefficients can be interpreted as there is a positive long term association between GDP and Inflation .This indicates that, in the long run, holding other things constant, on average a change in one percentage in Annual inflation brought 5.064793 % increase in GDP holding other variables constant but it is insignificant statistically at 5 % LOS. The relationship between economic growth and inflation is very sensitive here for instance, For investors, annual growth in the GDP is vital. If overall economic output is declining, or merely holding steady, most investors would not be able to scale up their profits, which is the core driver of their achievement. However, too much GDP growth is also dangerous, as it will most likely come with an increase in inflation, which erodes their investment market gains by making the current handled money (and future corporate profits) less valuable. Most economists today agree that 2.5-3.5% GDP growth per year is the most that the economy can safely maintain without causing negative side effects. even if, our result positive association between GDP and inflation, it is greater than 5% and even statistically insignificant. In other words is not a good indicator to the economic development.

Last variable in the long run model interpretations is labor quality which is positive association between labor quality and GDP. As depicted in the equation that, in the long run, holding other things constant, on average a one percent increases in completing level of education in high school positively increases GDP in about 5. 853922 percent holding other variables constant. The p-value is 0.6688 which is greater than 5% LOS and therefore it is insignificant statistically.

4.6.1. Short Run Relationships

After the interpretation of long-run coefficients above, short-run ECM model is estimated. The error correction term (ECM), indicates the speed of adjustment to return to equilibrium. The coefficients of the error correction term imply the way parameters come to equilibrium.

Table 4.11 shows the results of the D (GDP) equation in the error-correction model, from which the short-run effect of FDI, employment opportunity, inflation, labor quality on economic development which is proxies by GDP can be analyzed.

Table 4.11. Short Run Coefficients

Error correction	Dependent variable: D (GDP)			
	Coefficient	Standard Error	t- value	p- value
CointEq1	-0.031140	(0.03777)	[-0.82446]	
D(LOGGDP(-1))	-0.320267	(0.83944)	[-0.38153]	
D(LOGNET_FDI(-1))	0.029418	(0.029418)	0.029418	
D(LOGEO(-1))	-0.001299	(-0.001299)	-0.001299	
D(LOGINF(-1))	-0.081068	(-0.081068)	-0.081068	
D(LOGLQ(-1))	-0.013651	(-0.013651)	-0.013651	
Constant	0.333365	0.333365	0.333365	

Source: own Computation by E-View 11 output (2020)

$$\Delta \text{LOG GDP} = -0.03114 \text{ ECT} + 0.029418 \text{ LOGNET_FDI} - 0.001299 \text{ LOGEO} - 0.081068 \text{ LOGINF} - 0.013651 \text{ LOGLQ} + 0.333365$$

$$(0.03777) \quad (0.029418) \quad (-0.001299) \quad (-0.081068) \quad (-0.013651)$$

The coefficient of determination (R-squared) in the short run is low explaining that about (0.248538) or about 24.85 % of variation in the GDP is attributed to variations in the explanatory variables in the model.

One study by Bannerjee *et al.* (2003) stated that the high significant error correction term, the assurance in confirming the existence of a stable long-run relationship (Kidanemarim, 2014).

The adjustment coefficient of the error correction term for the equation is negative as we see from the table above and it would be interpreted as the previous period deviation from long run

equilibrium is corrected as the current period as an adjustment speed of 3.114%. But it is not a good indication of existence of a stable long run relationship among the variables.

A percentage change in foreign direct investment is associated with 2.9418% increase in GDP on average holding other variables constant in the short run.

A percentage change in employment opportunity is associated with 0.1299 % decrease in GDP on average holding other variables constant in the short run. But FDI is insignificant at 5% in the short run. Employment opportunity is significant at 5% that has a causal relationship with GDP, Foreign direct investment but it is insignificant with inflation and labor quality.

Similarly a percentage change in Annual inflation is associated with 0.081068 (8.1068%) decrease in GDP on average holding other variables constant in the short run. Annual inflation is insignificant at 5% LOS.

On the other hand a percentage change in labor quality is associated with 0.013651 or (1.3651%) decrease in GDP on average ceteris paribus in the short run. In the short run labor quality is insignificant affecting Ethiopian economic development during the study period, due to their relationship is negative in short run.

4.7. Model Diagnostic Test

It is essential to assure whether my model which was estimated best fitted or not by checking with few diagnostic test. Prior to doing any analysis, it is mandatory to assure the standard property of the model adequacy. Therefore I tried to check a number of diagnostic checking of the model, which includes VEC residual serial correlation LM test, VEC Residual Normality Tests, (Jarque-Bera test), and VEC Residual Heteroskedasticity Tests (Levels and Squares) and Such tests are recommended by Pesaran *et al.* (2001). In order to reject or do not to reject the null hypothesis, I refer by looking the p-values associated with the test statistics. That is the null hypothesis is rejected when the p-value are equal to or smaller than the standard significance level of 5%.The following are types of diagnostics' test undertaken:

Table 4.12. Model Diagnostic Test

S/N	Test Statistics	p-value
1	VEC residual serial correlation LM test	0.1395
2	VEC Residual Normality Tests	0.2524
3	VEC Residual Heteroskedasticity Tests (Levels and Squares)	0.6631

Source: own Computation by E-View 11 output (2020)

4.7.1. VEC residual serial correlation LM test

The null hypothesis of no serial correlation (Brush Cod fray LM test) is failed to reject for the reason that the p-values is higher than the standard significant level ($0.1395 > 0.05$).

4.7.2. VEC Residual Normality Tests

H0: Residuals are multivariate normal

H1: Residuals are not multivariate normal

From Jarque-Bera joint result for normality test result indicates that it could not be rejected the null hypothesis test for normality As the test result indicates that we can't reject because the p-value is $0.2524 > 0.05$ most commonly accepted significance level, which means that the model is correctly specified .

4.7.3. VEC Residual Heteroskedasticity Tests (Levels and Squares)

This test reveals that whether the variance of the errors in the model are constant or not 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 joint chi-square test of the residuals on the cross products of the regressors and testing the joint significance of the regression. From e-view 11 outputs the p-value is 0.6631 is higher than 5% of LOS, therefore it is not Heteroskedasticity and it is a good indicator of a model specified.

4.8. Unrestricted VAR model

VAR is vector autoregressive model and the term autoregressive is due to the appearance of lagged values of the dependent variable on the right hand side and the term vector is due to the fact that a vector of two or more variables included in the model and the VAR approach bypasses

the need for structural modeling by treating every variable as endogenous in the model as a function of the lagged values of all endogenous variables in the system and this model is commonly used for forecasting systems of interrelated time series and analyzing the dynamic effect of random disturbances on the system of variables.

There are two types of VAR models. If variables are not co-integrated after Johansson test of co-integration, then we develop unrestricted VAR model but if it is co-integrated, then undertaking vector error correction model is mandatory. However, for the model (9) specified in chapter three the variables were tested as not co-integrated by Johansson co-integration technique, therefore I used unrestricted VAR model to estimate Model 9 to see the relationship between my response variable of Gross capital formation with explanatory variables of foreign direct investment and labor quality by testing the Hypothesis formulated in Chapter one of this Thesis as follows:-

Testing of Hypothesis formulated in chapter one:

H0: There was no relationship between capital formation and FDI inflow in Ethiopia.

H1: There was relationship between capital formation and FDI inflow in Ethiopia.

Here I see the output of the estimated model which were not co-integrated after Johansson co-integration as follows:

Table 4.13. Estimated VAR model: GCF dependent variable

Variable	LOGGCF	LOG Net-FDI	LOGLQ
Coefficient	1.031874	0.598003	0.114721
Standard error	(0.03314)	(0.26608)	(0.19005)
t-statistic	[31.1397]	[2.24750]	[0.60365]
p-value	0.0000	0.0278	0.5481

Source: Own Computation by E-View 11 output (2020)

R-squared = 0.773152
Adjusted R-squared = 0.743564
S.E. of regression = 0.829119
Durbin-Watson stat = 2.282621

From t-statistics on table above GCF is about 31.1397 which means it strongly influences its own whereas NET_FDI strongly predicts GCF going by t-statistics of 2.24 to the country however Gross capital formation is less likely influenced by labor quality.

The coefficient of determination (R-squared) is highly explaining that about 77.31 % of variation in GCF is attributed to variations in the explanatory variables of Net flow of foreign direct investment and Labor quality in the model and the remaining 22.69% of the variation in Gross capital formation is due to factors which were not included in my model. .

As a percentage increase in net foreign direct investment account for a 59.80% increase on Gross capital formation on average holding other variables constant and also a one percentage increase in labor quality increases GCF by 11.47 percent on average holding other variables constant. From the p-value we can understand that LogNet_FDI is significant at about 5% LOS but Log LQ is insignificant with standard 5% LOS.

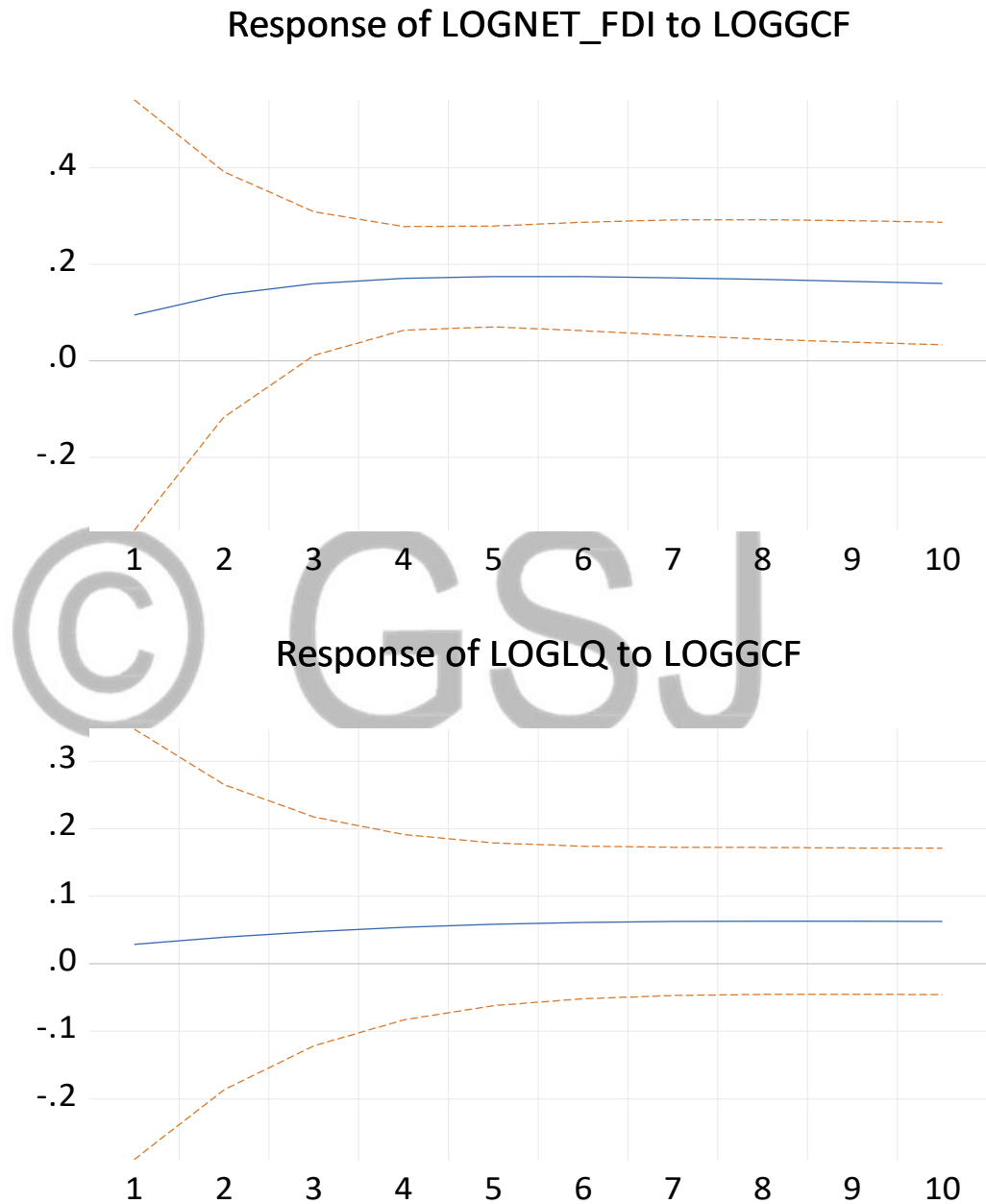
4.9. Impulse Response Functions and Variance Decomposition Analyses

4.9.1. Impulse Response Functions

IRFs are useful for being able to explain the signs of the relationship as well as how long those effects require taking place. IRFs can show how responsive a dependent variable is to a shock in an independent variable. IRFs is a vital tool to see dynamic effect of variable due to a random shock or innovation in other variables. It also touches 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 Gross capital formation to a shock in FDI and labor quality.

Figure 4.5 Response of LOGNET_FDI to LOGGCF & Response of LOGLQ to LOGGCF

Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.



Source: E-VIEW 11 Result (2020)

We have two graphs above that showing first response of LOGNET_FDI to LOGGCF to one standard deviation and response of LOGLQ to one standard deviation shock of LOGGCF. The blue line shows the impulse response function and the red line indicates that the 95% confidence interval.

Response to LOGNET_FDI is shown From the first graph that we can see the reactions of LOGNET_FDI to LOGGCF, is positive in initial period and a gradual increase up to period 4 and it is from period 4 upward the FDI response is entirely stable. Shocks to GCF will have a positive effect on FDI both in the short run and long run.

Response to LOG Labor quality is on a steady state of a one standard shock (innovation) to GCF which is above zero and this indicates shocks to GCF will have a positive effect both on Labor quality in short run and long run.

4.9.2. Variance Decomposition Analyses (VDA)

Variance decomposition is the forecast error gives the percentage of unexpected variation in each variable that is produced by shocks by other variables and it also indicates the relative effect that a variable has on other variable and it further enables assessment of economic significant of this effect as a percentage of the forecast error for a variable sum to one. The component that measures the fraction in a variable explained by innovations or shocks in other variables.

The following table reveals that variance decomposition of GCF in which I am interested to see the relationship of NET_FDI's effect to capital formation which in turn would have an effect to economic development to Ethiopia.

Table 4.14. Variance Decomposition of LOG GCF

Period	S.E	LOGGCF	LOGNET_FDI	LOGLQ
1	0.144567	100.0000	0.0000	0.0000
2	221462	85.28752	11.65148.	3.061000
3	0.297156	70.42307	22.45824	7.118685
4	0.369304	59.88539	29.34217	10.77244
5	0.435837	52.74446	33.43980	13.81574
6	0.496153	47.81965	35.87035	16.30999
7	0.550445	44.32052	37.32818	18.35129
8	0.599241	41.75933	38.21461	20.02606
9	0.643162	39.83357	38.76092	21.40550
10	0.682816	38.35076	39.10212	22.54712
11	0.718755	37.18480	39.31816	23.49704
12	0.751457	36.25076	39.45707	24.29217
13	0.781333	35.49001	39.54800	24.96199
14	0.808728	34.86118	39.60880	25.53002
15	0.833934	34.33448	39.65052	26.01500

Source: Own Computation by E-View 11 output (2020)

The result of the above table extracted from output e-view 11 variance decomposition test and the interpretations would be categorized between short run and long run period.

In the short run as we see from table in the first period the impulse or the shock to GCF account for 100% variation of the fluctuation in Gross capital formation or in its own shock. This means strong endogenous by GCF implying strong influence from its own variable of GCF where as FDI and labor quality has strongly exogenous or weak influence on GCF. In fifth period the shock to Foreign Direct Investment can cause 33.43% fluctuation in Gross capital formation and

this implies that FDI does have a moderate influence on Gross capital formation. But the shock to labor quality causes GCF for about 13.82% influence to economic development.

In the long run as we see from period 15, Net_FDI in its Log form contributes with highest cause or contributions amounting to 39.65% fluctuations to Gross Capital formation and Gross capital formation are explained by Labor quality by about 26.01%.

Generally the influence of NET_FDI and Labor quality on GCF is rising gradually over years from short run period to long run period.



CHAPTER FIVE

SUMMARY OF MAJOR FINDINGS, CONCLUSIONS & RECOMMENDATIONS

5.1. Summary of Major Findings

The paper examined the effects of FDI on the economic development in Ethiopia with a special focus of Gross capital formation taking other control variables which are factors that influence the outcome, but often arise from the empirical design, not the variables of interest and the study covered 46 years since 1974-2019. In the econometrics analysis, the effect of foreign direct investment on economic development in FDRE was investigated. In the thesis, economic development was measured in terms of GDP, Foreign Direct Investment, Employment opportunity, Inflation, Labor Quality, and Gross Capital Formation.

In the descriptive analysis, the following findings were achieved:

The trends of the stock of FDI in Ethiopia were \$109.6 million in 1980 and it reached to \$4.2 billion in 2016/17 and it was \$ 911,841.000,000 in 2019. The share of FDI to Gross capital formation in the country was 11.1 % and 8.8 % in 2014 and 2015 respectively.

In the inferential & econometrics analysis, the following Findings were achieved:

Before estimating the model to achieve the objectives set in chapter one and the model specified in chapter three, first it was checked Stationarity of the series of the data. The Stationarity of the data were first detected both by traditional method of graph and corrolgram and then after tested through statistically by unit root test using Augmented Dickey Fuller (ADF) test type with a statistical software package of E-view 11.

In the output of ADF unit root test at level or at original data series become stationary so that the first difference resulted to happen stationary. To investigate the long-term relationship between GDP and FDI ,a co integration test by Johansen was used by using Trace statistics and Maximum Eigen value and it was also tested by p-values with standard level of significance of 5% and after applying co-integration test to the model estimated, and there had been two different outcomes achieved; these were those models co-integrated or have long-run association and those are not co-integrated (had not have long-run association) among variables in their

model estimated. Therefore I used two of VEC and Unrestricted VAR models to achieve objectives of this paper and the models are:-

- 1) Vector error correction model (VEC) ; the model estimated in the paper was used for those variables which were tested as co-integrated (had have long-term association)
- 2) Unrestricted VAR model :-this model was estimated to variables of the model estimated and tested by Johansen co-integration technique and resulted as they had not have long-term association between variables .

By using VEC Model ,the thesis found that both long run co-integrating, and the short run coefficients in which in the long run there was a positive long term association between GDP and foreign direct investment and the findings in the short run indicated that a percentage change in Foreign direct investment was associated with 2.9418% increase in GDP on average holding other variables constant in the short run and a percentage change in employment opportunity was associated with 0.1299 % decrease in GDP on average holding other variables constant in the short run. But FDI is insignificant at 5% in the short run.

From the diagonal test of VEC model, the output indicated that there were no serial correlation (the model is correctly specified) ,the residual is normally distributed and no evidence of Heteroscedasticity problem.

Response of LOGNET_FDI to LOG GCF was positive in initial period and a gradual increase up to period 4 and it was from period 4 upward, the FDI response was entirely stable. Shocks to GCF would have a positive effect on FDI both in the short run and long run.

Response to LOG Labor quality was on a steady state of a one standard shock (innovation) to GCF which was above zero and this indicates shocks to GCF would have a positive effect both on Labor quality in short run and long run.

From variance decomposition, In the short run in the first period the impulse or the shock to GCF account for 100% variation of the fluctuation in Gross capital formation where as FDI and labor quality had strongly exogenous or weak influence on GCF. In fifth period the shock to Foreign Direct Investment caused 33.43% fluctuation in Gross capital formation and this implies that FDI did have a moderate influence on Gross capital formation. But the shock to labor quality caused GCF for about 13.82% influence to economic development.

In the long run in the last period, Net_FDI contributed highly causing to Gross capital formation and Gross capital formation was explained by Labor quality by about 26.01%.

Generally the influence of NET_FDI and Labor quality on GCF is rising gradually over years from short run period to long run period.

5.2. Conclusions

Based on findings of the study, the following conclusions have been achieved. To reap main and specific objectives of this paper, two research statistical analyses effectively utilized. These are descriptive analysis and that of inferential & econometric analysis.

Descriptive analysis method has been applied in order to answer the following the first research hypothesis and also to fulfill the first Thesis specific objective of assessing the trends of FDI as a percentage of the share of GDP from 1974 to 2019 and the Hypothesis formulated in chapter one was

" There was no relationship between GDP and FDI inflow in Ethiopia"

From the descriptive analysis in which variables plugged into the model the highest average value recorded is in NET_FDI and the share of FDI to GDP in Ethiopia is almost stable flow to the country that is close to Zero since 1980 to 1996 but there are a little bit increase from 1997-1998 but the highest peaked in the final year of 2019 to this study amounting to 11.7 % to contribute its share to GDP of Ethiopia.

The test of null hypothesis that is formulated in chapter one is:

“H0: There was no causality relationship between all independent variables and GDP in Ethiopia”

The hypothesis is tested by using Granger causality test and from the discussions on chapter four the following conclusion has been arrived as the causality relationship among all explanatory variable and the variable of interest of GDP are tested on their first difference but the null hypothesis is rejected and from the alternative hypothesis only the first difference of LOGGDP does cause Log of GCF and therefore the analysis found that the direction of causality between economic development indicators of GDP and Gross capital formation in Ethiopia is generally unidirectional that is one way causality that run from GDP growth to capital formation. This implies that GDP directly causes Gross Capital Formation in stimulating the economic development in the country but GDP is not an effect of Gross Capital Formation. In other words,

the occurrence of in the past values of GDP in Ethiopia causes GCF. However, the rest of explanatory variables resulted as there have no causality relationship among themselves.

The second specific objectives of this paper is" to investigate the short run and long run effects of FDI in Ethiopia" and by means of inferential statistics and econometrics analysis techniques manipulated ,time series analysis is used from 1974 to 2019 to estimate the models specified. The hypothesis formulated was as follows:-

" There was no short run and long run effect of FDI to Ethiopia."

By using Johansson co-integration' test, the conclusion entails two distinct results that are the variables either co-integrated and or no long term association. For long-term association estimating the model by VEC, the following conclusions are being realized:

In the Long-run there is a positive long-term association between GDP & FDI and it is also significant statistically in FDRE. The other control variable of labor quality has positive long-run association but statistically insignificant. The findings of this thesis concerning the long run positive effect of the FDI and the growth of Economic development are consistent with the study made in Korea over the 1980–2009 period. The study confirmed that a strong positive effect of FDI on Korea's economic growth, In addition to this, employment opportunity also positively affected the economic growth Koojaroenprasit (2012). Similar positive result in addition to Korea's finding also achieved in Pakistan as a long-run effect of FDI on economic growth (Shahbaz and Rahman 2010).Another Empirical result also assured that FDI is an important factor for economic development in a long run, especially for emerging and developing economies (Dinh et al., 2019).

In the short-run the coefficient of determination (R-squared) is low explaining that about 24.85 % of variation in the GDP is attributed to variations in the explanatory variables in the model. The adjustment coefficient of the error correction term for the equation is negative it implies as the previous period deviation from long run equilibrium is corrected as the current period as an adjustment speed of 3.114%.

A percentage change in foreign direct investment is associated with 2.9418% increase in GDP on average in the short run where as a percentage change in employment opportunity is associated

with 0.1299 % decrease in GDP in the short run. But FDI is insignificant at 5% in the short run and Employment opportunity is significant at 5% that has a causal relationship with GDP, Foreign direct investment but it is insignificant with inflation and labor quality.

In opposite to the above long-run positive effect mentioned between FDI and economic development , a negative one was also found in the empirical study made by Dinh et al.,(2019) in which FDI capital flows can hinder a country's economic growth in the short run, as studied in 30 developing countries.

The third specific objective of this paper is "to investigate the relationship between effect of FDI on increasing capital formation through expansion of production capacity" and the research hypothesis was as follows:

" There was no relationship between capital formation and FDI inflow in Ethiopia ."

The relationship of GCF and NET_FDI tested by unrestricted VAR model is as follows:

The coefficient of determination (R-squared) is highly explaining that about 77.31 % of variation in GCF is attributed to variations in the explanatory variables of Net flow of foreign direct investment and Labor quality in the model and the remaining 22.69% of the variation in Gross capital formation is due to factors which are not included in my model. .

As a percentage increase in Gross capital formation account for a 59.80% increase on net foreign direct investment on average holding other variables constant and also a one percentage increase in GCF increases 11.47 percent on labor quality on average holding other variables constant. From the p-value we can understand that LogNet_FDI is significant at about 5% LOS but LogLQ is insignificant with standard 5% LOS.

In the long run, Net_FDI in its Log form contributes with highest cause or contributions amounting to 39.65% fluctuations to Gross capital formation and Gross capital formation is explained by Labor quality by about 26.01%. Theoretically, the association among foreign direct investment (FDI), Gross capital formation, and economic development tends to be positive. This is assured by neoclassical and endogenous growth theories demonstrated that FDI scales up economic growth in a capital scarce economy by increasing in the volume of capital formation as well as efficiency of physical investment (Romer 1986, Lucas 1988).

My result is also totally in line with the neoclassical growth model, in which FDI promotes economic growth by increasing the volume of Gross capital formation (investment) Li, H. and Liu, F. (2004).

Generally the influence of NET_FDI and Labor quality on GCF is rising gradually over years from short run period to long run period and the increase from period one to period fifteen revealing that NET_FDI and Labor quality does have a great influence through time on Gross capital formation.

5.3. Policy Recommendation

The paper has attempted to assess the effects of foreign direct investment on economic development in FDRE. In this thesis, economic development is measured through GDP growth, GCF, NET_FDI flow, Employment opportunity, Annual inflation and Labor quality effects, and Based on the Conclusions of this study, the following policy recommendations are forwarded:-

1. In order to enhance and achieve the required level of economic development of the country, a lot of Governmental policy and regulatory issues should be addressed based on the conclusion of this study. In that the size and the type of FDI should be widen on holistic way to increase the GDP of the country and which in turn to trigger the overall economic development of Ethiopia with a due care of giving special emphasis in a line with stabilized and peaceful environment to investors to flow of FDI and more focusing on those investment areas whose investment is labor intensive.
2. The government should stimulate GDP to grow at increasing rate due to the fact that it directly causes Gross Capital Formation in the country which in turn stimulate the economic development in the country. In other words, the occurrence of in the past values of GDP in Ethiopia causes GCF
3. As we found in the findings that in the long-run there is a positive association between GDP & FDI, as a result the government must allow free of tax and reduced bureaucracy level considering the long-run effect to GDP and which in turn have an effect to the over-all economic development .

Employment opportunity by diffusion of FDI has a negative long-run effect and insignificant effect to the economic development of the country in this study. This might be that investment that flow into the country mostly holding few incumbents (job holders) that their potential holding focusing mostly their profits. Therefore, the FDRE should stimulate to the creation of

more and increasing sustainable jobs by stimulating foreign direct investors enhancing policies like little or no interest rate ,good tax holidays and more likely peaceful political environment including free of chaos.

4. As NET_FDI has a positive effect to the formation of Gross capital formation which in turn add value to the economic development of Ethiopia for this study period and the specific objective of this paper was to see the relationship of FDI and on increasing capital formation to Ethiopia. Thus, the study recommends that increasing diversified foreign direct investment projects whose benefits lasts long-term effects to increase the capital formation of the country must be a vital one.
5. In the long-run there is a positive direct association between GDP & Inflation but it is insignificant statistically as the study shown in this paper. Therefore, I Recommend that a high amount in the increase of Inflation destabilize the economy as a consequence reduce the inflow of FDI which in turn have a negative effect to the economic development in Ethiopia. Thus, the FDRE should maintain low inflation rate, stable handling of inflation to keep increasing amount of FDI in order to increase high economic development in Ethiopia.
6. In this thesis emphasis is given only focus on the effect of FDI on economic development which was here measured only on the gross capital formation, creation of employment opportunity, and stable inflation rate.

Therefore further research will be a crucial one on the areas of impact of investment bureaucracy and country's security situation on the flow of FDI to measure widely the economic development in Ethiopia.

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APPENDEXES

Table A. Raw Data collected from different institution

Year	GDP (In Millions of Birr) compiled by MoFED	Net FDI compiled by EIR,UNC TAD IN Dollar	Employment opportunity(EO) compiled by EIC In NUMBER	Annual Inflation compiled by CIA In percent	Labor Quality in Number compiled by EIC	Gross Capital Formation compiled by EEA (By Millions of Birr)
1974	8849 351 778.1	N/A	N/A	0.000859	N/A	801.16
1975	8709 608 577.3	N/A	N/A	0.000655	N/A	845.96
1976	9417 115 747.4	N/A	N/A	0.002854	N/A	743.52
1977	10528 538 646.0	N/A	N/A	0.001666	N/A	818.53
1978	11151 343 757.2	N/A	N/A	0.001431	N/A	795.91
1979	12233 405 236.4	N/A	N/A	0.001603	N/A	1,019.91
1980	13035 633 047.3	1000000	N/A	0.000448	N/A	1,246.25
1981	13375 996 901.9	100000	N/A	0.00061	N/A	1725.832216
1982	14074 974 498.6	2000000	N/A	0.00077	N/A	1839.21764
1983	15948 294 808.7	-2600000	N/A	0.0003	N/A	1812.777876
1984	14356 030 163.7	5100000	N/A	-0.00003	N/A	2336.762476
1985	17360 035 625.9	200000	N/A	0.00184	N/A	1760.150877
1986	18024 499 887.1	-600000	N/A	0.00056	N/A	2810.178188
1987	19096 712 772.7	-2600000	N/A	-0.0009	N/A	2834.193675
1988	19776 995 467.1	1700000	N/A	0.00022	N/A	3864.334344
1989	20871 805 726.6	-500000	N/A	0.00096	N/A	2865.229463
1990	22519 329 095.7	12000000	N/A	0.00052	N/A	2652.170928
1991	25790 404 882.6	6000000	N/A	0.0020	N/A	2520.717069
1992	28542 379 416.2	200000	693	0.0021	252	2413.038796
1993	36162 528 172.0	3500000	1,099	0.001	352	4788.072009

1994	37702 287 160.1	17200000	2,356	0.00012	897	5421.414199
1995	45092 412 573.0	14100000	428	0.0013	329	7031.66399
1996	50477 768 562.6	21900000	2,509	0.00009	1113	8086.476721
1997	51948 116 889.0	288500000	4,041	-0.00072	600	8900.503256
1998	49879 195 930.4	260700000	4,883	0.00036	917	9710.489331
1999	53631 030 231.7	70700000	1,511	0.0007	1001	10439.66619
2000	60048 982 557.5	134600000	6,878	0.00007	3027	15150.18081
2001	60729 743 058.0	349400000	5,080	-0.00082	2888	16375.82267
2002	58366 733 998.2	255000000	3,391	0.00017	1200	17196.13152
2003	63665 036 596.2	465000000	15,248	0.0017	7087	17548.2326
2004	74278 514 206.6	545100000	32,690	0.00032	22941	26109.04235
2005	89929 946 115.6	365100000	19,380	0.00117	10529	29079.63709
2006	105891 479 957.6	521200000	34,771	0.00136	28220	37964.53515
2007	173308 622 614.8	814600000	48,195	0.0017	36222	45441.74671
2008	250207 628 522.4	893700000	81,714	0.00444	74560	64007.59197
2009	337965 131 817.9	960300000	40,003	0.0008	22303	86908.67504
2010	385876 514 611.8	1242500000	26,158	0.00081	22220	106170.1087
2011	515078 500 000.0	1072100000	20,232	0.0033	6511	165,380.00
2012	747326 500 000.0	1231600000	14,455	0.00241	7059	277,243.70
2013	864673 200 000.0	146700000	35,887	0.00081	28800	309,526.60
2014	1047392 800 000.0	2202200000	37,278	0.00074	32000	421,786.00
2015	1568097 450 694.5	3268700000	21,238	0.0010	16521	508,976
2016	1832785 962 364.0	4170800000	52,012	0.00073	39871	585,665
2017	2200120 588 249.1	1894285200 0	131,277	0.00099	28000	704,596
2018	2696222 737 403.3	2225315200 0	16,105	0.00138	14000	764,076
2019	7.78634E+12	9.11841E+1 1	15,953	0.00126	13985	948,866

Table B. Different Statistical output from EVIEW 11

Vector Auto regression Estimates

Date: 05/25/20 Time: 09:55

Sample (adjusted): 1993 2019

Included observations: 27 after adjustments

Standard errors in () & t-statistics in []

	LOGGCF	LOGNET_F DI	LOGLQ
LOGGCF(-1)	1.031874 (0.03314) [31.1397]	0.598003 (0.26608) [2.24750]	0.114721 (0.19005) [0.60365]
LOGNET_FDI(-1)	-0.061602 (0.02221) [-2.77417]	0.547258 (0.17830) [3.06927]	0.026675 (0.12735) [0.20946]
LOGLQ(-1)	0.047051 (0.02826) [1.66499]	-0.040320 (0.22691) [-0.17769]	0.700570 (0.16207) [4.32264]
C	0.680321 (0.22847) [2.97767]	3.384450 (1.83455) [1.84484]	0.982555 (1.31034) [0.74984]
R-squared	0.993911	0.811186	0.773152
Adj. R-squared	0.993117	0.786558	0.743564
Sum sq. resids	0.480692	30.99210	15.81108
S.E. equation	0.144567	1.160811	0.829119
F-statistic	1251.537	32.93771	26.12989
Log likelihood	16.07159	-40.17293	-31.08714
Akaike AIC	-0.894192	3.272069	2.599047
Schwarz SC	-0.702216	3.464045	2.791023
Mean dependent	10.90291	20.13017	8.768581
S.D. dependent	1.742575	2.512592	1.637295
Determinant resid covariance (dof adj.)		0.018970	
Determinant resid covariance		0.011726	
Log likelihood		-54.91383	
Akaike information criterion		4.956580	

XCV

Schwarz criterion 5.532508
Number of coefficients 12

System: UNTITLED
Estimation Method: Least Squares
Date: 05/25/20 Time: 08:45
Sample: 1993 2019
Included observations: 27
Total system (balanced) observations 81

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1.031874	0.033137	31.13969	0.0000
C(2)	-0.061602	0.022206	-2.774165	0.0071
C(3)	0.047051	0.028259	1.664992	0.1004
C(4)	0.680321	0.228475	2.977665	0.0040
C(5)	0.598003	0.266075	2.247498	0.0278
C(6)	0.547258	0.178302	3.069274	0.0031
C(7)	-0.040320	0.226907	-0.177694	0.8595
C(8)	3.384450	1.834553	1.844836	0.0694
C(9)	0.114721	0.190046	0.603646	0.5481
C(10)	0.026675	0.127354	0.209458	0.8347
C(11)	0.700570	0.162070	4.322639	0.0001
C(12)	0.982555	1.310345	0.749845	0.4559

Determinant residual covariance 0.011726

Equation: $\text{LOGGCF} = C(1)*\text{LOGGCF}(-1) + C(2)*\text{LOGNET_FDI}(-1) + C(3)*\text{LOGLQ}(-1) + C(4)$

Observations: 27

R-squared	0.993912	Mean dependent var	10.90291
Adjusted R-squared	0.993117	S.D. dependent var	1.742575
S.E. of regression	0.144567	Sum squared resid	0.480692
Durbin-Watson stat	2.084024		

Equation: $\text{LOGNET_FDI} = C(5)*\text{LOGGCF}(-1) + C(6)*\text{LOGNET_FDI}(-1) + C(7)*\text{LOGLQ}(-1) + C(8)$

Observations: 27

R-squared	0.811186	Mean dependent var	20.13017
Adjusted R-squared	0.786558	S.D. dependent var	2.512592

S.E. of regression 1.160811 Sum squared resid 30.99210
 Durbin-Watson stat 1.710299

$$\text{Equation: LOGLQ} = C(9)*\text{LOGGCF}(-1) + C(10)*\text{LOGNET_FDI}(-1) + C(11)*\text{LOGLQ}(-1) + C(12)$$

Observations: 27

R-squared	0.773152	Mean dependent var	8.768581
Adjusted R-squared	0.743564	S.D. dependent var	1.637295
S.E. of regression	0.829119	Sum squared resid	15.81108
Durbin-Watson stat	2.282621		

VEC Residual Heteroskedasticity Tests (Levels and Squares)

Date: 05/24/20 Time: 08:55

Sample: 1974 2019

Included observations: 20

Joint test:

Chi-sq	df	Prob.
93.52279	100	0.6631

Individual components:

Dependent	R-squared	F(10,9)	Prob.	Chi-sq(10)	Prob.
res1*res1	0.925293	11.14702	0.0006	18.50585	0.0470
res2*res2	0.775109	3.101944	0.0516	15.50219	0.1148
res3*res3	0.394060	0.585296	0.7921	7.881204	0.6404
res4*res4	0.451035	0.739448	0.6788	9.020696	0.5301
res2*res1	0.878945	6.534667	0.0047	17.57891	0.0625
res3*res1	0.826823	4.297000	0.0194	16.53646	0.0853
res3*res2	0.640868	1.606042	0.2443	12.81736	0.2341
res4*res1	0.787571	3.336701	0.0419	15.75141	0.1070
res4*res2	0.753638	2.753167	0.0715	15.07277	0.1294
res4*res3	0.492961	0.875012	0.5839	9.859226	0.4529

VEC Residual Normality Tests

Orthogonalization: Cholesky (Lutkepohl)

Null Hypothesis: Residuals are multivariate normal

Date: 05/24/20 Time: 08:23
 Sample: 1974 2019
 Included observations: 20

Component	Skewness	Chi-sq	df	Prob.*
1	0.975421	3.171485	1	0.0749
2	0.731584	1.784050	1	0.1817
3	-0.874482	2.549062	1	0.1104
4	0.005930	0.000117	1	0.9914
Joint		7.504714	4	0.1115

Component	Kurtosis	Chi-sq	df	Prob.
1	4.612525	2.166864	1	0.1410
2	3.530842	0.234828	1	0.6280
3	3.271113	0.061252	1	0.8045
4	2.491279	0.215664	1	0.6424
Joint		2.678608	4	0.6130

Component	Jarque-Bera	df	Prob.	
1	5.338349	2	0.0693	
2	2.018878	2	0.3644	
3	2.610314	2	0.2711	
4	0.215782	2	0.8977	
Joint		10.18332	8	0.2524

*Approximate p-values do not account for coefficient estimation

VEC Residual Serial Correlation LM Tests

Date: 05/24/20 Time: 07:59
 Sample: 1974 2019
 Included observations: 20

Null hypothesis: No serial

correlati
 on at
 lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	22.75929	16	0.1203	1.638804	(16, 22.0)	0.1395
2	6.554644	16	0.9809	0.348760	(16, 22.0)	0.9826

Null
 hypothe
 sis: No
 serial
 correlati
 on at
 lags 1
 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	22.75929	16	0.1203	1.638804	(16, 22.0)	0.1395
2	30.60867	32	0.5369	0.800752	(32, 12.7)	0.7064

*Edge worth expansion corrected likelihood ratio statistic.

Vector Error Correction Estimates

Date: 05/23/20 Time: 00:22

Sample (adjusted): 1994 2019

Included observations: 20 after adjustments

Standard errors in () & t-statistics in []

Co-integrating Eq:	CointEq1
LOGGDP(-1)	1.000000
LOGNET_FDI(-1)	-1.999474 (0.18476) [-10.8222]
LOGEO(-1)	9.157567 (1.01028) [9.06436]
LOGINF(-1)	-5.064793 (0.39391) [-12.8576]

LOGLQ(-1) -5.853922
 (0.68427)
 [-8.55500]

C -55.88666

Error Correction:	D(LOGNET)				
	D(LOGGDP)_FDI	D(LOGGEO)	D(LOGINF)	D(LOGLQ)	
CointEq1	-0.031140 (0.03777) [-0.82446]	-0.003185 (0.21839) [-0.01458]	-0.047531 (0.13974) [-0.34013]	0.165610 (0.19661) [0.84234]	0.113228 (0.14198) [0.79749]
D(LOGGDP(-1))	-0.320267 (0.83944) [-0.38153]	-2.113222 (4.85375) [-0.43538]	1.120908 (3.10577) [0.36091]	1.568524 (4.36951) [0.35897]	3.705585 (3.15546) [1.17434]
D(LOGNET_FDI(-1))	0.029418 (0.05050) [0.58248]	-0.063817 (0.29202) [-0.21853]	-0.105782 (0.18686) [-0.56611]	-0.014229 (0.26289) [-0.05412]	-0.037896 (0.18985) [-0.19962]
D(LOGEO(-1))	-0.001299 (0.22739) [-0.00571]	-0.497924 (1.31482) [-0.37870]	-0.495897 (0.84132) [-0.58943]	-0.336349 (1.18365) [-0.28416]	-0.921878 (0.85478) [-1.07850]
D(LOGINF(-1))	-0.081068 (0.11340) [-0.71488]	-0.066435 (0.65569) [-0.10132]	0.183795 (0.41956) [0.43807]	-0.178988 (0.59028) [-0.30323]	0.592647 (0.42627) [1.39031]
D(LOGLQ(-1))	-0.013651 (0.18874) [-0.07233]	0.309289 (1.09135) [0.28340]	0.542421 (0.69832) [0.77675]	0.154198 (0.98247) [0.15695]	0.709547 (0.70949) [1.00008]
C	0.333365 (0.22634) [1.47282]	0.949773 (1.30875) [0.72571]	-0.186932 (0.83743) [-0.22322]	-0.597270 (1.17818) [-0.50694]	-0.823607 (0.85083) [-0.96800]
R-squared	0.248538	0.143240	0.483290	0.452842	0.326231
Adj. R-squared	-0.098291	-0.252188	0.244809	0.200307	0.015260
Sum sq. resids	0.690351	23.08069	9.450003	18.70505	9.754795
S.E. equation	0.230443	1.332455	0.852598	1.199521	0.866238
F-statistic	0.716601	0.362239	2.026531	1.793186	1.049073
Log likelihood	5.284097	-29.81141	-20.88160	-27.70938	-21.19904
Akaike AIC	0.171590	3.681141	2.788160	3.470938	2.819904
Schwarz SC	0.520097	4.029647	3.136666	3.819445	3.168410
Mean dependent	0.262652	0.502938	0.119312	-0.258849	0.146874

c

S.D. dependent 0.219890 1.190743 0.981106 1.341362 0.872924

Determinant resid covariance (dof adj.) 0.000635
 Determinant resid covariance 7.37E-05
 Log likelihood -46.73490
 Akaike information criterion 8.673490
 Schwarz criterion 10.66495
 Number of coefficients 40

Date: 05/18/20 Time: 00:52
 Sample (adjusted): 1982 2019
 Included observations: 29 after adjustments
 Trend assumption: Linear deterministic trend
 Series: LOGGDP LOGNET_FDI
 Lags interval (in first differences): 1 to 1

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.253587	15.74517	15.49471	0.0458
At most 1 *	0.221558	7.263367	3.841465	0.0070

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.253587	8.481803	14.26460	0.3318
At most 1 *	0.221558	7.263367	3.841465	0.0070

Max-eigenvalue test indicates no co-integration' at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Date: 05/18/20 Time: 05:02
 Sample (adjusted): 1994 2019

Included observations: 26 after adjustments
Trend assumption: Linear deterministic trend
Series: LOGGDP LOGNET_FDI LOGEO
Lags interval (in first differences): 1 to 1

Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None	0.451716	26.36923	29.79707	0.1180
At most 1	0.293367	10.74424	15.49471	0.2277
At most 2	0.063865	1.715881	3.841465	0.1902

Trace test indicates no co integration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration' Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.451716	15.62500	21.13162	0.2475
At most 1	0.293367	9.028355	14.26460	0.2838
At most 2	0.063865	1.715881	3.841465	0.1902

Max-eigenvalue test indicates no co-integration' at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Date: 06/15/20 Time: 21:30
Sample (adjusted): 1994 2019
Included observations: 20 after adjustments
Trend assumption: Linear deterministic trend
Series: LOGGDP LOGNET_FDI LOGEO LOGINF LOGLQ
Lags interval (in first differences): 1 to 1

Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.912596	99.82781	69.81889	0.0000
At most 1 *	0.686546	51.08356	47.85613	0.0241
At most 2	0.576560	27.88149	29.79707	0.0818
At most 3	0.376339	10.69461	15.49471	0.2310

At most 4 0.060665 1.251656 3.841465 0.2632

Trace test indicates 2 Co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Co-integration' Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.912596	48.74425	33.87687	0.0004
At most 1	0.686546	23.20207	27.58434	0.1650
At most 2	0.576560	17.18688	21.13162	0.1634
At most 3	0.376339	9.442952	14.26460	0.2511
At most 4	0.060665	1.251656	3.841465	0.2632

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

* denotes rejection of the hypothesis at the 0.05 level

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

Date: 05/18/20 Time: 05:43

Sample (adjusted): 1994 2019

Included observations: 20 after adjustments

Trend assumption: Linear deterministic trend

Series: LOGEO LOGGDP LOGINF LOGNET_FDI

Lags interval (in first differences): 1 to 1

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.711147	49.02548	47.85613	0.0386
At most 1	0.542657	24.18874	29.79707	0.1926
At most 2	0.319833	8.542332	15.49471	0.4094
At most 3	0.040842	0.833983	3.841465	0.3611

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Co-integration' Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.711147	24.83674	27.58434	0.1081
At most 1	0.542657	15.64641	21.13162	0.2462

At most 2	0.319833	7.708349	14.26460	0.4091
At most 3	0.040842	0.833983	3.841465	0.3611

Max-eigenvalue test indicates no co-integration' at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Date: 05/18/20 Time: 08:51
Sample (adjusted): 1982 2019
Included observations: 29 after adjustments
Trend assumption: Linear deterministic trend
Series: LOGGDP LOGGCF LOGNET_FDI
Lags interval (in first differences): 1 to 1

Unrestricted Co-integration' Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.249025	15.75339	29.79707	0.7295
At most 1	0.226279	7.448275	15.49471	0.5261
At most 2	0.000293	0.008508	3.841465	0.9262

Trace test indicates no co-integration' at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Co-integration' Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.249025	8.305115	21.13162	0.8841
At most 1	0.226279	7.439767	14.26460	0.4385
At most 2	0.000293	0.008508	3.841465	0.9262

Max-eigenvalue test indicates no co-integration' at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Date: 05/17/20 Time: 10:22
Sample (adjusted): 1982 2019
Included observations: 29 after adjustments
Trend assumption: Linear deterministic trend
Series: LOGNET_FDI LOGGDP
Lags interval (in first differences): 1 to 1

Unrestricted Co-integration' Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.253587	15.74517	15.49471	0.0458

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At most 1 *	0.221558	7.263367	3.841465	0.0070
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Trace test indicates 2 Co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Co-integration' Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.253587	8.481803	14.26460	0.3318
At most 1 *	0.221558	7.263367	3.841465	0.0070

Max-eigenvalue test indicates no co-integration' at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Co-integrating Coefficients (normalized by b*S11*b=l):

LOGNET_FDI	LOGGDP
-0.601839	0.528569
0.337099	-1.198718

Unrestricted Adjustment Coefficients (alpha):

D(LOGNET_FDI)	0.356927	-0.572332
D(LOGGDP)	-0.060751	-0.071549

1 Co-integrating Equation(s):	Log likelihood	-38.36405
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Normalized Co-integrating coefficients (standard error in parentheses)

LOGNET_FDI	LOGGDP
1.000000	-0.878256
	(0.44900)

Adjustment coefficients (standard error in parentheses)

D(LOGNET_FDI)	-0.214813
	(0.16387)
D(LOGGDP)	0.036562
	(0.02218)

Null Hypothesis: LOGEO has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.265401	0.1897
Test critical values:		
1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGEO)
Method: Least Squares
Date: 05/14/20 Time: 06:33
Sample (adjusted): 1993 2019
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGEO(-1)	-0.253405	0.111859	-2.265401	0.0324
C	2.470309	1.052441	2.347218	0.0271
R-squared	0.170318	Mean dependent var		0.116162
Adjusted R-squared	0.137131	S.D. dependent var		0.931827
S.E. of regression	0.865581	Akaike info criterion		2.620356
Sum squared resid	18.73077	Schwarz criterion		2.716344
Log likelihood	-33.37481	Hannan-Quinn criter.		2.648898
F-statistic	5.132043	Durbin-Watson stat		2.449228
Prob(F-statistic)	0.032406			

Null Hypothesis: LOGEO has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.822013	0.2020
Test critical values:		
1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGEO)
Method: Least Squares
Date: 05/14/20 Time: 06:41
Sample (adjusted): 1993 2019
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGEO(-1)	-0.556597	0.197234	-2.822013	0.0094
C	3.079193	1.059869	2.905259	0.0078
@TREND("1974")	0.068994	0.037711	1.829554	0.0798
R-squared	0.271870	Mean dependent var		0.116162
Adjusted R-squared	0.211193	S.D. dependent var		0.931827
S.E. of regression	0.827601	Akaike info criterion		2.563867
Sum squared resid	16.43815	Schwarz criterion		2.707849
Log likelihood	-31.61221	Hannan-Quinn criter.		2.606681
F-statistic	4.480581	Durbin-Watson stat		2.028117

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Prob(F-statistic) 0.022208

Null Hypothesis: D(LOGEO) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.896349	0.0001
Test critical values:		
1% level	-3.724070	
5% level	-2.986225	
10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOGEO,2)

Method: Least Squares

Date: 05/14/20 Time: 06:49

Sample (adjusted): 1995 2019

Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGEO(-1))	-2.013458	0.341475	-5.896349	0.0000
D(LOGEO(-1),2)	0.508820	0.218269	2.331161	0.0293
C	0.237431	0.177954	1.334225	0.1958
R-squared	0.736944	Mean dependent var		-0.030882
Adjusted R-squared	0.713030	S.D. dependent var		1.573627
S.E. of regression	0.842985	Akaike info criterion		2.608432
Sum squared resid	15.63373	Schwarz criterion		2.754697
Log likelihood	-29.60540	Hannan-Quinn criter.		2.648999
F-statistic	30.81623	Durbin-Watson stat		1.815216
Prob(F-statistic)	0.000000			

Null Hypothesis: LOGGCF has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.425123	0.8398
Test critical values:		
1% level	-4.175640	
5% level	-3.513075	
10% level	-3.186854	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGGCF)
Method: Least Squares
Date: 05/14/20 Time: 07:13
Sample (adjusted): 1975 2019
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGGCF(-1)	-0.079586	0.055845	-1.425123	0.1615
C	0.506174	0.324452	1.560089	0.1262
@TREND("1974")	0.017234	0.009095	1.895038	0.0650
R-squared	0.139236	Mean dependent var		0.157266
Adjusted R-squared	0.098248	S.D. dependent var		0.194696
S.E. of regression	0.184885	Akaike info criterion		-0.473828
Sum squared resid	1.435660	Schwarz criterion		-0.353383
Log likelihood	13.66112	Hannan-Quinn criter.		-0.428927
F-statistic	3.396944	Durbin-Watson stat		2.309227
Prob(F-statistic)	0.042910			

Null Hypothesis: D(LOGGCF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.044295	0.0000
Test critical values:		
1% level	-3.588509	
5% level	-2.929734	
10% level	-2.603064	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGGCF,2)
Method: Least Squares
Date: 05/14/20 Time: 07:21
Sample (adjusted): 1976 2019
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGGCF(-1))	-1.081018	0.153460	-7.044295	0.0000
C	0.172235	0.038253	4.502557	0.0001
R-squared	0.541595	Mean dependent var		0.003686
Adjusted R-squared	0.530681	S.D. dependent var		0.288985
S.E. of regression	0.197975	Akaike info criterion		-0.356966
Sum squared resid	1.646147	Schwarz criterion		-0.275866
Log likelihood	9.853247	Hannan-Quinn criter.		-0.326890
F-statistic	49.62209	Durbin-Watson stat		1.936650

Prob(F-statistic) 0.000000

Null Hypothesis: LOGGDP has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	4.938071	1.0000
Test critical values:		
1% level	-3.584743	
5% level	-2.928142	
10% level	-2.602225	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LOGGDP)
 Method: Least Squares
 Date: 05/14/20 Time: 07:27
 Sample (adjusted): 1975 2019
 Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGGDP(-1)	0.065721	0.013309	4.938071	0.0000
C	-1.485427	0.332064	-4.473314	0.0001
R-squared	0.361871	Mean dependent var		0.150662
Adjusted R-squared	0.347031	S.D. dependent var		0.184267
S.E. of regression	0.148900	Akaike info criterion		-0.927657
Sum squared resid	0.953363	Schwarz criterion		-0.847360
Log likelihood	22.87227	Hannan-Quinn criter.		-0.897723
F-statistic	24.38455	Durbin-Watson stat		1.513280
Prob(F-statistic)	0.000012			

Null Hypothesis: LOGGDP has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 9 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	3.739884	1.0000
Test critical values:		
1% level	-4.234972	
5% level	-3.540328	
10% level	-3.202445	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGGDP)
Method: Least Squares
Date: 05/14/20 Time: 07:35
Sample (adjusted): 1984 2019
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGGDP(-1)	0.350418	0.093698	3.739884	0.0010
D(LOGGDP(-1))	-0.128043	0.234061	-0.547050	0.5894
D(LOGGDP(-2))	-0.291502	0.244618	-1.191658	0.2450
D(LOGGDP(-3))	-0.535523	0.241274	-2.219566	0.0362
D(LOGGDP(-4))	-0.031607	0.244713	-0.129158	0.8983
D(LOGGDP(-5))	-0.403305	0.231465	-1.742403	0.0942
D(LOGGDP(-6))	-0.784954	0.242271	-3.239988	0.0035
D(LOGGDP(-7))	-0.100129	0.269110	-0.372074	0.7131
D(LOGGDP(-8))	-0.021293	0.269434	-0.079028	0.9377
D(LOGGDP(-9))	-1.153356	0.278803	-4.136806	0.0004
C	-7.765993	2.042062	-3.803015	0.0009
@TREND("1974")	-0.018901	0.008985	-2.103638	0.0461
R-squared	0.740765	Mean dependent var		0.171966
Adjusted R-squared	0.621950	S.D. dependent var		0.199805
S.E. of regression	0.122851	Akaike info criterion		-1.094481
Sum squared resid	0.362219	Schwarz criterion		-0.566641
Log likelihood	31.70065	Hannan-Quinn criter.		-0.910250
F-statistic	6.234567	Durbin-Watson stat		2.170903
Prob(F-statistic)	0.000092			

Null Hypothesis: D(LOGGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.051707	0.2646
Test critical values:		
1% level	-3.588509	
5% level	-2.929734	
10% level	-2.603064	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGGDP,2)
Method: Least Squares
Date: 05/14/20 Time: 07:39
Sample (adjusted): 1976 2019
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGGDP(-1))	-0.442448	0.215649	-2.051707	0.0465

CX

C	0.081975	0.038339	2.138146	0.0384
R-squared	0.091096	Mean dependent var		0.024464
Adjusted R-squared	0.069455	S.D. dependent var		0.179865
S.E. of regression	0.173506	Akaike info criterion		-0.620819
Sum squared resid	1.264383	Schwarz criterion		-0.539720
Log likelihood	15.65802	Hannan-Quinn criter.		-0.590744
F-statistic	4.209500	Durbin-Watson stat		1.539815
Prob(F-statistic)	0.046467			

Null Hypothesis: D(LOGGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.651516	0.0367
Test critical values:		
1% level	-4.180911	
5% level	-3.515523	
10% level	-3.188259	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGGDP,2)
Method: Least Squares
Date: 05/14/20 Time: 07:44
Sample (adjusted): 1976 2019
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGGDP(-1))	-0.876258	0.239971	-3.651516	0.0007
C	-0.030473	0.050018	-0.609246	0.5457
@TREND("1974")	0.007185	0.002292	3.134359	0.0032
R-squared	0.266785	Mean dependent var		0.024464
Adjusted R-squared	0.231019	S.D. dependent var		0.179865
S.E. of regression	0.157726	Akaike info criterion		-0.790165
Sum squared resid	1.019980	Schwarz criterion		-0.668516
Log likelihood	20.38364	Hannan-Quinn criter.		-0.745052
F-statistic	7.459063	Durbin-Watson stat		1.450930
Prob(F-statistic)	0.001727			

Null Hypothesis: LOGINF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, max lag=6)

t-Statistic Prob.*

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Augmented Dickey-Fuller test statistic		-2.265401	0.1897
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGINF)
Method: Least Squares
Date: 05/14/20 Time: 08:12
Sample (adjusted): 1993 2019
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGINF(-1)	-0.253405	0.111859	-2.265401	0.0324
C	2.470309	1.052441	2.347218	0.0271
R-squared	0.170318	Mean dependent var		0.116162
Adjusted R-squared	0.137131	S.D. dependent var		0.931827
S.E. of regression	0.865581	Akaike info criterion		2.620356
Sum squared resid	18.73077	Schwarz criterion		2.716344
Log likelihood	-33.37481	Hannan-Quinn criter.		2.648898
F-statistic	5.132043	Durbin-Watson stat		2.449228
Prob(F-statistic)	0.032406			

Null Hypothesis: LOGINF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.822013	0.2020
Test critical values:	1% level	-4.339330
	5% level	-3.587527
	10% level	-3.229230

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGINF)
Method: Least Squares
Date: 05/14/20 Time: 08:21
Sample (adjusted): 1993 2019
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGINF(-1)	-0.556597	0.197234	-2.822013	0.0094
C	3.079193	1.059869	2.905259	0.0078

@TREND("1974")	0.068994	0.037711	1.829554	0.0798
R-squared	0.271870	Mean dependent var		0.116162
Adjusted R-squared	0.211193	S.D. dependent var		0.931827
S.E. of regression	0.827601	Akaike info criterion		2.563867
Sum squared resid	16.43815	Schwarz criterion		2.707849
Log likelihood	-31.61221	Hannan-Quinn criter.		2.606681
F-statistic	4.480581	Durbin-Watson stat		2.028117
Prob(F-statistic)	0.022208			

Null Hypothesis: D(LOGINF) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.896349	0.0001
Test critical values:		
1% level	-3.724070	
5% level	-2.986225	
10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOGINF,2)

Method: Least Squares

Date: 05/14/20 Time: 08:22

Sample (adjusted): 1995 2019

Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGINF(-1))	-2.013458	0.341475	-5.896349	0.0000
D(LOGINF(-1),2)	0.508820	0.218269	2.331161	0.0293
C	0.237431	0.177954	1.334225	0.1958
R-squared	0.736944	Mean dependent var		-0.030882
Adjusted R-squared	0.713030	S.D. dependent var		1.573627
S.E. of regression	0.842985	Akaike info criterion		2.608432
Sum squared resid	15.63373	Schwarz criterion		2.754697
Log likelihood	-29.60540	Hannan-Quinn criter.		2.648999
F-statistic	30.81623	Durbin-Watson stat		1.815216
Prob(F-statistic)	0.000000			

Null Hypothesis: LOGLQ has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
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Augmented Dickey-Fuller test statistic		-1.959444	0.3018
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGLQ)
Method: Least Squares
Date: 05/14/20 Time: 08:26
Sample (adjusted): 1993 2019
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGLQ(-1)	-0.178575	0.091136	-1.959444	0.0613
C	1.688038	0.800889	2.107706	0.0453
R-squared	0.133131	Mean dependent var		0.148752
Adjusted R-squared	0.098456	S.D. dependent var		0.853060
S.E. of regression	0.809978	Akaike info criterion		2.487568
Sum squared resid	16.40161	Schwarz criterion		2.583556
Log likelihood	-31.58216	Hannan-Quinn criter.		2.516110
F-statistic	3.839422	Durbin-Watson stat		2.475634
Prob(F-statistic)	0.061301			

Null Hypothesis: LOGLQ has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.231717	0.4544
Test critical values:	1% level	-4.339330
	5% level	-3.587527
	10% level	-3.229230

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGLQ)
Method: Least Squares
Date: 05/14/20 Time: 08:27
Sample (adjusted): 1993 2019
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGLQ(-1)	-0.381057	0.170746	-2.231717	0.0352
C	1.762808	0.788097	2.236790	0.0349
@TREND("1974")	0.052206	0.037496	1.392325	0.1766

R-squared	0.197918	Mean dependent var	0.148752
Adjusted R-squared	0.131078	S.D. dependent var	0.853060
S.E. of regression	0.795189	Akaike info criterion	2.483965
Sum squared resid	15.17580	Schwarz criterion	2.627946
Log likelihood	-30.53352	Hannan-Quinn criter.	2.526778
F-statistic	2.961067	Durbin-Watson stat	2.166539
Prob(F-statistic)	0.070896		

Null Hypothesis: D(LOGLQ) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, max lag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.596575	0.0000
Test critical values:		
1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGLQ,2)
Method: Least Squares
Date: 05/14/20 Time: 08:28
Sample (adjusted): 1994 2019
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGLQ(-1))	-1.288717	0.195361	-6.596575	0.0000
C	0.186231	0.169266	1.100225	0.2821

R-squared	0.644522	Mean dependent var	-0.012895
Adjusted R-squared	0.629711	S.D. dependent var	1.395620
S.E. of regression	0.849254	Akaike info criterion	2.584887
Sum squared resid	17.30958	Schwarz criterion	2.681664
Log likelihood	-31.60353	Hannan-Quinn criter.	2.612755
F-statistic	43.51480	Durbin-Watson stat	2.080693
Prob(F-statistic)	0.000001		

Null Hypothesis: LOGNET_FDI has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.472390	0.8829

Test critical values:	1% level	-3.679322
	5% level	-2.967767
	10% level	-2.622989

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOGNET_FDI)

Method: Least Squares

Date: 05/14/20 Time: 09:29

Sample (adjusted): 1982 2019

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGNET_FDI(-1)	-0.050369	0.106627	-0.472390	0.6406
D(LOGNET_FDI(-1))	-0.260731	0.227312	-1.147016	0.2618
C	1.526179	2.043011	0.747024	0.4618

R-squared	0.086863	Mean dependent var	0.514731
Adjusted R-squared	0.016622	S.D. dependent var	1.497379
S.E. of regression	1.484882	Akaike info criterion	3.726245
Sum squared resid	57.32677	Schwarz criterion	3.867690
Log likelihood	-51.03056	Hannan-Quinn criter.	3.770544
F-statistic	1.236635	Durbin-Watson stat	1.598931
Prob(F-statistic)	0.306880		

Null Hypothesis: LOGNET_FDI has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.477715	0.0590
Test critical values:		
	1% level	-4.273277
	5% level	-3.557759
	10% level	-3.212361

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOGNET_FDI)

Method: Least Squares

Date: 05/14/20 Time: 09:30

Sample (adjusted): 1981 2019

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGNET_FDI(-1)	-0.718226	0.206522	-3.477715	0.0016
C	7.053973	2.404351	2.933837	0.0065
@TREND("1974")	0.231914	0.059803	3.877947	0.0006

R-squared	0.342113	Mean dependent var	0.271649
Adjusted R-squared	0.296742	S.D. dependent var	1.649765
S.E. of regression	1.383501	Akaike info criterion	3.576172
Sum squared resid	55.50820	Schwarz criterion	3.713585
Log likelihood	-54.21875	Hannan-Quinn criter.	3.621720
F-statistic	7.540272	Durbin-Watson stat	1.491434
Prob(F-statistic)	0.002308		

Null Hypothesis: D(LOGNET_FDI) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, max lag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.475588	0.0000
Test critical values:		
1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOGNET_FDI,2)

Method: Least Squares

Date: 05/14/20 Time: 09:25

Sample (adjusted): 1982 2019

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGNET_FDI(-1))	-1.307277	0.201878	-6.475588	0.0000
C	0.570070	0.274161	2.079322	0.0472

R-squared	0.608317	Mean dependent var	0.334636
Adjusted R-squared	0.593810	S.D. dependent var	2.296085
S.E. of regression	1.463365	Akaike info criterion	3.665826
Sum squared resid	57.81879	Schwarz criterion	3.760122
Log likelihood	-51.15448	Hannan-Quinn criter.	3.695359
F-statistic	41.93324	Durbin-Watson stat	1.614785
Prob(F-statistic)	0.000001		