The Impact of Foreign Direct Investment (FDI) on Ethiopia's Economic Growth

A dissertation submitted to the College of Economics and Management Science, Department of Economics, University of South Africa, in fulfilment of the requirements for the degree of Master of Commerce (M. Com)

By

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DECLARATION

I declare that the Impact of Foreign Direct Investment on Ethiopia's Economic Growth based on a time series data and ARDL approach is my own work and that all the sources used have been acknowledged with complete references.

Date: April 15, 2021

Name: Siyoum Gebrehiwot Woldemedhin

Signature: _____

DEDICATION

This dissertation is dedicated to my brother, Teklu Haile, my wife, Woineshet Begi, and my sons, Mihiret Siyoum and Yishak Siyoum.

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Above all, my greatest thanks go to The Almighty God for His gracious gift of time, space, knowledge, strength and endurance to start and complete this journey.

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ABSTRACT

The study aims to investigate how FDI impacts the economic growth of Ethiopia. To investigate this major research problem, it sets four interrelated objectives. The first objective aims to investigate the pattern of FDI inflows to understand the trend of inflows across different regimes. The second objective focuses on determining the impact or relationship between FDI and economic growth. The third objective targets determining the causality relationship between the two; and the fourth objective gives policy recommendations based on the results and discussions in the study. The study pursues a quantitative approach to achieve the objectives. The four econometric models used comprise the Auto Regressive Distributed Lag (ARDL) co-integration technique; short run and long run ARDL models; and Toda-Yamamoto (TY) causality models. These models used time series data for the period 1970 to 2018 from UNCTAD (United Nations Conference on Trade and Development) and IMF (International Monetary Fund) sources for variables of GDP, FDI, Gross Fixed Capital Formation, Labour, Trade and Consumer Price Index (CPI). Before a co-integration test, unit root analysis is made on the variables and the result shows that all variables except FDI are I(1) data; whereas, FDI is I(0) data. The co-integration test also indicates long-run relationships among the variables. The long-run model result shows a negative relationship between FDI and economic growth. All variables are used in their logged forms. The TY model also shows the result of unidirectional causality running from FDI to economic growth in Ethiopia. The negative long-run relationship between FDI and economic growth casts doubt whether FDI has benefited the economic growth of Ethiopia. Policy recommendations are thus drawn to meet the fourth objective based on the results of the study to provide policy implications to reverse the situation and harness the benefits from FDI.

TSHOBOKANYO

Thutopatlisiso eno e ikaeletse go sekaseka gore peeletso ya tlhamalalo ya boditšhaba (FDI) e ema jang kgolo ya ikonomi ya Ethiopia. Go sekaseka bothata jono jo bogolo jwa patlisiso , go beilwe maikemisetso a mane a a golaganang. Boikemisetso jwa ntlha bo ikaeletse go sekaseka paterone ya dikelelogare tsa FDI le go tlhaloganya mokgwa wa dikelelogare go kgabaganya dikarolo tse di farologaneng. Boikemisetso jwa bobedi bo totile go bona kamo kgotsa kgolagano magareng ga FDI le kgolo ya ikonomi. Boikemisetso jwa boraro bo amana le tlhomamiso ya kgolagano magareng ga bobedi; mme boikemisetso jwa bone bo neela dikatlenegiso tsa pholisi tse di ikaegileng ka dipholo le dipuisano mo thutopatlisisong. Thutopatlisiso e dirisa molebo o o lebelelang dipalopalo go fitlhelela maikemisetso. Dikao tse nne tsa ikonometeriki tse di dirisitsweng, di na le thekeniki ya tsenyeletsommogo ya *Auto Regressive Distributed Lag* (ARDL); dikao tsa ARDL tsa tsamaisokhutshwane le tsamaisotelele; le dikao tsa kgolagano tsa *Toda-Yamamoto* (TY). Dikao tseno di dirisitse *data* ya tatelano ya nako ya paka ya 1970 go ya go 2018 go tswa mo metsweding ya UNCTAD (*United Nations Conference on Trade and Development*) le IMF (*International Monetary Fund*) ya dipharologantsho tsa GDP, FDI, popego ya kapitale e e lolameng yotlhe, badiri, kgwebisano le tshupane ya ditlhotlhwa tsa badirisi (*consumer price index* (CPI)). Pele ga teko ya tsenyeletsommogo, go dirwa tokololo ya modi wa yuniti mo dipharologantshong, dipholo di bontsha gore dipharologantsho tsotlhe kwa ntle ga FDI ke *data* ya I(1); e le gore FDI ke *data* ya I(0). Teko ya tsenyeletsommogo e bontsha gape dikgolagano tsa tsamaisotelele magareng ga dipharologantsho. Dipholo tsa sekao sa tsamaisotelele di bontsha kgolagano e e sa siamang magareng ga FDI le kgolo ya ikonomi. Dipharologantsho tsotlhe di dirisitswe mo dipopegong tse di golagantsweng tsa tsona. Sekao sa TY se bontsha gape diponagalo tsa kgolagano ya ntlha e le nngwe e e tsamayang go tswa go FDI go ya kwa kgolong ya ikonomi ya Ethiopia. Kgolagano ya tsamaisotelele e e sa siamang magareng ga FDI le kgolo ya ikonomi e baka pelaelo ya gore a mme FDI e ungwetse kgolo ya ikonomi ya Ethiopia. Ka jalo, go dirilwe dikatlenegiso tsa pholisi go fitlhelela boikemisetso jwa bone go ikaegilwe ka dipholo tsa thutopatlisiso go tlamela ka dikakanyo tsa pholisi go fetola seemo le go laola maungo a FDI.

CONTENTS

ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criteria
AfDB	African Development Bank
AO	Additive Outlier
ARDL	Autoregressive Distributed Lag (Model)
ARMA	Autoregressive Moving Average
BG	Breusch Godfrey (Test)
BPG	Breusch-Pagan- Godftey (Test)
BLUE	Best Linear Unbiased Estimator
CPI	Consumer Price Index
CUSUM	Cumulative Sum of Residuals
CUSUMSQ	Cumulative Sum of Squares of Residuals
DGLS	Dynamic Generalized Least Square (Method)
DF	Dickey Fuller
DOLS	Dynamic Ordinary Least Squares
ECM	Error Correction Model
EEA	Ethiopian Economics Association
EIC	Ethiopian Investment Commission
EP	Export Promotion (Strategy)
EPRDF	Ethiopian Peoples' Revolutionary Democratic Front
FDI	Foreign Direct Investment
FGLS	Feasible Generalized Least Squares
FMOLS	Fully Modified Ordinary Least Squares
FNG	Federal Negarit Gazeta
GDP	Gross Domestic Product
GLS	Generalized List Square (Method)
GMM	Generalized Method of Moments
HQ	Hannan Quinn (Test)

ICT	Information and Communication Technology
IDP	Investment Development Path (Theory)
IMF	International Monetary Fund
IO	Innovation Outlier
IP	Import Strategy (Strategy)
IS	Import Substitution (IS)
JB	Jarque Bera (Test)
LM	Lagrange Multiplier
MNCs	Multi-National Corporations
MoFED	Ministry of Federal Economic Cooperation and Development
NOI	Net Outward Investment
NPC	National Planning Commission (of Ethiopia)
OECD	Organization of Economic Cooperation and Development
OLI	Ownership Location Internalization (Theory)
OLS	Ordinary Least Square
PP	Phillips Perron
R & D	Research and Development
RESET	Regression Specification Error Test
RGDP	Real Gross Domestic Product
SEM	Simultaneous Econometric Model
SIC	Schwartz Information Criteria
2SLS	Two Stage Least Squares
SSA	Sub-Saharan (Countries)
TY	Toda Yamamoto (Model)
UK	United Kindgdom
UNCTAD	United Nations Conference on Trade and Agreement
UNSD	United Nations Statistics Division
USD	United States Dollar
VAR	Vector Autoregressive

VECM	Vector Error Correction Model
WB	World Bank

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CHAPTER 1: INTRODUCTION

1.1 Background

Foreign direct investment (FDI) is regarded as one of the inputs of development which countries across the world have been competing for. Globally, countries have intensified efforts to attract FDI inflows through the creation of business-friendly legal and regulatory environments, implementing stable political and security systems, stable macro-economic environment and increased development of infrastructure (World Bank, 2018b). As a consequence, global FDI inflow has grown significantly over the last five decades. FDI inflows increased from USD 10.2 million in 1970 to USD 1.87 trillion by 2016. In 2017, developed and developing economies accounted for 63% and 37% of global FDI, respectively, although the inflow declined to USD 1.2 trillion in 2018 (UNCTAD, 2018; World Bank, 2019). In developing economies, Asia had the dominant share of FDI (25%) while Latin America and Caribbean countries accounted for 7% of the total developing countries FDI inflows. However, Africa's share in global FDI inflows averaged around 3% compared to the above regions (UNCTAD 2018a).

It has been posited that Foreign Direct Investment has made a positive contribution to economic growth globally, not only because it enhances technical know-how, skills, and productivity of the workforce, but also it generates business for local firms (World Bank, 2018b). However, FDI is not always praised for its contribution to growth across the board. For example, the Dependency Theory, prominent in the 1960s and 1970s, has been used to criticise FDI for aggravating inequalities between the developing and developed world for a number of reasons. Firstly, the benefits of FDI are disproportionately distributed between the host and home countries as the economic surplus generated is usually siphoned off by the latter. Secondly, Multinational Corporations (MNCs) may create distortions in host countries as they crowd out domestic companies and change domestic tastes. Thirdly, the MNC subsidiaries, along with their parent companies, often have the capacity to influence the host country's policies for the benefit of home countries. (Farny, 2016; Firebaugh, 1992; Todaro, 2009).

Significant FDI inflows started in Ethiopia between 1960 and1974, a period that coincided with the emergence of the capitalist economy. Foreign Direct Investment grew in line with the growth of GDP which averaged around 4% over the same period (Geda & Befikadu, 2005). Then, between 1960 and 1974 the introduction of the first Investment Code and labour union in the country helped to promote investment (Markakis, 2011). According to UNCTAD

(2018a), FDI inflows increased from USD 4 million in 1970 to USD 29 million in 1974. However, between 1974 to 1991 (the Derg Military Regime era), a sharp fall in FDI inflows was observed as the government intervention policy was not conducive to FDI. Woldekidan (2015) explains that the reversal of FDI inflows in the country between 1974 to 1991 was due to the absence of policies to incentivise the foreign investment.

Ethiopia's FDI inflow revived after the Derg Regime was toppled by Ethiopian Peoples' Revolutionary Democratic Forces (EPRDF) in May 1991 (Geda & Befikadu, 2005). In post-1992, the FDI inflow increased from USD 200 million in 1992 to USD 3.6 billion by 2017 with an average annual growth rate of more than 33.5% (UNCTAD, 2018b), concomitant to Ethiopia's economic growth that averaged 10% after 1992. Consequently, Ethiopia was the second highest recipient of FDI in Africa next to Egypt in 2017 (UNCTAD (2018b).

This notable growth in FDI inflow was mainly due to a series of measures taken by the Ethiopian government to speed up the integration process of the country's economy into the world economy via wider participation of the private sector (MoFED, 2010). For instance, following the first investment proclamation in 1992, the establishment of the Ethiopian Investment Office (now the Investment Commission) contributed significantly to the increase in FDI inflows (FNG, 2002). In addition, the Ethiopian Investment Commission (EIC) has been encouraging foreign investors to invest in key sectors, including manufacturing and agro-processing. Further, the establishment of the Ethiopian Privatisation Agency[1] in 1994 to promote the role of the private sector in economic growth through transfer of public enterprises to private investors (IMF, 1999) allowed a number of state firms to be transferred to big foreign companies. The government has also taken measures to promote the export sector by harnessing the participation of the private sector in the sector. Some of these measures included allowing firms engaged in agriculture and agro-processing to enjoy advantages such as, tax holidays that range between eight and nine years, exemption of tax on exports with the exception of semi-processed hides and skins, and exemption of duties and taxes on purchased goods for production of export products (Woldekidan, 2015).

Although Ethiopia has shown significant improvements in attracting globally scarce resources, what is vital is the contribution of FDI to the country's growth. Understanding the dynamic relationship between FDI and economic growth is key for Ethiopia's economic growth agenda.

[1] The Ethiopian Privatisation Agency is now known as the Ethiopian Privatisation and Public Enterprises Supervising Agency.

It is against this background that this study aims to investigate the relationship between FDI and the country's economic growth.

1.2 Statement of the Problem

FDI inflows into Ethiopia has varied over decades along with political regimes. There was a modest increase in FDI inflows during the Emperor Hailesilassie regime (1930-1973) that coincided with the emergence of capitalism, especially, for the period 1960-1973. FDI inflows into the country that was USD 4 Million in 1970 increased to USD 29 Million by 1973 (Markakis, 2011; UNCTAD, 2018a). FDI inflows plummeted to zero and then negative values (disinvestment) during the Derg regime (union of military men) between 1974 and 1991. This was partly due to the adoption of the socialism ideology by the military regime that resulted, not only in nationalization of private companies, but also capital flight out of the country (Geda et al. 2005). A revival of FDI inflows occurred after the overthrow of the military regime by the Ethiopian Revolutionary Forces (EPRDF) in 1991. Consequently, following a series of reforms by the EPRDF government (now transformed into Biltsigina party, meaning prosperity party) to reinstate the market economy (UNCTAD, 2018a), FDI inflows not only increased to USD 200 Million in 1992, but also rose to a record high USD 3.6 Billion by 2017.

In many countries, especially, in the South East Asian economies, FDI has historically been one of the major contributors of economic growth via bringing or strengthening structural transformation (Yue, 2007). However, the importance or role of FDI to Ethiopia's economic growth appears limited. That is, despite the remarkable growth of FDI inflow to the country, especially, during the EPRDF regime, FDI contribution to its growth is seen to be negligible or not positive. As a consequence, the economy is still highly dependent on the agriculture sector that accounts for 40 percent of the GDP, 77.3 percent of employment of the labour force and 37 percent of foreign exchange earnings. The industrial sector constitutes only 17 percent of the GDP, greatly constrained by the poor performance of the manufacturing sector (World Bank, 2018b; World Bank, 2014). Ethiopia's economic growth in the past decades seems rather driven by the government massive investment in infrastructure, i.e., roads, power, industrial parks and other infrastructure investments (World Bank, 2019b). This trend arouses interest in this study to investigate to what extent FDI has impacted or contributed to Ethiopia's economic growth.

The impact of FDI on Ethiopia's economic growth has not been adequately studied both in focus and method. Regarding the focus, only a few FDI-Growth nexus studies have investigated the effect of FDI on Ethiopia's economic growth. Most of the studies focus on examining the determinants of FDI or economic growth with minimal attention given to FDI-economic growth relationships. Regarding the methodology, flaws on the use of appropriate econometric techniques are prevalent in Ethiopian FDI-economic growth literature. Methodological flaws range from applications of OLS techniques on time series data without unit root test to the use of incorrect techniques to investigate the nexus between FDI and economic growth. These problems lead to spurious and or unreliable regression results.

The study thus contributes to the FDI-economic growth literature in general, and to Ethiopia by filling these research focus and methodology gaps through the investigation of the impact of FDI on Ethiopia's economic growth.

1.3 Research Objectives

The main objective of this study is to examine the relationship between FDI and economic growth in Ethiopia. Specifically, the study intends to:

1. Provide an understanding of the trend of FDI and economic growth in Ethiopia over the study period;
2. Determine the impact of FDI on economic growth in Ethiopia;
3. Determine the direction of causality between FDI and economic growth in Ethiopia; and
4. Provide policy recommendations based on the findings of the study.

1.4 Significance of the Study

FDI is documented to contribute significantly to the economic growth of many developing countries, especially, via enhancement of structural transformation, burgeoning of exports, enabling technological and know-how transfers and increasing employment. Although the inflow of this scarce resource has been increasing in Ethiopia over time, its impact on the country's economic growth has not been comprehensively examined. Despite being a preferred destination in East Africa for FDI, quantity may not necessarily translate into effectiveness. Understanding the effectiveness of FDI inflows in enhancing the country's economic growth is of paramount importance. This study is therefore significant for three main reasons. First, the few available FDI studies on Ethiopia have mainly focused on investigating the

determinants of FDI. In this regard, the study contributes its share to the FDI-economic growth literature as it targets the nexus between FDI and Ethiopia's economic growth. Second, the handful of studies that examine the impact of FDI on Ethiopia's economic growth are not adequate both in depth and scope. The study thus renders its importance by giving a more comprehensive scope to the nexus between FDI-economic growth for Ethiopia.

Third, this study, through the determination of the relationship between FDI and economic growth and the direction of causality, examines the effectiveness or impact of FDI on economic growth in Ethiopia thereby providing policy recommendations supported by empirical analysis to harness the benefits from FDI inflow. From this perspective, the results of the study and subsequent recommendations will contribute to informing policy makers on how to boost the contribution of FDI to Ethiopia's economic growth.

1.5 Outline of the Study

The study is organised into six chapters including the introduction (chapter one). Chapter two discusses the background of economic growth and foreign direct investment (FDI) in Ethiopia; chapter three discusses the literature on FDI and economic growth; chapter four explains the conceptual framework; chapter five explains the methodology and data. Chapter six presents and discusses the estimation and analysis of results including policy recommendations.

Chapter 2: Background Information on Economic Growth and FDI in Ethiopia

2. 0 Introduction

Ethiopia covers an area of 1.104 Million km^2 and is located in the Horn of Africa. The country has a mountainous land which has a massive plateau at its centre in the ranges of 2000m-2500m above sea level (Markakis, 2011). Ethiopia, the second populous country in Africa with a population of plus 100 Million, has diverse socio-cultures of more than 70 ethnic groups. The population is dominated by the young (i.e. below age 30) who make up 64 percent of the population (EEA, 2017).

Though Ethiopia is still one of the poor countries in the world, it has experienced one of the fastest economic growths in the world during the post-1991 period after the military regime was toppled. Beginning from 2005, Ethiopia's economy has experienced a broad-based growth with growth rates averaging around 10 percent per annum (World Bank, 2018b). Consequently, the proportion of Ethiopians living in extreme poverty fell from 55.3 percent to 33.5 percent in the period since 2005 (World Bank, 2018a). This chapter provides a comprehensive explanation of the FDI inflows and economic growth in Ethiopia, trends in FDI inflows including FDI sources and policies.

2.1 Economic Growth and FDI in Ethiopia

The importance and magnitude of FDI inflows into the Ethiopian economy is strongly associated with the reigning political regimes the country has experienced (Woldekidan, 2015). Ethiopia's political landscape as related to FDI inflows can be categorized in three distinct categories: the Imperial Regime, the Derg Regime and EPRDF Regime.

(i) The Imperial Regime (1960-1973)

The Imperial Regime of Haile Silassie I started in 1930; however, since the first Commercial Code and Investment Code of Ethiopia were introduced in 1960 and 1963, respectively (Cheru, 2019), 1960 is considered as the beginning year for discussion of the regime. In this period (i.e. 1960-1973), FDI inflows was directed mainly to the manufacturing sector for import substitution (Markakis, 2011). The first investment code was also enacted which was dubbed 'the most liberal in Africa' at that time (Markakis, 2011). The first labour union was also organised in 1962 on which 50,000 workers signed up for memberships (Markakis, 2011).

Under this regime, the economy had market-system orientation though coffee, tobacco, petrol were state monopolies. Agriculture was dominant both as a major economic activity and export trade where coffee was the leading export product.

With regards to FDI, from 1950s many lowland areas with economic potential relatively close to population centres and trade routes were directly incorporated through foreign investment in commercial agriculture. For example, in the Awash Valley, British and Dutch cotton and sugarcane investments displaced pastoralists in Oromo and Afar regions (Harbeson, 1978). Similarly, foreign investors established sesame production in Humera, in the northwest (Puddu, 2012).

In this period, modern capitalism was beginning to take root though it was disrupted by internal power struggles. Food production could not cope up with the increasing demand then; in fact, it declined leading to the shocking famine of the 1970s. This finally resulted in massive opposition and the overthrow of the Imperial Regime which was then replaced by the Derg Regime (Markakis 2011).

(ii) The Derg Regime (1974-1991)

Between 1974 and 1991, a command economic system led by radical Marxist-Leninist ideology was introduced by the Derg,[2] as a result of which the pre-1974 market-oriented and imperial system was replaced. Land reform was made in 1975 with the slogan, "Land to the Tillers." Medium and large private enterprises were also nationalized, including banks and insurance companies.

During this regime, the annual GDP growth rate was 0.3 percent for the period 1974-1978 and per cap income growth rate was negative. The economy performed poorly, in general, aggravated by recurrent droughts and the severe war in the northern part of the country. The economy showed some recovery between 1978 and 1980 as GDP growth increased to 4.6 percent. However, between 1980 and1985, the economy deteriorated mainly due to droughts that affected the entire country. Guided by five-year and ten-year national plan, the government tried to reverse the situation; but the economy continued to stagnate at 2 percent growth rate with per capita income growth that continued to be negative (Geda et al. 2005).

[2] Derg means the committee of the unity of military men and policemen.

In this period, the FDI environment was not encouraging. Due to increasing national insecurity, political instability and continued nationalization of industries, FDI inflows were severely discouraged. The government tried to encourage FDI with the introduction of the joint venture proclamation in 1983; but it was not successful. Consequently, prolonged war, political instability, not only discouraged FDI, but also resulted in the overthrow of the Derg Regime which was then replaced by the Ethiopian People's Revolutionary Democratic Front (EPRDF) Regime (Markakis, 2011).

The Ethiopian Peoples' Revolutionary Democratic Front (EPRDF) and Biltsigina Party (Prosperity Party) Regime (1992-present day)

The post-1991 period witnessed a series of reforms to change the command economy system into a market-oriented system (MoFED 2010). The privatisation program started and the Ethiopian Privatisation Agency was established in 1994 (IMF, 1999). A series of Investment proclamations were also issued; foreign investors were incentivized with encouraging investment packages. These and other measures helped the country see a rise in FDI inflows in the early 1990s that averaged 8.2 Million USD between 1990 and 1995 (UNCTAD, 2004) and peaked at 3.6 Billion USD in 2017 (UNCTAD, 2017).

2.2 Trends in FDI Inflows and GDP in Ethiopia

Figure 2.1a below depicts the general trend in FDI inflows for the period 1970 to 2018 and indicates the significant change in FDI inflows after 1992. FDI inflows had been showing an increasing trend between 1970 and 1973 (see figure 2.1b), indicating that there had been some growth in FDI inflows during the period in line with the emerging capitalist system in the times of Emperor Haile Silassie I. The period 1974 to1991, however, saw a drastic declining trend in FDI inflows since the advent of the Derg Regime that introduced socialism into the country. This declining trend in FDI inflows is observable in figure 2.1(b) which shows FDI as a proportion of GDP. Net FDI inflows that was 29 Million USD at the end of the imperial regime declined averaging below zero, especially, between 1983 and 1987. In this period, inward FDI inflows not only declined, but also capital flight occurred due to the nationalization of private companies that took place in the period.

After 1991, FDI inflows began to increase following a series of fundamental reforms undertaken by the government. FDI inflows increased from zero in 1992 to 4 Billion USD in 2017 (World Bank 2018c; Hailu, 2017). Specifically, there was an upsurge of FDI inflows into Ethiopia after 2012 with an average growth of 50 percent per annum following export oriented

manufacturing foreign investment activities in industrial parks. This trend peaked at 4 Billion USD in 2017 (UNCTAD, 2020). The decline in FDI inflows that occurred after 2016 is mainly related to the political instability that prevailed in the country from 2015 up to the end of 2019 (see figure 2.1a that shows FDI inflows in millions of dollars and figure 2.1b that shows the ratio of FDI inflows to GDP).

Figure 2.1a Trend of FDI inflows into Ethiopia (1970 – 2018), Millions of Dollars

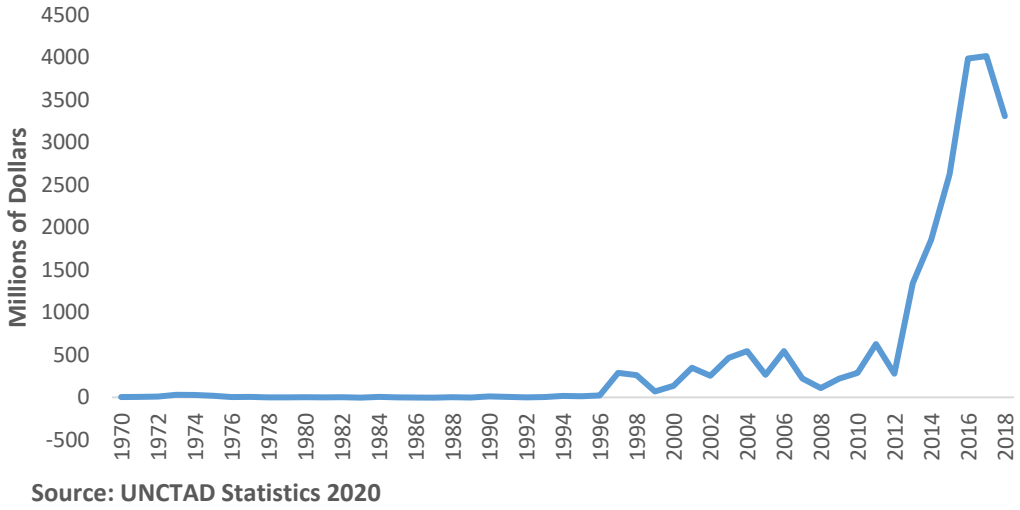
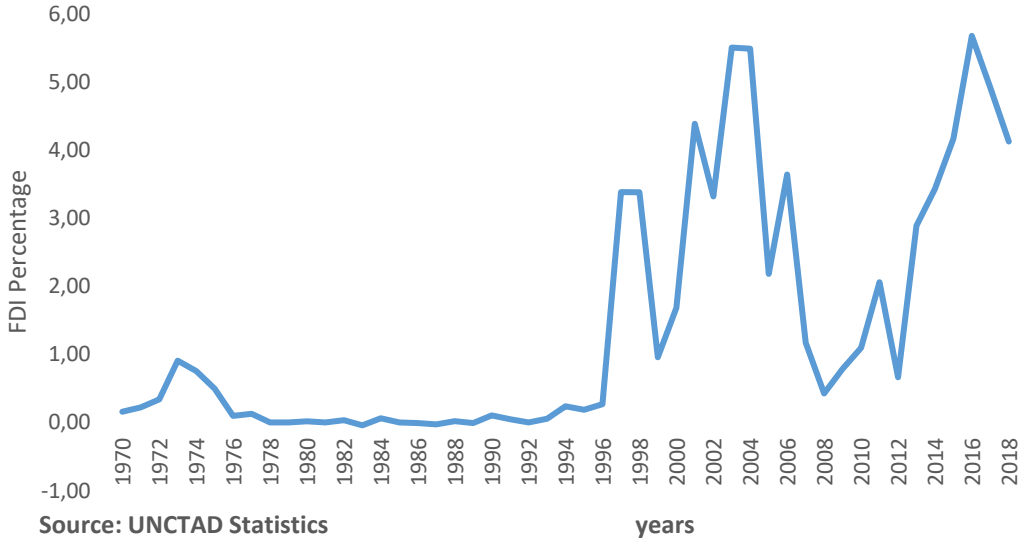


Figure 2.1b FDI as a percentage of GDP in Ethiopia (1970 – 2018)

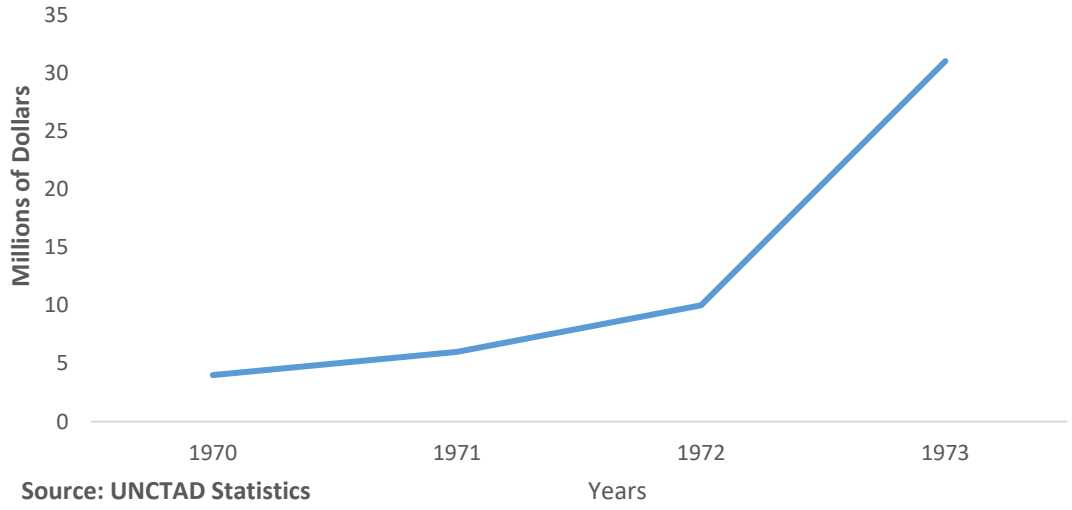


2.2.1 FDI Inflows by Political Regimes

(a) The Imperial Regime

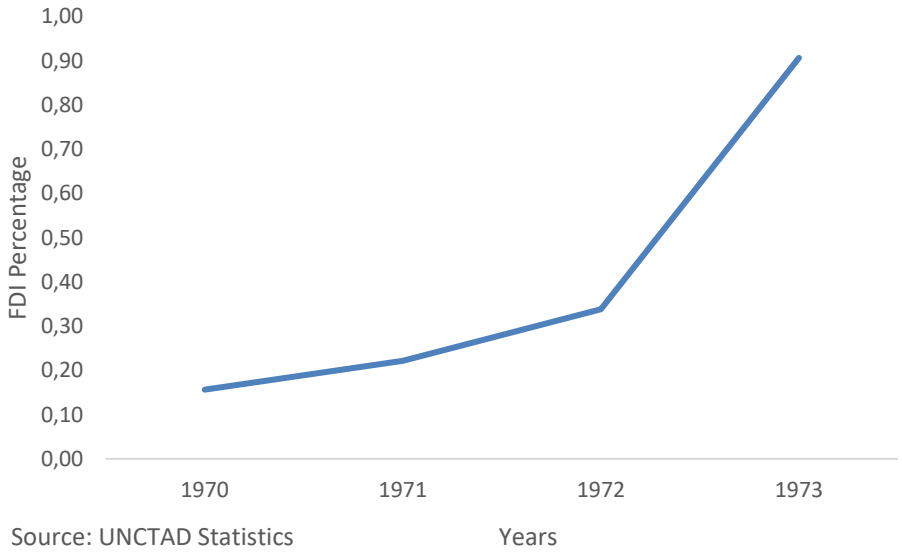
The flow of FDI into Ethiopia differed from one political regime to another. Figures 2.2a and 2.2b indicate rising FDI inflows during the imperial regime (1960-1973), mainly due to FDI activities of British and Dutch companies in large commercial farms of cotton and sugar cane in the Awash Valley, and sesame farms in Humera (Harbeson, 1978; Poddu, 2012). During this regime, modern capitalism was beginning to take root amidst the existing feudal system. The first investment code of the country was introduced in the beginning of 1960s, which not only stimulated FDI inflows to commercial farming, but also promoted investments in import substitution manufacturing industries (Markakis, 2011).

Figure 2.2a FDI inflows into Ethiopia (1970 – 1973), Million Dollars



Source: UNCTAD Statistics

Figure 2.2b FDI as a percentage of GDP (1970 – 1973)



Source: UNCTAD Statistics

(b) The Derg Regime

Figures 2.3a and figure 2.3b highlight the worst period for FDI inflows into Ethiopia. FDI inflows declined sharply, falling from USD 29 Million in the last year of the imperial regime to zero in 1983, after which followed a period of disinvestment for most of the years between 1985 and 1989 (UNCTAD, 2018a). This decline in FDI coincided with the time that the Derg Regime took power in 1974 and Marxist-Leninist doctrine was declared as the country's governing ideology. Lands were distributed to peasants with the popular slogan of the time, "Land to the Tiller;" and private companies were nationalized (Geda, 2003). All these events were not conducive for foreign investors and resulted in FDI being almost non-existent during the regime.

Figure: 2.3a FDI Inflows from 1974-1991, Millions Dollars

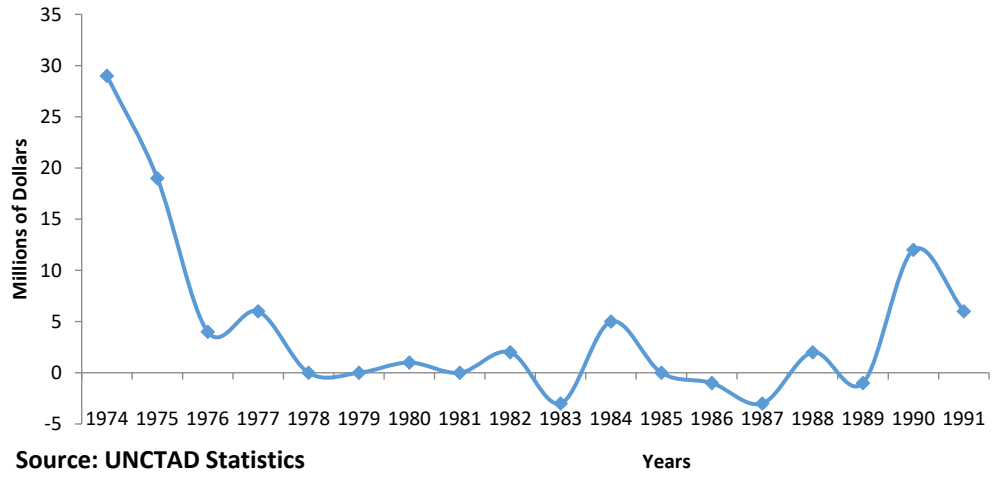
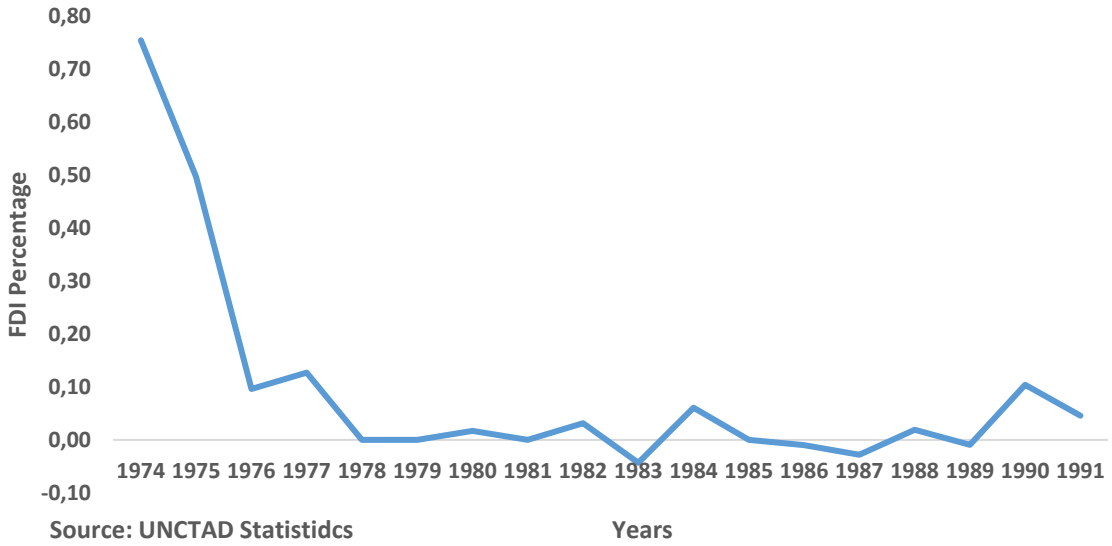


Figure: 2.3b FDI as a percentage of GDP from 1974-1991



(c) The EPRDF (now Biltsigina Party) Government

Figure 2.4a and figure 2.4b indicate notable increase in FDI inflows into the country after 1991 following a series of measures taken by the EPRDF Party (now transformed into Biltsigina Party, meaning, 'Prosperity Party') to reinstate the market economy (MoFED, 2010). The government made series of revisions of the investment proclamations to promote FDI inflows (UNCTAD, 2004); consequently, inflows began to pick up after 1991. The volatility of FDI inflows since mid1990s is related to variations of magnitudes of FDI projects that existed. The global financial and economic crises of 2008/2009 and the adverse impact of the Ethio-Eritrean conflict in the 2008-2010 period also negatively affected FDI inflows between 2009 and 2019. Promotion of Ethiopia's industrial park strategy that hinged on development of export-led

labour-intensive manufacturing industries was the main reason for the FDI upsurge after 2013 that peaked in 2016 (UNCTAD, 2018a; World Bank, 2015b). The government of Ethiopia implemented the industrial park development strategy by emulating the experiences of South-East Asian countries to address market failures related to land access, infrastructure and logistics costs (World Bank, 2015b).

Figure: 2.4a FDI Inflows from 1992-2018, Millions of Dollars

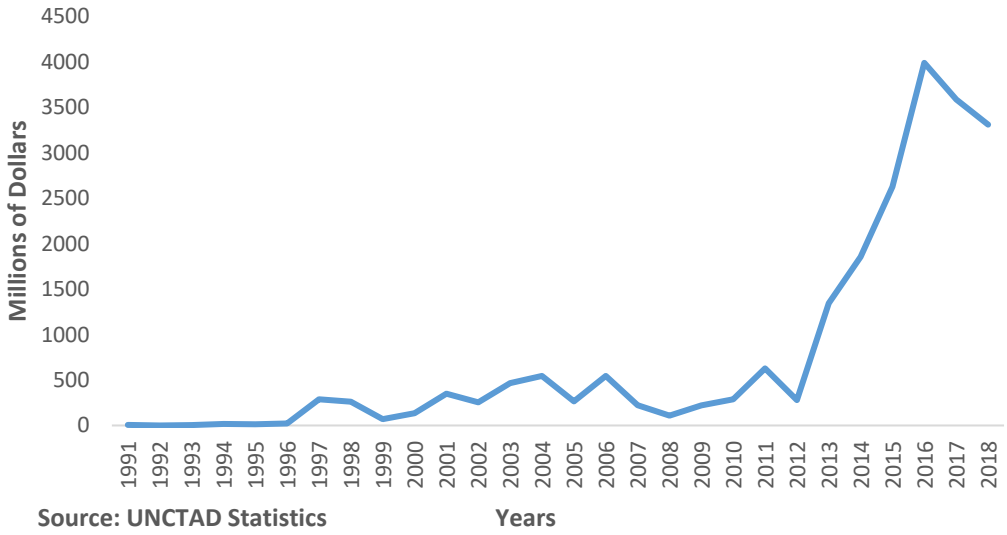
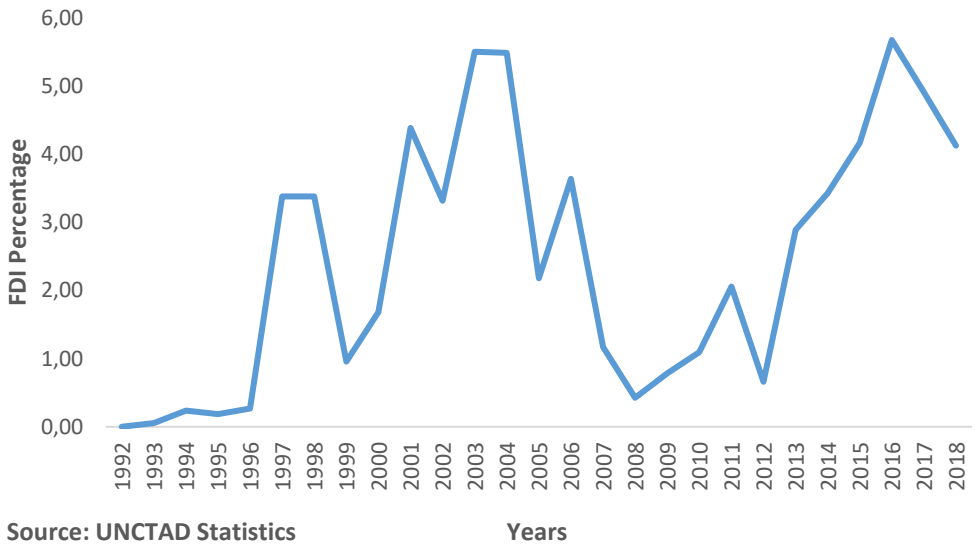


Figure: 2.4b FDI as a percentage of GDP (1992-2018)

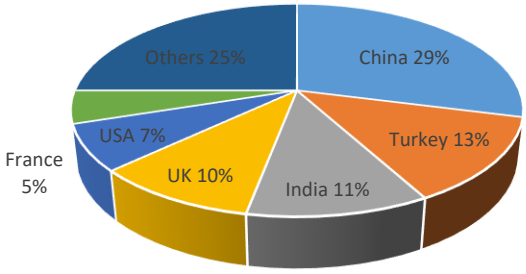


2.3 Ethiopia's FDI Sources and Policies

2.3.1 Sources of FDI Inflows to Ethiopia

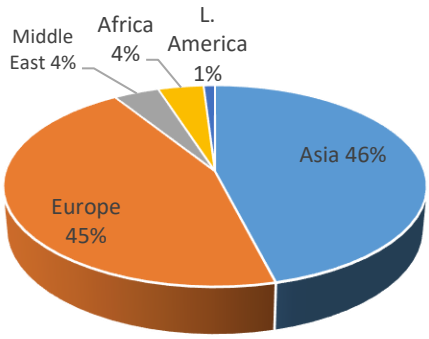
Forty six percent of FDI inflows into Ethiopia come from Asia, mainly due to FDI inflows from China and India. Europe (45%), Middle East (4%), Africa (4%) and Latin America (1%) account for the rest of Ethiopia's FDI inflows. (EIC, 2016). The country specific information shows that FDI inflows into Ethiopia is dominated by developing countries origins. China (29%), Turkey (13%), India (11%) are the top three biggest sources of FDI followed by UK (10%), USA (7%) and France (5%) (EIC, 2016). European FDI inflow is dominated by Turkey, UK and France; whereas Middle East source of FDI is dominated by Saudi Arabia. Saudi Arabia's FDI inflow is dominated by investment from a single company called MIDROC Ethiopia, owned by a Saudi Arabian investor (Woldekidan, 5015). Africa's share as a source of FDI inflow to Ethiopia mainly comes from Sudan. In the following figures, major FDI inflow sources are indicated by origins of countries and continents.

Figure: 2.5 FDI Inflows to Ethiopia by Countries of Origin %



Source: Adopted from Woldekidan (2015) EIC (2016)

Figure: 2.6 FDI Inflows to Ethiopia by Continent of Origin



Source: Adopted from Woldekidan (2015)

2.3.2 The FDI Policy

In Ethiopia, attraction of FDI was a significant part of legislations in the1960s. Modern investment code encompassing encouragement of FDI via a number of incentives began to emerge in line with the codification of the investment laws of 1963 (Cheru et al. 2019). However, the legislative activity during the Derg military regime curtailed FDI up until the overthrow of the government by EPRDF forces in 1991. In 1992, the transitional government issued the first investment proclamation after the demise of the military regime and the present investment laws were enacted after the adoption of the new constitution of the Federal Democratic Republic of Ethiopia (FDRE) in 1995 (Cheru et al, 2019).

The Ethiopian Investment Policy as it pertains to foreign investment has been revised more than four times in the past two decades. The present investment policy has elements that include:

- Foreign investors can engage in investment activities open for FDI on their own or in partnership with domestic investors without any ownership restrictions in joint investment.
- Foreign investors are required to secure investment permits from the Ethiopian Investment Commission (EIC) or other appropriate governmental bodies.
- Foreign investors are required to transfer/inject USD 200,000 as a minimum requirement for wholly foreign owned single investment, or USD 150,000 for joint investment with domestic investors.
- Foreign investors are required to transfer/inject USD 100,000 as a minimum requirement for wholly foreign owned single investment in technical consultancy services or USD 50,000 for the same joint investment with domestic investors.
- Foreign investments are guaranteed from any act of expropriation or nationalization as they are protected by constitutional and investment laws.
- Foreign investors are guaranteed to repatriate profits, dividends, principals, interest on external loan outside Ethiopia in convertible currency.
- Foreign investors are guaranteed of their rights to employ foreign national managers and experts.
- Foreign investors are beneficiaries of Ethiopia's signatory of Multilateral Investment Guarantee Agency that has concluded bilateral investment promotion and protection treaties with 30 countries.
- Foreign investors are also beneficiaries related to treaties with 18 countries to avoid double taxation (EIC, 2020).

Foreign investment is also encouraged with fiscal incentives that include: tax holidays for prioritized investment areas (like industrial park development, agro-processing, textile and apparel, leather, metal engineering, construction materials, pharmaceuticals, and chemicals), income tax holidays of one to nine years, duty free for import of capital goods, provision of land at competitive lease price (i.e. greater than USD 1 per square meter), investment credit

support and duty exemption for raw materials and inputs. Industrial parks are also under development recently where major infrastructure facilities are put up to promote foreign direct investment (UNCTAD, 2020).

2.3.3 Overview of the Effectiveness of FDI Policies in Ethiopia

The effectiveness of FDI policies depend on how the policies harness benefits from FDI to economic growth of countries (Moura, 2013). In this regard, mechanisms (frameworks) with which FDI affects economic growth are identified by Moura (2013) and are used to assess the effectiveness of Ethiopia's FDI policies. Moura (2013) identifies six mechanisms on how FDI affects economic growth based on OECD studies that include: knowledge and know-how transfer, human capital formation/development, integration to global economy, increased competition, firms development and restructuring, and difficulty of implementation of economic policies. It is argued that inasmuch as these mechanisms enhance the economic growth of developing economies, they may also negatively affect economic growth of these countries if there are no proper FDI policies and strategies in place to mitigate negative effects and harness positive effects of the mechanisms (Moura, 2013). In the following, the effectiveness of Ethiopian FDI policies are discussed with the first four identified mechanisms that are believed to be more relevant in the Ethiopian case.

UNCTAD (2020) sees technology and know-how transfer as phenomena that require collaborative and complex processes where knowledge and information flow in many directions and human capacities develop to ensure the transfer. UNCTAD (2020) also identifies linkages between FDI and domestic firms as the main source of technology and know-how transfer given the experiences from different parts of the world. Accordingly, technology and know-how transfer from FDI occurs when there is movement of knowledge-intensive labour between FDI and domestic firms via spill overs and demonstration effects. However, studies indicate that Ethiopia's technology transfer process is very limited for the following major reasons. First, the jobs created with FDI in the country are not knowledge-intensive. Even with the limited knowledge-intensive jobs the FDI offers, Ethiopia does not have adequate human capital to absorb the technology and know-how. It is argued that Ethiopia has not yet developed a workforce with the discipline and culture needed for learning by doing, interacting in a modern and dynamic world knowledge system (Oqubay 2019; Oya 2019). Second, studies also indicate that foreign investors are reluctant to have linkages with domestic businesses as they focus only on their own interests (UNCTAD, 2020). Third, there is a problem of information

limitation and dependability pertaining to technology and know-how transfer which is problematic in harnessing the process of technology and know-how transfer to domestic businesses (UNCTAD, 2020).

With regards to the human capital development mechanism, policy makers and the government should give due attention as to whether or not the highly skilled FDI workforce stay in the country. Studies show that there is ample possibility for the highly skilled labour of FDI to migrate to other countries equipped with better R and D facilities (Moura, 2013). In Ethiopia, such possibility is high and the FDI policy should be responsive to the problem. Tesfachew (2019) also confirms high outward migration rates of skilled Ethiopians is problematic for the country as it puts the country in a position of a net exporter of skilled manpower contrary to its limited human capital.

Furthermore, firstly, as it is a common phenomenon with developing countries, FDI inflow to Ethiopia has been in low and medium technology industry, with a concomitantly low requirement for foreign investors to invest in human resources. Secondly, even in the high technology sectors, the wide technology gap has inhibited the ability of the local employees to learn, either because the gap is so great that it is hard to bridge, or because the perceived gap simply deters foreign investors from attempting to bridge it (Michie, 2001; UNCTAD, 2020).

Related to FDI's global integration mechanism as having impact on economic growth, increased trade, openness and financial flows are mentioned as some of the major factors that increase the global integration of developing economies (Mencinger, 2003; OECD, 2002). However, this mechanism, especially, related to FDI's impact on increased trade and openness, may have negative effects on countries economic growth if there are no policies to address the problem. FDI may rather increase imports instead of exports of developing countries as most of the raw materials and inputs may be imported from abroad for reasons of inferior quality of local materials (Moura, 2013). Such phenomena may harm the economic growth of Ethiopia, too, via many linkages, for example, depletion of country's foreign exchange reserves and widening of balance of payments.

The manufacturing sector, which is considered as the engine of growth in developing economies, has not performed well in Ethiopia. Its contribution to employment generation, exports, output and inter-sectoral linkages is limited (Oqubay, 2019). For example, though the stock of FDI in export sector grew by USD 14 Billion between 2008 and 2017(Oqubay, 2019),

its contribution to the country's economic growth, particularly, in enhancing Ethiopia's export, and hence, its integration effect to the global economy, has been minimal.

Competition eliminates domestic monopolistic behaviours to the advantages of product users through price stabilization. However, increased competition with the presence of FDI may also wipe out domestic firms (Moura, 2013). Accordingly, it is argued that there are possibilities of crowding out effects of FDI on domestic investments in Ethiopia (Kedir, 2012; Dessie, 2016). These studies indicate that some foreign companies compete with domestic companies in Ethiopia in investment activities that are reserved for only domestic investors with the use of domestic resources (like domestic bank loans). Aboye (2017) also concluded that FDI crowds out domestic investment in Ethiopia unlike public investment that has crowd-in effect on both domestic and FDI. Besides, when the net effect is considered, the empirical model results of this study also indicates that there is a negative long-run relationship between FDI and economic growth indicating, perhaps, there is a long-run crowding out effect of FDI on domestic investment in the long-run. Given the foregoing discussions above on the effectiveness of Ethiopia's FDI policies on harnessing the impacts of FDI-growth channels using (Moura, 2013) framework, it can be concluded that the Ethiopia's fragmented FDI policies are not arguably effective.

In general, given the above challenges, no clear FDI policy has been enforced to mitigate the problems. UNCTAD (2002) also reveals that the FDI policy challenges or lack of policy effectiveness of FDI policy with characteristics of unnecessary bureaucratic aspects, irrational capital requirements, lacking dispersal of investment promotion efforts to different stakeholders, no clear FDI promotion strategy and under resourced.

2.3 Summary and Conclusion

Informative characterization of the trend and patterns of FDI and economic growth of Ethiopia is achieved by investigating FDI and economic trends classified by the reigning regimes that existed. Accordingly, three notable periods are identified as they pertain to FDI inflows and economic growth of the country, namely, the imperial regime (1960-1973), the Derg military regime (1974-1991) and the EPRDF/Biltsigina government (1992 to present).

In the imperial regime, FDI inflows increased gradually in line with the emerging capitalism. The first commercial and investment codes that simulated the emerging capitalist economy and FDI were also introduced in 1960 and 1963, respectively. FDI thus flowed into the county in line with pursuance of import substitution strategies in manufacturing industries. Significant

FDI inflows were directed towards development of large-scale commercial sesame, cotton and sugar cane farms in the North, Eastern and Awash valley parts of the country; and FDI inflows reached around USD 29 Million by the end of the regime.

In the Derg regime, the country adopted a socialist ideology that resulted in nationalization of private firms. Consequently, FDI inflows not only plummeted to zero but also became negative due to disinvestment or foreign capital flight out of the country. Economic growth was also negative (with negative per capita growth) aggravated by periodic drought and wars (with the neighbouring country and civil war within the country).

Economic growth and FDI began to revive in the EPRDF/Biltsigina regime following the demise of the Derg military regime in 1991. The EPRDF (now transformed into Biltsigina Party) took a series of measures that not only reinstated the market economy, but also that brought the remarkable growth of FDI inflows into the country. Consequently, economic growth rose to stunning growth that averaged around 10% for decades. FDI inflows also rose from zero or disinvestment values to more than USD 3.6 Billion by 2016. FDI into Ethiopia originates from Asia (47%), Europe (46%), Middle East (4%) and other continents that together constitute (3%).

Examination of Ethiopia's FDI policies reveals that the FDI policies are fragmented and largely ineffective. The Moura (2013) policy effectiveness framework based on the OECD (2002) study explains four mechanisms through which FDI affects economic growth, namely; technology and know-how transfer, human capital development, integration to the global economy and competition. With regards to the ineffectiveness of FDI policies as related to technology and know-how transfer, some of the reasons include, firstly, FDI in Ethiopia is of low knowledge intensive where the possibilities of knowledge and know-how transfer to local employees is low as compared to FDI in high knowledge intensive sectors. Secondly, Ethiopia has not yet developed a workforce, to satisfactory level, with the discipline and culture needed for learning by doing by interacting in a modern and dynamic world knowledge system. Thirdly, foreign investors in Ethiopia are reluctant to establish linkages with domestic business to promote technology and know-how transfer process. Concerning the human capital development aspect, firstly, outward migration of Ethiopian skilled manpower to countries where better R & D facilities and life conditions are available is hampering contribution of FDI to human capital development. Secondly, foreign investors intentionally refrain from investing in manpower development to fill up the skill gap of local employees.

Observation of the role of FDI in promoting Ethiopia's economy global integration and competiveness also indicates some ineffectiveness. With regards to global integration role of FDI, two major weaknesses of FDI are observed. One is that FDI does not visibly enhance the manufacturing sector to make it the major contributor to the export sector. The contribution of the manufacturing sector to country's export and GDP is still limited . The other weakness of FDI is that it has more import orientation on the use of raw materials and inputs than the use of domestic input resources thereby contributing to the widening of the country's balance of payments. Similarly, FDI's role in promoting competitive domestic market is limited. In fact, studies indicate some FDIs have crowding-out effects on domestic investments in the country.

Chapter 3. Literature Review

3.0 Introduction

This chapter provides a comprehensive review of the literature on FDI and economic growth. This chapter provides a review of relevant literature that pertain to the underpinning theories on the relationship between FDI and economic growth, empirical relationship (nexus) between FDI and economic growth and causality between the two variables. The literature review also identifies gaps in the existing body of empirical literature from the methodological perspective with additional focus on the Ethiopian FDI-economic growth nexus and causality relationships studies.

To this end, the literature review is divided in two broad divisions, theoretical and empirical literature review. In the theoretical literature review section, the underpinning FDI-economic growth theories are discussed. In the empirical literature section, empirical relationships (positive, negative and or none) between FDI and economic growth are discussed under the broad division of countries as developed and developing countries. Literature on the causality relationships is also reviewed accordingly.

3.1 Definitions and Types of FDI

The IMF and UNCTAD definitions of FDI occupy the dominant position in the FDI literature. IMF defines FDI as an international investment made by an entity resident in one economy in an enterprise that resides in another economy. That is, it is an investment made to acquire lasting interest in an enterprise operating outside the country of an investor (IMF, 1993). This is a narrow definition of FDI in that it focuses on the initial investment or transaction. The working definition of FDI per the IMF's Balance of Payments Manual (IMF, 1993), defines FDI in broad sense as international investment meant, not only for obtaining lasting interest by a resident entity in an enterprise in another country, but also all subsequent transactions after initial investment in affiliate companies abroad. In the broad definition, FDI is thus seen as a flow of capital, expertise, and technology in the FDI receiving country subsequent to the initial investment. UNCTAD (2012) defines FDI as a 'long-term relationship' in view of having lasting interest and control by a resident enterprise in a country other than it resides. De Mello (1999) defines FDI as an international inter-firm cooperation that involves significant equity stake and effective management decision power or ownership control in foreign enterprises. This is also a broad definition of FDI as it indicates the ability of foreign direct investors in

capital transfer, research and development (R & D), production know-how and technology (i.e. both tangible and intangible assets) for the host country.

There are two main classifications of FDI: (i) Green Field vs Merger and Acquisitions (M&A) (ii) vertical vs horizontal. According to UNCTAD (2006), green field FDI are projects involving investment in new production facilities or expansion of the existing facilities that results in additional capital formation, employment or productive capacity in the recipient country; whereas, M&A is the taking over of an existing enterprise or the merging of capital, asset and liabilities of an already existing business that results only in transfer of ownership. In the second classification of vertical and horizontal FDI, vertical FDI refers to firms or MNC's (Multi-National Corporations) whose production or value chains are vertically sliced into different stages of production or processes depending on the costliness of different stages of production in different parts of the world. In horizontal FDI, firms duplicate production chains to have access to major markets in different parts of the world. In either of the cases, the decision to invest in foreign markets is a function of the trade-off between fixed cost of establishing a new plant in foreign countries and variable costs associated with exporting products to particular markets (Helpman, 2006).

FDI is sometimes classified based on the purposes of investment in the host countries. According to Brouthers et al. (2008), FDI is classified as market seeking, resource seeking, efficiency seeking and strategic or created-asset seeking. Market-seeking FDI targets serving the market with local production and distribution rather than via exporting. Resource seeking FDI seeks to obtain cheaper resources, for example, labour, raw materials and others in the host country. Efficiency-seeking FDI aims at creating cost-effective production networks in view of achieving competitiveness, economies of scale and specialization. Strategic or created-asset seeking FDI targets acquisition of foreign assets to promote long-term strategic objectives. That is, the FDI aims at advancing global or regional strategic goals of companies into foreign networks (Brouthers et al. 2008).

3.2 Theoretical Literature Review

3.2.1 Theoretical Underpinnings of FDI

A number of theories exist that explain the relationship between FDI and economic development. The most notable are: (i) The Investment-Development Path Theory (IDP) (ii) The OLI Eclectic Paradigm Theory and (iii) The product life cycle theory.

3.2.1.1 The Investment Development Path (IDP) Theory

The IDP theory postulates that a country's state of development relates to its international FDI position (Dunning and Narula, 1996). To this end, Dunning observed that a country's stage of development (measured by GDP or GDP per capita) relates to its net outward investment position (NOI) which is the outward investment less inward investment. Considering this, Dunning identified four stages of development; Narula later added the fifth stage of development (Narula and Dunning, 2000). These stages are: limited location advantage, 'generic' location advantage, created asset type location advantage, strong location advantage in a created asset, and strong Location advantage in created asset but with fluctuating net zero or positive level of inward and outward FDI (Narula and Dunning, 2000).

The first stage, limited location advantage, is characterised by little or no inward FDI and few domestic firms with no ownership advantage and outward FDI. The second stage, 'generic' location advantage, is characterised by growing inward FDI, growth of domestic industry in support sectors and little outward FDI. In the third stage, created-asset type location advantages are developed with characteristics of rising inward FDI, strong domestic industry and rising outward FDI. The fourth stage, strong location advantage in a created asset, is characterised by features that include: strong created assets ownership advantage of domestic firms, and outward FDI exceeding inward FDI. The fifth stage is similar to the fourth stage with the exception that at this stage there is fluctuating net zero or positive inward and positive FDI (Narula and Dunning, 2000). The IDP theory or framework, in general, suggests FDI plays a significant role in promoting capabilities of domestic firms to take part in the outward FDI at the later through various linkages.

3.2.1.2 The Product Life Cycle Theory

The product life cycle theory as related to FDI was developed by Vermon in 1966. Vermon (1966) identifies four stages of product life cycle, namely: innovation, growth, maturity and declining stages. The third or maturity stage predicts the genesis of FDI.

In the first phase of the production cycle, that is the innovation stage, a new product is innovated or successfully developed with R and D expenditure. At this stage, products are not standardized; production costs are high; and inputs, processing and specifications are insecure, which by themselves, begin to signal locational options implications. Products are also introduced at higher costs to the intended markets; and the demand for the products is

characterised by price inelasticity. At this stage, the need and the associated expenditure for effective communication in the target markets is also high.

In the growth stage, products begin to be exported to foreign markets, along with domestic production expansion, as the result of which producers have the incentive to expand processes and production. At this stage, price-sensitive consumers start to emerge in line with the emergence of imitators that produce copycat products, the overall impact of which is to take the growth stage smoothly into the maturity stage. At the product maturity stage, the product is so standard that copycat producers take advantage of cheap labour; and product prices continue to be lower. This situation, in turn, compels original innovators of the product to make decisions to invest in foreign countries, which means FDI. In the declining stage, when production commences in foreign countries with FDI, prices are further depressed due to lower costs and the declining phase is triggered.

The theory was criticized for solely being based on US experience where high tech products are invented with higher R and D expenditures, and that it may not explain situations in textile and garment industries where no significant technological advancement was made. As emphasized by Hills (2007), the production technologies in textile and garment industries are rather labour intensive and less-knowledge intensive. Tylor (1986) also criticizes the theory for its narrow focus relying largely on technology determinism and geographical location considerations ignoring adequate conceptualization of how firms interact with business environment in making investment decisions. Authors, for example, (Navaretti et al. 2001; Yamazawa, 1983; Yulek et al. 2019) argue that the relocation of textile and clothing industries mainly relates to cheap labour. However, the theory still offers a strong reason on how FDI is generated. It is also quite evident that the theory has influence or relates to the so-called new trade theories that improved the weaknesses of H-O trade theories in international economics (Salvatore, 2011).

3.2.1.3 The OLI Paradigm

The OLI theory is one of the most influential theories to date in explaining how foreign investors are motivated to invest in foreign countries. Dunning (1976) pioneered the theory on how ownership-specific, location specific and internalization advantages, named OLI electric paradigm, push international investors (MNCs) to invest in foreign countries (Sharmiladev, 2017).

Ownership specific advantages relate to net ownership advantages (that are mostly intangibles) of investing companies as compared to foreign firms in foreign markets. These include: copyrights, patent rights, branding, management of internal skills, technological advances, economies of scale, etc. Ownership advantages relate to advantages pertaining to location. Internalization advantages emanate from firms' ability to decide either to sell their exclusive right of their operations (tangibles and intangibles) or internalize depending on assessments of advantages and disadvantages of doing so (Dunning, 2001; Sharmiladev, 2017).

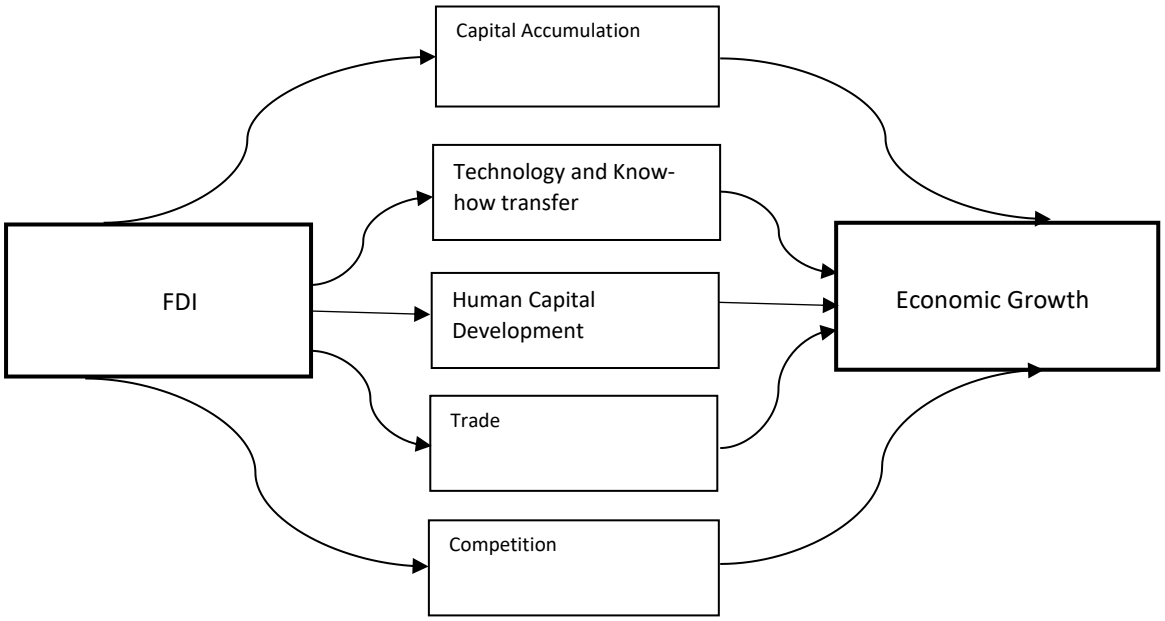
3.3 Empirical Literature Review

This section discusses the empirical literature on the nexus between FDI and economic growth. In addition, the literature on the casual relationship between the two variables is also explored. The discussion follows two broad streams, the literature on developed countries and the literature on developing countries. In the latter, the discussion includes Asian, Latin American and African countries including Ethiopia. However, as the relationship between FDI and economic growth is better understood with comprehension of how FDI channels affect economic growth, FDI-economic growth channels are first discussed.

3.3.1 FDI-Economic Growth Channels

Different studies identify different channels on how FDI impacts economic growth. However, capital accumulation, technology know-how and transfer, human capital development (manpower development), trade and competition are identified as major channels in many studies (UNCTAD, 2020a; OECD 2002; Moudatsou, 2003; Osano and Koine, 2016). Figure 3.1 depicts the FDI-growth channels.

Figure: 3.1 Schematic Diagram of FDI-Economic Growth Channels



Source: Adopted from UNCTAD 2020 and OECD 2002

(i) The Capital Accumulation Channel

Capital accumulation has direct impact on countries' economic growth as it increases the productive capacity of developing economies. The relationship between capital accumulation and economic growth has strong theoretical and empirical foundations as discussed above. Exogenous and endogenous theories are prominent in providing such strong foundations (Snowdon, 2005; Salvatore, 2011). Exogenous theory including augmented Solow model predict short-run relationship between capital accumulation (where FDI is a part of it) and economic growth as they are characterised by diminishing returns. Endogenous growth theory, however, predicts long-run relationship between capital accumulation and economic growth due to its assumption of increasing returns to scale brought about technological change (Snowdon, 2005). The Harrod-Domar Growth model also argues capital accumulation generated by saving and investment is the major determinant of economic growth (Thong and Hao, 2019).

Empirical studies also provide empirical evidences on the relationship between capital accumulation and economic growth. Osuninda (2014) found capital accumulation and saving have positive relationships with economic growth in Nigeria. Iwaisako (2013) also argues capital accumulation and innovation are the driving forces of economic growth. Borensztein (1998), however, argues that the impact of FDI on economic growth via capital accumulation

depends on whether or not FDI has crowd-in or crowd-out effect on domestic investment, and thus cannot be conclusive.

(ii) The Technology and Know-how Transfer Channel

Borensztein (1998) argues FDI contributes to economic growth more than domestic investment via transfer of technology. The author also stresses a minimum human capital threshold is required in an economy for technology transfer to occur. De Mello (1999) also argues FDI contributes to economic growth of countries through incorporation of new inputs and transfer of new technologies. Saggi (2002) and Hermes (2003) also see technology know-how and transfer as prominently important mechanism to bring about economic growth in developing economies via improvement of productivity of local firms. Technology transfer occurs in four interrelated channels that include: vertical linkages, horizontal linkages, migration of skilled labour and internalization of R & D. In the case of developing economies, the strongest technology transfer occurs with vertical linkages because of backward linkages with local suppliers in FDI host countries (OECD, 2002).

However, technology and know-how transfer, as FDI-growth channel, may also have depressing effect on economic growth of developing economies if the channel transmission mechanism is ineffective or the transferred technology is not appropriate. The ineffectiveness of technology and know-how transfer may emanate from the fact that FDI may introduce inappropriate technology that hampers the development of appropriate domestic-based technologies. In this regard, Vissak and Roolaht (2005) argue that FDI may induce too much dependency on technologies of developed nations. Sen (1998) also notes FDI, mainly, from MNCs, has a tendency to suppress domestic R & D activities thereby make host developing economies remain dependent on MNCs' home technologies.

(ii) The Human Capital Channel

In the human capital development channel, FDI may have both a positive and a negative impact on the economic growth of host countries. It is argued that FDI improves the knowledge of labour force of host economies in new methods of production and management practices that have positive effects on economic growth of the countries (De Mello, 1999; Zhang 2001). Ozturk (2007) explains that FDI raises the productive capacity of host economies via improvement of the skills of labour force through trainings. Moura and Forte (2010) contend that FDI fosters human capacities of countries through formal and informal trainings that foreign companies offer to their employees. However, the channel may also exert negative

effects on economic growth. OECD (2002) argues that FDI may fast track or enable technologies and systems that employ fewer employees by replacing domestic firms and systems that use labour intensive techniques. This negatively affects the economic growth of host economies as it reduces employment. Michie (2001) also argues that the impact of FDI on human capital may be low when the inward FDI is in low to medium industries that require low level of knowledge and skills. The author asserts that such inclinations (i.e. investment on low and medium industries) on the part of foreign investors relate to the fact that multinational corporations (MNCs) may be deterred from investing in industries that are high knowledge and skill intensive as they may have motives to refrain from bridging the knowledge and skill gaps on local workers. Alternatively, the knowledge and skill gap on the part of local workers may inhibit local employees themselves from getting employment opportunities in knowledge intensive FDI.

It can thus be concluded that the impact of FDI on economic growth via the human capital channel depends on the specific conditions of FDI host economies. In this regard, UNCTAD (1999) argues that the effect of Trans National Corporations (TNCs) activities on generation of employment and building up of skills in host countries varies from country to country depending on the type or motivation of FDI, the industries in which TNCs invest, the strategies TNCs adopt, host country policy and general conditions.

(iii) The Trade and Investment Channel

The trade and investment channel through which FDI impacts economic growth relates to FDI's role in integrating the domestic economy with the global economy. There is an emerging consensus that FDI and trade linkage should be viewed in a broader sense of the former's role to integrating the host country to the global economy (global integration) rather than the direct impact of FDI on imports and exports (OECD, 2002). The global integration may be in the form of international financial flows, trade and business management. Barry (2000) argues that integration to global economy increases country's openness that in turn enhances economic growth. Blomström and Kokko (1998) also discuss domestic businesses get knowledge from FDIs, specifically, MNCs, by copying internalization processes the latter have been through. The knowledge that may have positive spill over effect on the economic growth of the host economies include: international marketing expertise, establishment of international networks and development of international lobbies. Domestic businesses may have the advantages of getting acquainted with the internalization process by being suppliers and sub-contractors of

FDI, finally being transformed to exporters to international markets (Blomström and Kokko, 1998). All these factors make the trade and investment integration channel exert positive effects on economic growth of host developing economies.

The trade and investment channel also supports FDI to impact economic growth via technology and know-how transfer. In the Ethiopian case, for example, the share of capital goods imports as a proportion of GDP sharply increased from 5.1 percent in 2003 to 13.3 percent in 2005 indicating the country's increasing reliance on imported technology for its economic growth. This figure remained higher than 10 percent surpassing the percentage of capital good imports in Kenya, Tanzania and Bangladish (Gebreyesus, 2016; UNCTAD, 2020a).

With regards to the negative effects of trade and investment channel on economic growth, the spread of international crises to domestic businesses via FDI, and hence to domestic economy, can be mentioned. Vissak and Roolaht (2005) mention FDIs are the easiest ways to transfer international crises to host economies because of their integration to the international markets. The issue of repatriation of profits can also be linked with negative effects of the integration channel. It is argued that the repatriation of profits may exceed the benefits from initial FDI in host economies in the long-run (Ram and Zhang, 2002), termed as emptying of capital by Sahoo and Mathiyazhagan (2003).

(iv) The Competition Channel

Competition channel may have both positive and negative effects on economic growth of developing countries. With the entry of FDIs, domestic firms may be forced to be more innovative spending more resources on R & D activities to compete with foreign companies (Driffield, 2000; Varamini and Vu, 2007). Development of such competitive behaviour may create opportunities for them being sub-contractors or partners of big foreign companies that have better access to international markets and technology (Blomström and Kokko, 1998). FDIs may also benefit the domestic economy via elimination of monopolistic behaviours of domestic firms with introduction of better supply conditions, quality products and lower product prices that have positive impact on economic growth of host economies. OECD (2002) argues that the presence of foreign companies promotes competition, efficiency and lower prices by spurring domestic competition. However, the competition channel also exerts negative effects on economic growth. Big foreign companies (like MNCs) have the tendency to create monopolistic or oligopolistic markets by eliminating domestic firms via exploiting all comparative advantages at their disposals (Zhang, 2002). Besides, FDI may cause the cost of

domestic borrowing to increase as they have better bargaining position with banks as compared to domestic firms (Chakraborty and Basu, 2002). These negative effects of competition channel may have depressing impact on economic growth of developing countries.

With regards to the negative effects of competition channel, empirical studies show that the anti-competitive behaviour of FDI after eliminating domestic companies or increased concentration of FDI is more serious in developing countries than developed countries. In fact, studies indicate that in developed countries concentrations of FDI are of pro-competitive type that encourage competition and efficient allocation of resources (OECD, 2002). It is thus recommended that in developing countries, where anti-competitive behaviour of FDI is prevalent, measures that enhance openness to international trade and introduction of efficiency-enhancing national competition laws should be introduced to temper the anti-competition behaviours of FDI (OECD, 2002).

3.3.2 Nexus Between FDI and Economic Growth in Developed Countries

Despite the general assertion that FDI is important for economic growth of countries, empirical results on impacts of FDI on economic growth are mixed or inconclusive. In this regard, De Mello (1999) asserts that the contention of the positive impact of FDI on economic growth of countries is less controversial in theory than in practice. The inconclusiveness of empirical results is seen in discussions of respective sections of both developed and developing countries.

Applying a panel VAR on 32 OECD and non-OECD countries between 1970 and1990, De Mello (1999) found that, while FDI positively impacted economic growth of OECD countries, there was no significant effect on the growth of non-OECD countries. De Mello (1999) noted that the impact of FDI on economic growth is dependent upon the complimentary and substitutability properties of new technology embodying FDI-related investment and old technology embedded in investment (domestic), which he concluded is higher in advanced OECD countries than developing countries. As a consequence, foreign investors are inclined to select technologies that go with the productive and institutional features of developing countries that he characterised as: (i) less efficient in using new FDI-related technologies, (ii) have difficulties in assimilating with technology and capital intensive improvements (iii) are less modern or productive. Given these realities, the author concluded that FDI importance as a vehicle to narrow technology gap between technology leaders (developed economies) and technology followers (developing economies) is questionable.

Vu and Noy (2009) focused on the sectoral impact of FDI on growth with a panel of six developed countries for the 1980-2003 period; and they found that FDI had a positive impact on the economic growth of some countries and no impact on the economic growth of the other countries. They emphasized that the sectoral impact of FDI is dependent upon how FDI interacts with labour thereby resulting in different impacts in different countries and economic sectors. Employing OLS estimation technique on data from sixteen European countries between 1998 and 2013, Stefanova and Miteski (2017) also found that FDI has a positive impact on the economic growth of the sixteen European countries via the industry and service sectors; whereas, it has no impact on economic growth via construction sector.

Numerous studies have also examined the nexus for individual European or developed countries with a positive findings reported. Applying Johansen co-integration and OLS techniques to time series data for the period 1977-2004, Andraz (2010) concluded that FDI has a positive impact on economic growth in Portugal. Subjecting US data from 1970 to 2000 to simultaneous equation model (SEM) estimation, Ghosh and Van den Berg (2006) showed that FDI positively impacts the US economy through improved productivity. Employing an augmented aggregate production function and applying bounds test to co-integration approach and ECM analysis, Kim and Bang (2008) concluded that there is a positive long-run and short-run relationship between FDI and economic growth in Ireland between 1975 and 2006. Owusu et al. (2019) concluded that there is a positive long-run relationship between FDI and economic growth in Singapore applying Johansen co-integration technique and VECM on a time series data for1970-2015 period.

However, a number of studies found the relationship between FDI and economic growth to be negative for European countries. For example, applying ARDL estimation technique on Croatian time series data for the period 1994 to 2012, Dritsaki and Stiakakis (2014) found that FDI has a negative relationship with economic growth in Croatia both in the short and long-run. The authors concluded that FDI is not pro-growth in Croatia. Similarly, Szkorupová (2015) concluded a negative impact of FDI on economic growth of European countries as FDI crowded out domestic investments in the countries. The author applied a panel regression model on European countries for the period 1993 to 2012. Applying Bayesian Regression technique on a panel data of 28 EU countries for the period 2008 to 2014, Simionescu (2016) also found that FDI negatively affects the economic growth of seven European countries, namely, Austria, Denmark, Estonia, Cyprus, Portugal, Sweden and UK.

Contrary to the above findings of both positive and negative impact of FDI on economic growth in developed countries, there are studies that provided opposing results. For example, using De Mello's empirical framework and Beach Mackinnon technique that corrected for autocorrelation and annual time series data for the period 1976 to 2008, Asheghian (2011) found that FDI did not impact economic growth in Canada for the period 1976 to 2008. The author found that Canada's economic growth is determined by factors of production where domestic investment has a significant impact. Similarly, using the ARDL estimation technique, Carbonell (2018) concluded that FDI has no significant impact on Spain's economic growth for the period 1984 to 2010. The author related the absence of an impact of FDI on Canada's economic growth to the crowding out effect of FDI on domestic investment as the former competes with the latter for domestic bank loans. Applying GMM technique on a panel of 111 countries, where Ireland is included, Solomon (2011) found FDI has insignificant impact on economic growth of Ireland.

Similarly, utilising OLS regression analysis for the period 2001 to 2013, Pandya and Sisombat (2017) found an absence of a relationship between FDI and economic growth in Australia. Subjecting data on 111 countries for the period 1981 to 2005 to generalised method of moments (GMM) estimation technique, Solomon (2011) found that FDI does not have a significant impact on the economic growth of most of the developed countries in the study. Applying OLS estimation techniques and using time series data for 1989 to 2008 period, Angelopoulou and Liargovas (2014) also found that FDI has no significant impact on economic growth in a sample of 16 European Monetary Union (EMU) member nations.

3.3.3 The Nexus Between FDI and Economic Growth in Developing Countries

3.3.3.1 FDI-Economic Growth Nexus in Transition Economies, Asian and Latin American Developing Economies

The inconclusiveness of the empirical literature on the impact of FDI on economic growth is more evident in developing economies for the following reasons. The major reason is that the broad category of developing economies includes countries that are numerous and diversified in the level of development, income, geography and geo-political conditions that contribute to the varied results of the impact of FDI on economic growth (World Bank, 2020). The other reason relates to the use of different methodologies, data sets and flaws in applications of models. In the following, the FDI-economic growth nexus for developing economies, in

general, and the European transition economies, Asian, Latin America and African countries are discussed.

Borensztein et al.(1998) concluded that FDI has a positive impact on economic growth in developing countries using a panel data of 69 developing countries for the period 1970 to1989. The authors underscored the notion that the impact of FDI on economic growth is dependent upon the stock of human capital and absorptive capacities that FDI host countries have for new technologies. Examining a panel of 44 developing countries for the period 1970 to 2005 with application of heterogeneous panel co-integration technique, Herzer (2010) argued that there are large differences across developing economies on the impact of FDI on the economic growth though he concluded that the impact of FDI on the economic growth of these countries is negative on the average.

Subjecting a panel data of 62 countries, including 37 developing countries over the period 1975 to 2000, to 2SLGS, GMM and Cancer and Hansen (2004) techniques, Jyun-Yi (2008) concluded that the impact of FDI on economic growth is ambiguous. According to Jyun –Yi (2008), in countries where better initial levels of GDP and human capital (absorption capacity) exist, FDI has positive impact on economic growth. However, FDI has the opposite impact on economic growth in countries where the initial levels of GDP and FDI are low. On the other hand, Dinh et al. (2019) employed VECM and fully modified OLS (FMOLS) techniques and examined the nexus for the period 2000 to 2014 and concluded that FDI has a positive impact on economic growth in the long-run in lower-middle-income developing economies; but it has negative impact in these countries in the short-run.

Empirical studies on FDI-economic growth nexus in European transition economies also appear to provide mixed results. Applying panel co-integration and common correlation effect (CCE) estimation techniques, Saglam (2017) concluded that FDI has negative effect on economic growth of European transition economies for the period 1995 to 2014. The author related the negative result to the slowing of structural transformation of the transition economies (i.e. economic reforms, privatisation, etc.). Similarly, Curwin and Mahutga (2014) found that FDI penetration, measured as the ratio of inward FDI stock to GDP, is negatively related to economic growth in European transition economies between 1990 and 2010. They attributed the negative result to the weak institutional capacities of the transition economies to harness the benefits of FDI inflows. On the contrary, Sapienza (2010) concluded that FDI has positive and significant lagged impact on economic growth of European transition economies

employing a panel model on a panel data of 25 transition economies in Europe for the period 1990 to 2005.

Asia is also not an exception to mixed results pertaining to the impact of FDI on economic growth though more positive FDI-economic growth relationships are prevalent in East and South East Asia. Baharumshah and Thanoon (2006) found strong evidence that FDI has a positive effect (both in short-run and long-run) on economic growth of East Asian countries including China for the period 1982 to 2001. They posit that knowledge embodied in FDI improves the productivity of the economies of host countries as its spill over effect is high. Similarly, applying a panel co-integration analysis, Kotrajaras et al. (2011) concluded that FDI has a positive impact on the economic growth of a group of 15 East Asian countries for the period 1990 to2009. They emphasize that the impact of FDI on East Asian countries depends on complementary factors, particularly, each host country's economic conditions, such as, level of financial market development, institutional development, better governance and appropriate macro-economic policies.

Using data on 29 Chinese provinces for the period 1985 to 2008, Ali and Zhang (2013) adopted the Borensztein et al. (1998) approach, where the interaction of FDI and human capital is introduced in the model to capture technology spillovers, to find that FDI has a positive impact on China's economic growth. Ali and Ahmad (2010) also found that FDI has a positive impact on economic growth of Malaysia applying OLS on a panel data of Malaysia for the period 1980 to 2006. Similarly, employing panel co-intergration techniques in the examination of the nexus for eight South Asian Association for Regional Cooperation (SAARC) countries for the period 1960 to 2013, Jun (2015) found that FDI has a significant positive contribution to economic growth.

Contrary to the above positive findings for Asian countries, Rahman (2014) found a negative relationship between FDI and economic growth for Bangladesh using a multivariate regression analysis and time series data for the period 1999 to 2013. According to Rahman (2014), the negative relationship was attributable to a number of factors including: unskilled labour force, inadequate infrastructure, slow moving privatisation process, inefficient bureaucracy, political instability and recurrent natural disaster in the country. Employing a VAR approach in examining the nexus between FDI and economic growth for Malaysia for the period 1970 to 2008, Mohammed et al. (2013) also concluded that FDI does not have a relationship with economic growth.

A similar result was observed by Falki (2009) who found that FDI has no significant impact on Pakistan's economic growth using OLS regression techniques on time series data for the period 1980 to 2006. The author recommended that Pakistan needs to develop its infrastructure, human capital and create stable macro-economic conditions to harness the benefits from FDI. Focusing on Pakistan for the period 1978 to 2008 and applying the ARDL model technique, Iram (2009) also found that FDI to the manufacturing and services sectors does not have a significant impact on Pakistan's economic growth in the short-run, but has long-run positive impact on the country's economic growth. On the contrary, applying similar ARDL estimation techniques, Raza (2016) found that FDI in the manufacturing, communication, transport, storage and energy sectors has a positive impact on Pakistan's economic growth for the period 1972 to 2011.

Applying OLS and VECM techniques on a time series data of India for the period 1980 to 2013, Abubakar and Bala (2016) found that FDI is positively related to economic growth in long-run while the impact of FDI is negative in the short-run. Siddiqui et al. (2017), on the contrary, applying OLS and panel co-integration estimation techniques on Indian time series data for the period 2001 to 2014, concluded that FDI does not have a significant impact on economic growth, especially, when its impact on sectors are considered.

Empirical studies on FDI-economic growth nexus in developing Latin America economies also indicate mixed or inconclusive results. Applying Johansen co-integration and ECM techniques on a quarterly time series data for the period 1970 to 2004, Oladipo et al. (2009) found that FDI is positively related to economic growth in Mexico. Similarly, employing Pedroni's co-integration and VECM techniques and examining the nexus for nine South American countries for the period 1980 to 2015, Nantwi and Erickson (2019) found that there is a positive long-run relationship between FDI and economic growth. Conversely, using panel data estimation, Alvarado et al. (2017), however, found that the effect of FDI on economic growth is insignificant in 19 Latin American countries studied for the period 1980 to 2014. Considering the impact of FDI inflows from specific FDI origin countries perspective, Timini et al. (2019) also found that China's FDI does not have significant impact on economic growth of Latin American countries applying GMM techniques on a panel of 19 Latin American countries for the period 2001 to 2015. The authors employed GMM techniques to deal with the simultaneity problem observed in the model. However, the technique used may pose inconsistency problem as GMM techniques unfold bad small sample properties, as in the case of the small number of observations considered in the study (Gujarati, 2009).

Employing panel techniques on a panel data of seven Latin American countries for the period 1995 to 2013, Rjoub (2016) concluded that FDI has positive relationship on economic growth and has no crowding out impact on domestic investment. On the contrary, applying Perdoni's (2001) panel techniques, Herzer (2010) found negative relationships between FDI and economic growth in five Latin America countries out of eight Latin American countries considered in the sample of 44 developing countries for the period 1970 to 2005.

3.3.3.2 FDI-Economic Growth Nexus in African Countries

Many studies have examined the relationship between FDI and economic growth for Africa, SSA, sub regions in Africa and individual African countries. Ambiguity of results as it pertains to the impact of FDI on economic growth is also prevalent in Africa's FDI-economic growth empirical literature.

Employing GMM estimation techniques to examine the impact of FDI on the economic growth of a panel of 45 African countries between 1980 and 2016, Acquah and Ibrahim (2019) found ambiguous results (a mix of positive and negative results) on the relationship between FDI and economic growth. They relate the ambiguity of results to the magnitude of economic growth of countries, where they have observed positive impact of FDI on economic growth associated with higher economic growth of countries. They have also found that the financial sector indicator used in the models have dampening effect on the impact of FDI on economic growth of respective countries. However, Ojewumi and Akinlo (2017) found positive relationship between FDI and economic growth in a panel of 33 Sub-Saharan countries for period 1980 to 2013 when environmental and energy consumption variables are considered. The authors employed co-integration and VECM techniques to arrive at the results. Similarly, utilising FGLS and GMM estimation techniques on a panel of 50 African countries, Gui-Diby (2014) also concluded that FDI has a positive and significant impact on economic growth for the period 1980 to 2009.

On the other hand, applying OLS and GMM techniques on a panel data of five SSA countries for the period 1980 to 2013, Awolusi and Adeyene (2016) concluded that the impact of FDI on economic growth is generally negligible. The authors, however, emphasized that the impact of FDI on economic growth of South Africa is relatively better as compared to the rest of countries considered in the study due to better efficiency of utilisation of FDI. Focusing on the East Africa region, Oneya et al. (2018) found that the relationship between FDI and economic growth is also insignificant by applying OLS technique on a consolidated time series data of

East African countries for the period 1990 to2016. They attribute the insignificant relationship between FDI and economic growth in the region to minimal plough-back investments from FDI profits.

Subjecting South Africa's time series data for the period 1960 to 2002 to Johansen co-integration test and VECM techniques, Fedderke and Romm (2006) found that FDI has a positive effect on the country's long-run economic growth as it has a positive spill over effect via technology transfer from multinational companies (MNCs), despite its short-run crowing out impact on domestic investment. Similarly, applying co-integration ECM techniques on time series for the period 1970 to 2003, Moolman et al. (2006) concluded that FDI has a positive impact on aggregate output of South Africa when better infrastructure, market size and appreciating currency are considered. On the contrary, Mazenda (2014), employing co-integration and VECM estimation techniques, concluded that FDI has a negative long-run relationship with economic growth of South Africa for the period 1980 to 2010. Mazenda (2014) attributed the negative impact of FDI on South Africa's economic growth to the ineffectiveness of the South African government's policies to attract growth enhancing FDI.

Alabi (2019) found the relationship between FDI and economic growth in Nigeria between 1986 and 2017 to be positive. The major limitation of the study is that the author used simple regression technique to estimate the parameters despite the use of variables that are of dissimilar order of integration (i.e. I(0) and I(1)). As a consequence, the results are suspected to have been subjected to spurious results. It is recommended that ECM based models (like ARDL) are preferable for such type of time series data after testing co-integration of variables (Giles, 2013a).

Possu et al. (2010) rather focused on sector level to investigate the impact of FDI on economic growth in Nigeria. Using OLS techniques and Nigerian time series data for the period 1970 to 2003, the authors concluded that FDI has a positive significant impact in the mining, quarrying, transportation and communication sectors, but an insignificant impact on agriculture. The authors related the insignificant impact of FDI in agriculture to inadequacy of FDI spillovers inducement in the sector, and that the growing ICT sector did not aid the sector as it did in other sectors (like the manufacturing and service sectors). They also attributed the insignificant impact of FDI in agricultural sector to migration of agricultural labour to mining sector dominated by oil production. Ayanwale (2007), using OLS and 2SLS estimation techniques, found that FDI inflows into Nigeria's manufacturing sector between 1970 and 2002 had a

negative impact on economic growth while the impact of non-extractive FDI on Nigeria's economic growth was insignificant.

Applying co-integration and ECM model on a time series data for the period 1970 to 2012, Kingu (2018) found that FDI impacts economic growth negatively in Tanzania. Jilenga et al. (2016) also found a negative but insignificant relationship between FDI and economic growth in the long-run for Tanzania applying ARDL model on a time series data for the period 1971 to 2011. Masanja (2018), however, found a positive but insignificant impact of FDI on economic growth of Tanzania between 1991 and 2013 using OLS and ECM models.

Applying OLS estimation techniques on a time series data for Kenya for the period 1960 to 2010, Soi et al. (2013) found that FDI does not have a significant impact on economic growth of Kenya. However, Ngeny and Mutuku (2014) found that FDI has a positive impact on economic growth in Kenya; whereas, volatility of FDI has a negative impact on economic growth. They employed ARDL and Engle Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) approach to measure the impact of FDI and volatility of FDI, respectively, on economic growth of Kenya for the period 1970 to 2011.

3.3.3.3 FDI-Economic Growth Nexus in Ethiopia

Studies on the FDI-economic growth nexus in Ethiopia, which are relatively few, also unfold inconclusive results. Using OLS and Engle – Granger co-integration analysis, Abeje (2013) concluded that FDI has a positive long-run impact on economic growth in Ethiopia for the period 1981 to 2010. Woldekidan (2015), by applying OLS regression techniques on Ethiopian time series data for the period 1980 to 2015, concluded that FDI in Ethiopia positively impacts real GDP. The author also concluded that FDI in Ethiopia crowds in domestic investment. Similarly, by applying simultaneous equations econometric model on time series data for the period 1974 to 2014, Chanie (2017) concluded that FDI positively affects the economic growth in Ethiopia. Employing VAR approach and Johansen co-integration analysis for the period 1975 to 2013, Gizaw (2015) also concluded that FDI positively affects economic growth in Ethiopia.

On the other hand, Menamo (2014) arrived at contradictory or anomalous results by concluding that FDI has a positive impact on Ethiopia's economic growth with crowding out effect on domestic investment. In most part of FDI- economic growth literature, the prevalence of negative impact of FDI on economic growth is accompanied by crowding out effect (negative effect) on domestic investment when FDI and domestic investment are included in the model.

In this regard, one of the major reasons for such anomalous conclusion may be related to the use of improper econometric model. First, for instance, although the author found that the time series data for period 1974 to 2011 were integrated of order one I (1), co-integration test was not utilised to check the existence of long-run relationship among the variables. In fact, the author used differenced time series data to eliminate unit root problems which may have resulted in loss of information from the time series data thereby resulting in erroneous results (Gujarati, 2009). Second, if the variables considered were 'co-integrated', the ECM theorem would inform that the data generating process is explainable with the ECM model where the lagged correcting variable is included to bring about equilibrium relationship (Gujarati, 2009). But when 'co-integrating' time series data are used in differenced from, as in the case of Menamo (2014), the lagged variable is practically assumed to be zero, which creates ECM bias. These factors suggest that the model used may have resulted in wrong results.

On the contrary, by applying VAR for the period 1970 to 2009, Kedir (2012) found that per capita real GDP (and hence poverty) is negatively related to FDI inflows in the long-run. Kedir (2012) also concluded that the negative relationship between per capita real GDP and FDI is due to crowding out of domestic investment, repatriation of profits and low human capital in Ethiopia. Similarly, using data for the period 1981 to 2015 and employing VECM and Johansen co-integration analysis, Dessie (2016) concluded that FDI has a negative effect on per capita gross domestic product both in the short run and long-run. The findings were attributed to the misuse of foreign investment incentives (for example tax incentives) by foreign investors for an unintended purpose. Melak (2018) also concluded a negative long-run relationship between FDI and economic growth in Ethiopia applying Engle-Granger co-integration and OLS technique on time series data for the period 1981 to 2013.

3.3.4 The Causal Relationship Between FDI and Economic Growth

3.3.4.1 Causality Between FDI and Economic Growth in Developed Economies

Inconclusiveness of empirical results is also evident in FDI-economic growth causality literature of developed countries. For example, Dritsaki and Adamopoulos (2004) concluded that there is a unidirectional causality from FDI to GDP for Greece applying VAR approach and Johansen co-integration analysis with Error Correction Model (ECM) framework on time series data for the period 1960 to 2002. Contrary to this result, employing Johansen co-integration, ECM and the Granger causality test on time series data for the period 1970 to 2009,

Georgantopoulos and Tsamis (2011) found the existence of a unidirectional causality from economic growth to FDI for Greece.

Both studies used similar approaches (VAR, Johansen co-integration analysis and ECMs) but arrived at different causality relationship conclusions. One possible explanation for such inconsistency of results, apart from data variations, could boil down to the weakness of the traditional Granger causality analysis which both studies employed. The traditional Granger causality analysis that uses only two variables, as in the case of Georgantopoulos and Tsamis (2011), ignores the influence of other variables whose absence may result in spurious causality results, subjecting causality results into inconsistency problem (Toda, 1995). The other reason could be the use of Wald test that no more approximates the Chi distribution asymptotically when causality analysis is made with cointegrating non-stationary data (which both studies used) thereby subjecting the outcomes to erroneous results (Giles, 2011a; Giles, 2013a).

Applying univariate traditional Granger causality analysis on time series of Singapore for the period 1976 to 2002, Feridun and Sissoko (2011) found that there exists a unidirectional causal relationship from FDI to GDP. The Granger causality analysis result is questionable as it is based on non-stationary data without co-integration. The existence of co-integration guarantees causation; but the reverse is not true. Given this established fact, there is a high degree of vulnerability for the concluded FDI-economic growth causality to be based on spurious regression results as co-integration test did not testify the existence of co-integration between variables (Giles, 2013a; Giles, 2011a). On the contrary, Owusu et al. (2019) concluded that there is a bi-directional causality between FDI and economic growth in Singapore using traditional Granger causality analysis with time series data for the period 1970 to 2015.

Moudatsou and Kyrkilis (2011) found that economic growth in developed nations of Europe Granger causes FDI except Finland where FDI Granger causes economic growth. To arrive at such conclusions, they used VECM based Granger causality analysis for the period 1970 to 2003. Countries considered include: Austria, Belgium, Cyprus, Denamark, Finland, Italy, Malta, Netherlands, Portugal, Spain, Sweden and UK. On the contrary, employing a VAR approach and Toda Yamamoto (1995) Granger causality procedure, Johan and Manuchehr (2010) concluded that there is a bi-directional causality between FDI and economic growth in Sweden, and a unidirectional causality running from FDI to economic growth in Norway, and no causality between the two variables in Denmark and Finland.

Asheghian (2011) found that no causal relationship between FDI and economic growth in Canada applying traditional Granger causality model on time series data for the period 1976 to 2008. Applying simultaneous equations model (SEM) on a panel of 23 OECD countries for the period 1975 to 2004, Turkan et al. (2008) concluded that there exists a bi-directional relationship or endogeneity between FDI and economic growth.

3.3.4.2 Causality Between FDI and Economic Growth in Developing Economies

Causality studies in developing economies also unfold mixed results. Applying panel causality analysis on panel data of 14 European transition economies between 1995 and 2014, Saglam (2017) found that there is a unidirectional causality running from FDI to economic growth in European transition economies. Similarly, Carp (2015) concluded a unidirectional causality running from FDI to economic growth, with the exception of Hungary (no causality), applying Granger-causality estimations on a panel of five European transition economies for the period 1993 to 2013. On the contrary, applying Granger causality on a quarterly panel data of 10 European transition economies between 1993 and2006, Varamini and Kalash (2010) concluded that FDI does not have any causal relationship with economic growth.

On the other hand, causality analysis by Hansen and Rand (2006) used panel data of 31 developing countries, where 10 Asian developing economies included for the period 1970 to 2000, to show that there is a bi-directional causal relationship between FDI and GDP. The bi-directional relationship result considered allowing country specific heterogeneity of all parameters for countries included in the study. One of the limitations of their causality analysis is that it is based on non co-integrating data where the hypothesis of no co-integration is not rejected at 5% significance level. This means the causality analysis result is not laid down on the existence of co-integration of variables thereby casting doubt on the dependability of the result (Giles, 2011a).

Similarly, Basu, Chakraborty, and Reagle (2003) found that there is a long-run bi-directional relationship for more open economies; whereas, in relatively closed economies, the Granger causality between FDI and economic growth appeared to run from economic growth to FDI implying economic growth and FDI are not mutually reinforcing in closed economies. To arrive at these conclusions, they applied a VECM on a panel data of 23 developing countries (where ten of them are from East, South East and South Asian countries) for period 1978 to 1996.

Chowdhury and Mavrotas (2005) concluded the existence of a bi-directional relationship between FDI and GDP in Malaysia and Thailand, and unidirectional causality from GDP to FDI in Chile, applying Toda Yamamoto approach on a time series data for the period 1969 to 2000. The study also noted the existence of bold heterogeneity of FDI-economic growth relationship among the considered countries. One of the limitations of the study, however, is that the existence of co-integration of the I(1) data is not checked with appropriate co-integration test technique. This lessens the dependability of the causality result as causality may not necessarily justify the existence of co-integration of data (Giles 2011a, 2013a). Bin-Shaari, et al. (2012) also concluded a bi-directional causality relationship between FDI and economic growth in Malaysia applying Granger causality model on a time series data for the period 1971 to 2010. However, their causality result casts doubt as it may be based on spurious regression results. They used a traditional causality technique that is not applicable for co-integrating I(1) data where traditional Wald test statistic may not approximate the sought asymptotic Chi square distribution (Giles, 2011a; Giles, 2013a). Moreover, their causality analysis did not consider the impact of other variables (i.e other than FDI and GDP growth rates) thereby increasing the likelihood of getting spurious causality regression results (Anguibi, 2015; Giles, 2011a).

On the contrary, Mohamed et al.(2013) concluded no causal relationship between FDI and economic growth in Malaysia. However, they found domestic investment having bi-directional causality relationship with GDP that led them to advise the government to incentivize domestic investors. To achieve these results, they employed VECM approach preceded by co-integration test where they found co-integrating I(1) data for Malaysia's time series for the period 1970 to 2008 period. One of the limitations of VECM approach for causality analysis relates to distortion of significance level as Wald statistic may not approximate the Chi square distribution under asymptotic conditions with the presence of co-integrating I(1) time series data (Giles, 2011b).

Tang et al. (2008) found that there is a unidirectional causality relationship from FDI to economic growth in China applying ECM model on a time series data for the period 1988 to 2003. On the contrary, Zhao and Du (2007) concluded there is a weak (i.e. not highly significant) bi-directional relationship between FDI and economic growth in China using VAR approach developed by Toda and Phillips and time series data for the period 1985 to 2003. On the other hand, Majagaiya and Gu (2010) also found there is a unidirectional causality from

FDI to GDP applying the traditional Granger causality model on Nepal's time series data for the period 1980 to 2006.

Applying Toda-Yamamoto Granger causality approach on a time series data of India for the period 1971 to 2008, Guru-Gharana (2012) found that there is a unidirectional causality running from FDI to economic growth. Jayachandra and Selian (2010) also concluded a unidirectional relationship from FDI to GDP by employing Granger causality approach on a time series data of India for the period 1970 to 2007. However, Chakraborty and Basu (2002) found evidence that GDP Granger causes FDI in India using VECM approach for the period 1974 to1996. On the other hand, Siddiqui et al. (2017) found there is a bi-directional causality between FDI and economic growth in India applying panel causality technique on a panel data for period 2001 to 2014.

Employing Toda Yamamoto causality approach on a time series data of Pakistan for the period 1970 to 2010, Ullah et al. (2014) concluded a unidirectional relationship running from economic growth to FDI in Pakistan. However, Shahzad et al. (2016) found a bi-directional causality between FDI and economic growth both in the short and long run applying VECM causality approach on a quarterly time series data of Pakistan for the period 1988 to 2010.

Applying Johansen co-integration and VECM Granger causality approach on a time series data for the period 1970 to 2012, Alshehry (2015) found there is a unidirectional causality relationship from FDI to economic growth both in short-run and long-run in Saudi Arabia. Based on the findings, the author recommended (i) improvement of investment climate in Saudi Arabia to attract more FDI, (ii) promotion of FDI investments in sectors other than hydrocarbons, (iii) improvement of the human capacities through training and (iv) implementation of simplified administrative systems. Belloumi and Alshehry (2018), on the contrary, found a bi-directional (negative) long-run relationship between FDI and economic growth (proxied by non-oil GDP growth) for Saudi Arabia applying ARDL-ECM approach on Saudi Arabia's time series data for the period 1970 to 2015. To verify the results, the author also used Full Modified OLS (FMOLS), Dynamic OLS (DOLS) and Canonical Co-integration Regression (CCR) techniques and arrived at similar conclusions. Based on this result, Belloumi and Alshery (2018) recommended (i) to direct FDI to more productive sectors where FDI can impact economic growth (ii) make Saudi Arabia's economic activities independent of oil rents.

Oladipo et al. (2009) concluded a unidirectional relationship between FDI and economic growth for Mexico using a time series data for period 1970 to 2004 and traditional Granger

causality technique. Oladipo (2013), applying Toda Yamamoto (1995) and Dolado and Lutkepohl (1996) causality analyses techniques, however, found a bi directional relationship between FDI and economic growth for Mexico, Brazil, Argentina, Peru, Venezuela and Argentina. The author also found unidirectional causality relationships running from FDI to economic growth for other Latin American and Caribbean countries covered in the study with the exception of Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, and Jamaica.

Employing VECM and Granger causality analyses on a panel data for the period 1970 to 2006, Elboiashi, et al. (2009) concluded there is a bi-directional causality between FDI and GDP in Tunisia. However, the causality runs from FDI to GDP in Egypt and Morocco. Soumare'(2015) also found bi-directional causality relationship between FDI and economic growth for North African countries by applying Granger causality model on a panel data for the period 1990 to 2010.

Examining the casual relationship between FDI and economic growth in ten SSA countries, Esso (2010) concluded that FDI Granger causes economic growth in three countries, namely, Angola, Cotd' Ivoire, and Kenya; whereas, economic growth Granger causes FDI in two countries, namely, Senegal and South Africa, and no long-run relationship exists between FDI and economic growth in the rest of Sub-Saharan countries considered. The study used Pesaran, Shin, and Smith (2001) ARDL bounds test to co-integration approach and the Toda and Yamamoto (1995) approach for the period 1970 to 2007. Despite its merit of the use of Toda-Yamamoto approach for co-integrating non-stationary time series data, the main limitation of Esso (2010) is that it considered causal relationships only between real GDP per capita and real FDI variables ignoring the influence of other variables. Omission of important variables that influence the relationship between FDI and economic growth may subject the causality analysis to spurious relationship results (Anguibi, 2015). On the other hand, employing Granger causality technique on a panel data of 23 African countries for the period 1970 to 2011, Seyoum and Jihong (2014) found a bi-directional causality relationship between FDI and economic growth.

Available studies of causality relationship between FDI and economic growth for Ethiopia also unfold inconclusiveness or mixed results. For example, Woldekidan (2015) concluded a unidirectional causality from FDI to growth. However, the author's result on causality relationship between FDI and growth casts reasonable doubt as she made use of the traditional

Granger causality technique that considered only the two variables (i.e real GDP and FDI), ignoring the impact of other control variables which may lead to inconsistent causality relationship results (Anguibi, 2015; Toda and Yamamoto, 1995). Gizaw (2015) also concluded unidirectional causality running from FDI to economic growth in Ethiopia applying pairwise Granger causality analysis on a time series data for the period 1974 to 2013. On the contrary, Awel and Woldegiorgis (2014) found no causality relationship between FDI and economic growth in Ethiopia applying Toda Yamamoto causality approach on a time series data for the period 1974 to 2010.

Table: 3.1 Summary of Empirical Literature Review

Authors	Period	Country	Methodology/Data	Result
Nexus Between FDI and Economic Growth-Developed Countries				
Owusu et al. (2019)	1970-2015	Singapore	Johansen Co-integration and VECM	Positive long-run relationship
Carbonell (2018)	1984-2010	Spain	ARDL model	No relationship between FDI and economic growth
Pandya and Sisombat (2017)	2001-2013	Australia	OLS	No relationship
Stefanova and Miteski (2017)	1998-2013	16 European Countries	OLS technique	Positive relationship (via/for industry and service sectors); and no relationship via/for construction sector)
Simionescu (2016)	2008-2014	Seven European Countries	Bayesian Regression Technique	Negative relationship between FDI and economic growth
Szkorupová (2015)	1993-2012	European Countries	Panel regression technique	Negative relationship between FDI and economic growth

Authors	Period	Country	Methodology/Data	Result
Angelopoulou and Liargovas (2014)	1989-2008	16 Developed Countries of EMU	OLS technique on a panel data	No relationship
Dritsaki and Stiakakis (2014)	1984-2010	Croatia	ARDL approach	Negative relationship in the short and long-run
Ashegain (2011)	1976-2008	Canada	De Mello's regression framework	No relationship between FDI and economic growth
Solomon (2011)	1981-2005	26 Developed economies 85 developing economies	GMM technique	No relationship
Andraz (2010)	1977-2004	Portugal	OLS technique	Positive relationship
Vu and Noy (2009)	1980-2003	6 developed countries	OLS and Endogeneity Test	Positive relationship
Kim and Bang (2008)	1975-2006	Ireland	Augmented Aggregate Production and Bounding test approach	Positive long-run and short-run relationship exist.
Ghosh and Van den Berg (2006)	1970-2000	USA	SEM	Positive relationship between FDI and economic growth (via improvement of productivity)
De Mello (1999)	1970-1990	32 OECD & Non-OECD Countries	Time Series & Panel Data	A positive relationship between FDI and Growth for OECD Countries; no relation for non-OECD Countries

Authors	Period	Country	Methodology/Data	Result
Nexus Between FDI and Economic Growth-Developing Countries				
Anetor et al. (2020)	1990-2017	29 SSA countries	FGLS	Negative relationship
Dinh et al. (2019)	2000-2014	Lower middle income countries	VECM and FMOLS	Negative in the short-run and positive in the long-run
Nantwi and Erickson (2019)	1980-2015	Latin American Developing economies	Pedron's panel co-integration technique	Positive long-run relationship between FDI and economic growth
Timini et al. (2019)	2001-2015	19 Latin American countires	GMM technique	No significant relationship between FDI and economic growth
Acquah and Ibrahim (2019)	1980-2016	46 African countries	GMM technique on a panel data	Ambiguous/mixed result
Alabi (2019)	1986-2017	Nigeria	OLS	Positive relationship between FDI and economic growth
Melak (2018)	1981-2013	Ethiopia	OLS	FDI has negative long-run impact on economic growth
Massanja (2018)	1991-2013	Tanzania	OLS and ECM models	Insignificant positive relationship between FDI and economic growth
Kingu (2018)	1970-2012	Tanzania	ECM model	Negative relationship between FDI and economic growth
Oneya et al. (2018)	1990-2016	East African countries	OLS	No/insignificant relationship between FDI and economic growth

Authors	Period	Country	Methodology/Data	Result
Saglam (2017)	1995-2014	European transition economies	Panel data co-integration and common correlation effect (CCE)	Negative relationship between FDI and economic growth
Siddiqui et al. (2017)	2001-2014	India	OLS and panel co-integration technique	No relationship between FDI and economic growth
Alvarado et al. (2017),	1980-2014	Latin American Developing economies	Panel data technique	No significant relationship between FDI and economic growth
Ojewumi and Akinlo (2017)	1980-2013	33 SSA countries	VECM on a panel data	Positive relationship between FDI and economic growth
Chanie (2017)	1974-2014	Ethiopia	SEM	Positive relationship between FDI and economic growth
Jilenga et al. (2016)	1970-2011	Tanzania	ARDL approach	Negligible negative relationship between FDI and economic growth
Awolusi and Adeyene (2016)	1980-2013	5 SSA countries	OLS and GMM technique on a panel data	Negligible/no significant relationship
Rjoub (2016)	1995-2013	Seven Latin American countries	Panel Regression	Positive relationship between FDI and economic growth
Abubakar and Bala (2016)	1980-2013	India	VECM	Positive and negative relationships in the long-run and short-run, respectively.
Raza (2016)	1972-2011	Pakistan	ARDL approach	Positive relationship

Authors	Period	Country	Methodology/Data	Result
				between FDI and economic growth
Dessie (2016)	1981-2015	Ethiopia	VECM	FDI has negative impact on economic growth both in the short and long-run
Jun (2015)	1960-2013	SAARC countries	Panel co-integration technique	Positive relationship between FDI and economic growth
Woldekidan (2015)	1980-2015	Ethiopia	OLS	Positive relationship between FDI and economic growth
Gizaw (2015)	1975-2013	Ethiopia	VAR approach	Positive relationship between FDI and economic growth
Menamo (2014)	1974-2011	Ethiopia	OLS	Positive relationship between FDI on economic growth, but found out crowding out of FDI on domestic investment.
Ngeny and Mutuku (2014)	1970-2011	Kenya	ARDL and EGARCH	Positive relationship between FDI and economic growth; but volatility of FDI has negative relationship with economic growth
Gui-Diby (2014)	1980-2009	50 African countries	GMM technique on a panel data	Positive relationship between FDI and economic growth

Authors	Period	Country	Methodology/Data	Result
Mazenda (2014)	1980-2010	South Africa	Johansen Co-integration and VECM	Negative relationship between FDI and economic Growth
Rahman (2014)	1999-2013	Bangladesh	Multivariate OLS Regression analysis	Negative relationship between FDI and economic growth.
Curwin and Mahutga (2014)	1990-2010	European transition economies	Panel data regression	Negative relationship between FDI and economic growth
Ali and Zhang (2013)	China	1985-2008	Borensztein et al. (1998) approach	Positive relationship between FDI and economic growth
Mohammed, et al. (2013)	1970-2008	Malaysia	VECM with Time series data	No relationship between FDI and economic growth.
Soi et al. (2013)	1960-2010	Kenya	OLS	No significant relationship between FDI and economic growth
Abeje (2013)	1980-2010	Ethiopia	OLS	Positive relationship between FDI and economic growth
Kedir (2012)	1970-2009	Ethiopia	VAR approach	FDI is negatively related with economic growth in the long-run
Kotrajaras et al. (2011)	15 East Asian Countries	1990-2009	Panel co-integration approach	Positive relationship betwee FDI and economic growth
Herzer (2010)	1970-2005	44 Developing economies	Panel co-integration technique that considers heterogeneity	Negative relationship on the average

Authors	Period	Country	Methodology/Data	Result
Sapienza (2010)	1990-2005	European transition economies	Panel data model	Positive relationship between FDI and economic growth
Ali and Ahmad (2010)	1980-2006	Malaysia	OLS on a panel data	Positive relationship between FDI and economic growth
Posu et al. (2010)	1970-2003	Nigeria	OLS	Positive relationship in mining, quarrying, transport and communication sectors; but insignificant on the growth of agriculture, forestry and fishery sector
Oladipo et al. (2009)	1970-2004	Mexico	Johansen co-integration and ECM technique	Positive long-run relationship between FDI and economic growth
Iram (2009)	1978-2008	Pakistan	ARDL approach	No relationship in the short-run, but positive relationship in the long-run
Falki (2009)	1980-2006	Pakistan	OLS	No relationship between FDI and economic growth.
Jyun-Yi (2008)	1970-2000	37 developing countries and other countries totalling 62	2SLGS, GMM and Cancer and Hansen (2004) techniques	Mixed results of positive, negative and no relationship results
Ayanwale (2007)	1970-2002	Nigeria	OLS and 2SLS	Negative impact of FDI in manufacturing and no/insignificant

Authors	Period	Country	Methodology/Data	Result
				impact FDI on non-extractive sectors
Baharumshah and Thahoon (2006)	East Asian Countries	1982-2001	Dynamic Generalized Least Squares (DGLS)	Positive relationship in both short-run and long-run
Fedderke and Romm (2006)	1956-2003	South Africa	Johansen Co-integration and VECM	Positive effect on economic growth
Moolman et al. (2006)	1970-2003	South Africa	Co-integration techniques	FDI Positively impacts economic Growth
Borensztein et al. (1998)	1970-1989	69 developing countries	Paned data regression technique	FDI and economic growth has Positive relationship dependent upon absorptive capacity
Causality Between FDI and Economic Growth-Developed Countries				
Owusu et al. (2019)	1970-2015	Singapore	Granger causality	Bidirectional relationship between FDI and economic growth
Moudatsou and Kyrkilis (2011)	1970-2003	Developed countries of Europe	VECM Granger causality	Economic growth Granger causes FDI in developed nations of Europe except Finland where FDI Granger causes economic growth
Feridun and Sissokko (2011)	1976-2002	Singapore	Granger Causality	Unidirectional from FDI to Economic growth
Ashegain (2011)	1976-2008	Canada	Granger Causality Analysis (time series)	No causality

Authors	Period	Country	Methodology/Data	Result
Georgantopoulos and Tsamis (2011)	1970-2009	Greece	Johansen Co-integration Test and Granger Causality Test	Unidirectional causality from economic growth to FDI
Johan and Manuchehr (2010)		Sweden, Norway, Denmark, Finland	Toda Yamamoto (1995) approach	Bidirectional causality in Sweden, unidirectional causality from FDI to economic growth in Norway and no causality in Denmark and Finland.
Turkcan et al. (2008)	1975-2004	23 OECD Countries	Simultaneous equation system using GMM	Bi-directional relationship between FDI & economic growth
Dritsaki et al. (2004)	1960-2000	Greece	VAR, ECM Granger Causality	Unidirectional Causality from FDI to GDP
Causality Between FDI and Economic Growth-Developing Countries				
Belloumi and Alshehry (2018)	1970-2015	Saudi Arabia	ARDL-ECM Granger causality approach, and also FMOLS, DOLS and CCR techniques for verifications	Bi-directional relationship between FDI and economic growth
Saglam (2017)	1995-2014	European transition economies	Panel causality analysis	Unidriectional causality from FDI to economic growth
Siddiqui et al. (2017)	2001-2014	India	Panel causality approach	Bidirectional relationship between FDI and economic growth
Shahzad et al. (2016)	1988-2010	Pakistan	VECM causality approach	Bidirectional relationship between FDI and

Authors	Period	Country	Methodology/Data	Result
				economic growth both in the short and long-run.
Carp (2015)	1993-2013	Five European Transition economies	Panel causality analysis	Unidriectional causality from FDI to economic growth with the exception of Hungary where no causality is found.
Alshehry (2015)	1970-2012	Saudi Arabia	VECM Granger Causality approach	unidirectional relationship from FDI to economic growth both in the short-run and long run
Soumare'(2015)	1990-2010	North African countries	Granger causality	Bi-directional relationship between FDI and economic growth.
Woldekidan (2015)	1980-2015	Ethiopia	OLS	Unidirectional causality from FDI to economic growth.
Awel and Woldegiorgis (2014).	1974-2010	Ethiopia	Toda-Yamamoto Approach	No causality relationship between FDI and economic growth.
Gizaw (2015)	1974-2013	Ethiopia	Pairwise Granger causality	Unidirectional causality from FDI to economic growth.
Seyoum and Jihong (2014)	1970-2011	23 African countries	Panel Granger causality	Bi-directional relationship between FDI and economic growth
Ullah et al. (2014)	1970-2010	Pakistan	Toda-Yamamoto (1995) approach	Unidirectional relationship from GDP to FDI

Authors	Period	Country	Methodology/Data	Result
Mohammed, et al. (2013)	1970-2008	Malaysia	Co-integration and VECM approach for causality	No causal relationship between FDI and economic growth.
Oladipo (2013)		Brazil, Argentina, Peru, Venezuela and Argentina.	Toda-Yamamoto (1995) and Dolado and Lutkepohl (1996)	Bi-directional relationships in the countries
Guru-Gharana (2012)	1971-2008	India	Toda-Yamamoto (1995) causality approach	Unidirectional relationship from FDI to GDP
Bin-Shaari, et al. (2012)	1971-2010	Malaysia	Granger Causality	Bi-directional causality relationship
Esso (2010)	1970-2007	10 SSA countries	ARDL and Toda-Yamamoto (1995) causality approach	FDI Granger causes economic growth in Angola, Cote d' Ivorire and Kenya; economic growth Granger causes FDI in Senegal and South Africa; an no causality relationships in the rest of SSA.
Jayachandran and Seilan (2010)	1970-2007	India	Granger causality approach	Unidirectional causality from FDI to economic growth
Majagaiya and Gu (2010)	1980-2006	Nepal	OLS and Granger causality	Unidirectional relationship from FDI to GDP
Varamini and Kalash (2010)	1993-2006	10 European transition economies	Panel causality analysis	No causality between FDI and economic growth.
Oladipo et al. (2009)	1970-2004	Mexico	Granger causality	Unidirectional from FDI to economic growth.

Authors	Period	Country	Methodology/Data	Result
Elboiashi, et al. (2009)	1970-2006	Egypt, Morocco, and Tunisia	VECM and Granger Causality	Bi-directional causality in Tunisia and unidirectional from FDI to GDP in Egypt and Morocco.
Tang et al. (2008)	1988-2003	China	VECM causality approach	Unidirectional relationship from FDI to economic growth
Zhao and Du (2007)	1985-2003	China	VAR approach developed by Toda and Philips (1993)	Bi-directional relationship (weak)
Hansen and Rand (2006)	31 Developing countries	1970-2000	Heterogeneous panel model causality	Bi-directional causal relationship between FDI and GDP
Chowdhury and Mavrotas (2005)	1969-2000	Chile, Malaysia, and Thailand	Toda-Yamamoto Causality	Uni-directional causality from GDP to FDI for Chile, and bi-directional for Malaysia and Thailand
Basu, et al. (2003)	23 Developing Countries	1978-1996	VECM on Panel data	Bi-directional relationship in open economies and unidirectional relationship from economic growth to FDI in relatively closed economies
Chakraborty and Basu (2002)	1974-1996	India	VECM	Unidirectional relationship from GDP to FDI

3.4. Summaries and Conclusions on Literature Review

Major findings from literature review can be summarized as follows. The underpinning theories of FDI generally focus on the relationship between FDI and development and how FDI is initiated in FDI originating or FDI home countries. Unlike economic growth theories

(discussed in the conceptual framework section) that lay the foundation for functional relationship between FDI and economic growth, and that substantially predict the positive contribution of the former to the latter, empirical literature unfolds mixed or inconclusive results on the impact of FDI to economic growth.

However, while mixed results of FDI-economic growth relationships are prevalent in both developed and developing economies, the empirical literature on impact of FDI on economic growth for developing and developed countries appears to subtly follow the pattern of an inverted U finding or hypothesis on the relationship between the impact of FDI on economic growth and income levels of countries as forwarded by European Investment Bank (ECB) with authorship of Baiashvili and Gattini (2020). The inverted U shaped FDI- growth impact and countries' income level relationship finding, in general, explains the impact of FDI on economic growth (measured as the percent change in GDP per capita in response to 1% increase in FDI/GDP ratio), and countries' income levels (i.e., low, low middle, high middle and high per World Bank income based classification of countries), plots an inverted U shaped graph. That is, the impact of FDI on economic growth is low in low income countries, high in low middle income countries, peak in high middle income countries, and low in high income counties. Baiashvili and Gattani (2020) inverted U FDI impact-income level hypothesis suggests that the impact of FDI is low for low income group countries due to their low absorptive capacity; whereas, its impact is higher in low middle and higher middle income group countries that have high FDI demand and better absorptive capacity. However, the impact of FDI on economic growth declines as countries transition to high income group countries (despite the existence of high absorptive capacity) as FDI does not provide the needed financing for capital accumulation in developed nations except for import of new technologies and inputs for existing production function (Baiashvili and Gattini, 2020).

With regards to the methodological aspect of the literature, some weaknesses can be mentioned. The first one is that in studies that make use of single equation multivariate models, regressions are carried out, in some cases, after simply identifying the order of integration without making co-integration analyses. This distorts OLS regression results as the possibilities of regressing with co-integrating variables is foregone in the case of the prevalence of co-integrating variables. Related to this, OLS multivariate regressions that use time series data of order of integration (1) are observed to use differenced data that may result in loss of information and distortion of results. The other technical flaw observed is that there are empirical studies in

which no unit root analyses are made altogether subjecting regression outputs to spurious results, especially, when the data used are non-stationary.

One of the major weaknesses observed with causality analysis is related to the use of a single variable causality analysis which ignores the impacts of other influential variables. The other problem relates to the fact that differenced time series data are used in VAR based FDI-economic growth causality models in cases of non-stationary data. As discussed earlier, this tradition may result in distortion of results as the models are vulnerable to loss of useful information. The use of VECM or ECM based causality analysis for co-integrating variables with the traditional Wald test can also be mentioned as another weakness area observed in the empirical literature as studies indicate that Wald test statistic does not approximate Chi Square distribution under asymptotic conditions when non-stationary data are used (Giles, 2011b).

Chapter 4: Conceptual Framework

4.0 Introduction

Conceptual framework is defined as an integral part of understanding and analysing the research problem (i.e. the effects/impact of FDI on Ethiopia's economic growth in the case of this study). Conceptual framework is a good instrument to give a thorough understanding of the research problem and establish links among the problem, research objectives, empirical hypotheses and methods of a research that are explicitly and implicitly shown in this study (Ethridge, 2004). Accordingly, in this chapter, the conceptual framework focuses on explaining theories that serve as the foundation for establishing a functional relationship between FDI and economic growth.

4.1 The Neo-Classical Growth Model (Exogenous Growth Model)

Following the seminal contributions of Solow and Swan between 1956 and 1957, the Neo-Classical growth model (exogenous growth model) became the dominant model in the economic growth literature (Snowdon, 2005). The main distinguishing feature of exogenous growth models is that technology is assumed to be exogenously determined. This is because the model assumes technology to be a public good freely available to all countries (Snowdon, 2005). It is a proximate economic growth analysis in that it assumes economic growth is generated via accumulation of exogenous factors of production, capital, labour, and technology. The exogenous growth model is also a Smithean economic analysis in that it considers economic growth that is based on a division of labour, specialization and trade, in addition to accumulation of exogenous factors of production (Snowdon, 2005).

The neoclassical or exogenous growth model is based on the classical aggregate function that is expressed as: $Y=A_tF(K, L)$, where Y is the real output; K is capital; and A_t is total productivity that measures technology through time. As a consequence, the model is characterised by diminishing returns on capital which has been the subject of major criticism. Elboiashi (2011) argues that the accumulation of factors of production subject to diminishing returns makes the neo-classical model analysis applicable to short-term economic growth, ignoring the long-term growth. Besides, the model is criticized for its assumption of capital to be solely related to accumulation of tangible assets. Ho and Liang (2007) also argue the neo-classical model does not explain how technology, knowledge and information are transmitted along with capital accumulation. However, there are also counter-arguments that support the

neo-classical model. Barro and Sala-I-Martin (1995), for example, argue that the neo-classical model is concerned about long-term economic growth as it considers a time trend with the exogenously determined technology. Despite critics discussed above, the neo-classical growth model serves as a strong vehicle to explain the direct relationship between FDI and economic growth. Snowdon (2005) also notes the Solow model serves as the starting point for any discussion of economic growth for economists.

4.2 The Endogenous Growth Model

The development of the endogenous growth model was spearheaded by the prominent economist Romer (1990) who sought to develop a growth model in which per capita growth is determined by investment decisions (endogenous) rather than by unexplained exogenous technical progress (Snowdon, 2005). To this end, Romer, unlike the neoclassical model, broadened the capital investment to include investment in knowledge as well as the accumulation of physical goods (Snowdon, 2005). The endogenous growth model is explainable with the aggregate function of Y=F(K, L, A) presented in two variants.

The first variant of Romer's (1986) model considered technological progress as an unintended by-product of capital accumulation of firms where the growth of knowledge (technology) is assumed to depend on the growth of invested capital. Thus, because knowledge is only partially excludable, investments made in certain firms have positive spill over effects (externalities) in transferring similar knowledge to other firms in the country. This means any increase in aggregate capital (K) improves technology (A). Therefore, in essence, the whole story of the first variant of endogenous growth model is that though there is diminishing returns in capital accumulation process, the aggregate function faces an increasing returns on factors of production due to increasing spill overs of knowledge in the economy brought about by accumulated capital.

The second variant of the endogenous model emerged when Romer improved the first version of the endogenous model that considered technology or knowledge as the by-product of aggregate capital. He thus developed the second variant of the endogenous growth model based on the new Schumpeterian framework of endogenous technological change that has three premises (Snowdon, 2005). The first premise is that the basic driving force for economic growth is a technological change that results in a better transformation of inputs into outputs via production processes. Secondly, technological change is an endogenous process driven by

decisions of economic agents that have financial benefit interests. Thirdly, he characterised knowledge as non-rivalry in consumption and a partially excludable public good.

In characterizing knowledge, Romer noted that there is non-rivalry of knowledge in consumption as the use or consumption of knowledge by certain firms does not reduce the availability of knowledge for other firms. He also noted the concept of partial excludability of knowledge, where excludability is defined as the ability of firms to prevent their knowledge from being used by other entities.

The implication of characterizing firms' knowledge or ideas as non- rivalry is that knowledge can be acquired without limit by firms, and that once new knowledge or ideas are developed or acquired by certain firms at considerable cost, it can be used by other firms at no cost making the marginal cost of the new idea to be zero. The fact that knowledge is only partially excludable, given the legal and technology systems available, means substantial spill overs to other firms may exist from firms that use or develop new ideas. Thus, the second variant of endogenous growth theory also establishes returns on factors of production cannot be constant-returns-to scale due to the existence of non-rivalry in consumption and partial excludability of knowledge. There is rather an increasing return on factors of production.

4.3 Augmented Solow Model

The Augmented Solow model was developed by Mankiw, Romer, and Weil (1992) to better explain income disparities between countries by improving the weaknesses of the neo-classical growth model. The model aims to increase the share of income of capital in the model by including the accumulation of human capital as well as physical capital. This model is written as: $Y= K^{\alpha} H^{\beta}(AL)^{1-\alpha-\beta}$, and $(\alpha + \beta) < 1$, where K, H denote physical and human capital stocks, respectively, and AL is the labour input measured in efficiency units to capture both the quantity of labour and the productivity of labour determined by available technology (Snowdon, 2005). With the addition of human capital, the share of capital increased to 2/3 as compared to capital share in exogenous growth model (1/3). In the model, though income differentials are better explained as compared to the Solow model, the growth model does not show endogenous growth as per capital income eventually settles down to a steady state and grows at the exogenously determined rate of technological progress. This is because the sum of exponents of H and K becomes less than one (Snowdon, 2005).

4.4 Conclusion

In general, the following points can be concluded from the foregoing discussions on major economic growth theories. Firstly, the neo-classical theories (exogenous model including the augmented model) are inherently Smithean that anticipate output productivity improvement via division of labour, specialization and trade; whereas, the endogenous model is a Promethean economic growth model that anticipates a sustainable growth driven by technological progress and innovation (Snowdon, 2005).

Secondly, because exogenous theory characterised by diminishing returns emphasizes solely the direct impact of FDI on economic growth through accumulation of factors of production, its implication on long-term FDI-economic growth relationship is weak. However, the endogenous theory has strong implication on long-term FDI-economic growth relationship via technology and know-how spill overs (indirect impact) that results in increasing returns to scale of factors of production.

Thirdly, both exogenous and endogenous growth models discussed above have strong implications for the problem under investigation. The exogenous theory predicts the direct impact of FDI on economic growth via accumulation of factors of production; whereas the endogenous growth theory, predicts both the indirect and direct impact of FDI on economic growth via its emphases on spill over effects of FDI and accumulation of factors of production, respectively (Baiashvili and Gattini 2020; Behnam, 2012). So, neo classical and endogenous theories lay the foundations for short and long-run models used in the study, respectively.

Chapter 5: Methodology

5.0 Introduction

This chapter presents the methodology used in the study. The model adopted is specified and the variables included are discussed. The study applies the multivariable Autoregressive Distributed Lag (ARDL) model, developed by Pesaran (2001), for the examination of the nexus between FDI and economic growth in Ethiopia between 1970 and 2018. The chapter concludes with a discussion of the sources of data employed in the study and the limitations of the study. The chapter thus explains the empirical models and techniques used to arrive at conclusions set in the research objectives in five sections, namely, model specification, explanation and justification of variables, a priori expectations, data and data sources, estimation techniques and model stability diagnostics.

The empirical models utilised in the study include: Auto regressive distributed lag (ARDL) for co-integration (unrestricted ARDL model), long-run ARDL model, short-run ARDL (restricted ARDL model) and Toda-Yamamoto (TY) model. The ARDL model for co-integration analysis is used to check the existence of long-run relationships among the variables used; whereas, the long-run ARDL model is used to estimate the relationship between economic growth, as a dependent variable, and explanatory variables in the long-run. The short-run ARDL model is an Equilibrium Correction Model (ECM) that measures how variables are related in the short-run including the speed of adjustment between the short-run and long-run variables. The TY model is used to determine the causality between economic growth and FDI while taking into account the impact of other explanatory variables considered in the model. The chapter also contains unit root test techniques to determine the stationarity/non stationarity of time series data and order of integration. Major stability diagnostic tests that include RESET, serial correlation, heteroscedasticity, normality, cumulative sum of squares of recursive residuals (CUSUM), cumulative sum of squares of recursive residuals (CUSUMSQ), inverse roots polynomials are also discussed.

5.1 Econometric Model Specification

This study pursues a quantitative approach using an econometric model based on the Cobb Douglas production function that specifies production as a function of labour and capital (i.e Y=F(L, K)), inspired by the neoclassical growth theory. This study specifies real GDP(RGDP)

as the dependent variable, foreign direct investment (FDI), gross fixed capital formation (GFCF), labour force (LAB), trade (TR) and inflation (CPI) as explanatory variables.

The Cobb-Douglass production function is expressed as:

$$\mathbf{RGDP_t = \alpha_1 FDI_t^{\beta 1} GFCF_t^{\beta 2} LAB_t^{\beta 3} TR_t^{\beta 5} CPI_t^{\beta 6} e^{et}} \text{……..……..(1)}$$

where GDP_t, FDI_t, $GFCF_t$, LAB_t, TR_t, CPI_t, e_t are real GDP, foreign direct investment, gross fixed capital formation, labour, trade, CPI, and the error term, respectively.

Equation (1) is written in log-log form as:

$$\mathbf{lnGDP_t = \beta_0 + \beta_t + \beta_1 lnFDI_t + \beta_2 lnGFCF_t + \beta_3 lnLAB_t + \beta_4 lnTR_t + \beta_5 lnCPI_t + e_t} \text{…… (2)}$$

Where:

LnGDP is log of GDP

LnFDI is log of FDI inflows

$LnGFCF_t$ is log of gross fixed capital formation

$lnLAB_t$ is log of labour

lnTR is log of trade

lnCPI is log of consumer price index (inflation).

5.2 Explanation and Justification of Variables

The variables included in the model are common in the FDI-economic growth literature. Real GDP, the value of final goods and services produced in the economy annually, is measured at constant 2010 USD prices. FDI, a flow concept, is also measured at USD constant price 2010. Gross fixed capital formation is a value of acquisitions of new or existing fixed assets by business sector and government less disposals of fixed assets per annum valued at USD 2010 constant prices. Fixed assets include acquisitions of new and existing tangible assets (i.e. machinery and equipment, dwellings, cultivated assets, for example, trees, livestock, etc., major improvements to existing fixed or natural assets including land, and acquisitions of intangible assets, for example, software (UNSD, 2019). GFCF is considered as a proxy for domestic investment. Labour force is used as per the definition of the International Labour Organisation (ILO) that considers active population above the age of 15 (ILO, 2011). Trade is

the value of merchandized imports and exports at USD 2010 constant prices. Consumer price index (CPI) values are also based on at USD 2010 constant prices.

FDI affects the economic growth of developing economies through various ways. Lenka et al. (2014) conclude that FDI is one of the major determinants of economic growth in developing countries as it increases capital accumulation, employment, know-how and technology transfer. Chirwa et al. (2016) also argue that FDI is one of the key macro-economic determinants of economic growth in developing countries and suggest that the impact can be via direct and indirect channels. In this regard, Woldekidan (2015) identifies capital formation and increased output as direct channels through which FDI affects economic growth; whereas, spill over effects of FDI, i.e., know-how and skill transfers, and productivity improvement of labour are identified as indirect channels. With regards to the impact of FDI on economic growth via indirect channel, Ekholm (2017) also mentions improved management skills, labour training on new work practices as examples of indirect channels.

GFCF is included in many studies as one of variables that determine or impact economic growth and is therefore included in the model as proxy for domestic investment. In addition, it is one of the major determinants of economic growth both from a theoretical and empirical perspectives. It contributes to the growth of employment and output thereby having a direct impact on economic growth. Accordingly, economic theory indicates that the production possibility curve (productive capacity of the economy) shifts outward when the magnitude and productivity of factors of production (i.e. capital and labour) increase (Salvatore, 2011). Sinha (2017) points improvement of productive capacity, generation of employment opportunities and promotion of technological innovations as channels through which investment affects economic growth.

Labour is also one of the most important determinants of economic growth in developing countries from both empirical and theoretical perspectives that Ethiopia is not an exception to. The well-known exogenous and endogenous growth theories consider labour as one of the major determinants of economic growth. Factors of production, for example labour, affects economic growth through productivity (Korkmaz, 2017). The author further identifies factors including improvement of knowledge and skills, technological innovations through research and development (R&D) and climate conditions are responsible for productivity improvement of labour thereby impacting economic growth. Authors such as (Adu ,2013) ; (Raleva, 2014); (Manh, 2014); (Woldekidan, 2015) also include labour as determinant of growth in their

econometric models. The effects of labour on economic growth, however, may vary from country to country depending on the productivity, education and skill levels of labour.

Trade is included in the model as it is also one of the major macro-economic factors that affect economic growth. According to the endogenous growth theory, trade affects economic growth in a number of ways, that is, via (i) helping developing countries to absorb technology from advanced nations, (ii) making developing countries to be beneficiaries from R & D activities in advanced nations, (iii) promoting larger economies of scale in production, (iv) reducing price distortions leading to efficient allocation of resources, (v) encouraging greater specialization and more efficiency in production of intermediate goods, and (vi) introduction of new products and services (Salvatore, 2011). Trade is proxied in this study by the sum of merchandize exports and imports.

Following Chanie (2017) and Amusa (2019), inflation (growth of CPI) is included in the model as a proxy of macro-economic stability. According to Chanie (2017) higher inflation is an indication of macro-economic instability which in turn hampers investment and economic growth.

5.3 A Priori Expectations

Although the general trend in the empirical findings is skewed towards a positive relationship between the two variables, the relationship between FDI and economic growth remains inconclusive. De Mello (1999), for example, concludes that FDI has a positive impact on growth in OECD countries; whereas, it has an insignificant impact on the economic growth of non-OECD countries. Kedir (2012) asserts that there is a negative relationship between per capita real GDP and FDI in Ethiopia due to crowding out effect of FDI on domestic investment, repatriation of profits and low human capital. On the contrary, Chanie, (2017) concludes FDI has significant and positive relationship with economic growth in Ethiopia. Therefore, the relationship between FDI and economic growth remains an empirical question.

The relationship between gross fixed capital formation and economic growth is generally expected to be positive. However, even though capital investment is seen as a positive contributing factor to economic growth as implied in growth theories, this may not always be the case in empirical studies. Eberechukwu (2013), for example, concludes that capital formation and economic growth has positive feedback relationship in Sub-Saharan countries. Onyinye et al. (2017), on the other hand, find gross fixed capital formation to has a negative impact on economic growth in Nigeria. Chanie (2017) finds a positive significant relationship

between economic gross fixed capital formation and economic growth in Ethiopia. On the contrary, Kedir (2012) concludes a negative relationship between domestic investment and economic growth as FDI in Ethiopia has a crowding out effect on domestic investment. Given the ambiguity in the empirical results, Onyinye (2017) argues that the impact of gross fixed capital formation on economic growth varies from country depending on how the intensity of saving, GDP, interest rate, exchange rate, population growth rate and money supply conditions impact gross fixed capital formation. So, though the expectation on the relationship between gross fixed capital formation and economic growth may be significantly positive, such relationship is not always warranted as it depends on country specific conditions that determine the effectiveness of domestic investment towards improvement of the economy's productive capacity.

The relationship between labour force and economic growth remains an empirical question as there is ambiguity in the findings from the literature. For Ethiopia, Woldekidan (2015), for example, concludes a negative relationship between the labour force and economic growth and reasons out that such negative relationship may have links to the unavailability of adequate skilled labour force and low productivity of labour in Ethiopia. On the contrary, Gebru (2015), concluded that labour has a positive long-run impact on economic growth in Ethiopia due to the expansion of educational and health coverage in the past decades which have positive linkage with the improvement of human capital in Ethiopia.

The relationship between trade and economic growth appears to be positive both on theoretical and empirical grounds as trade enhances economic growth. As a consequence, the expectation on the trade variable is not different from this assertion either. Traditional trade theories suggest that trade based on comparative advantages of countries benefits trading nations (Salvatore, 2011). Amusa (2019) also argues that increased trade enhances economic growth through channels of transmission of technology, increased productivity and export capacity and allocation of factors of production to more productive sectors.

The relationship between inflation and economic growth is expected to be negative as inflation introduces uncertainty which hampers economic growth. In this regard, Barro (2013) confirms inflation is costly to economic growth as businesses and households perform poorly due to uncertainties induced by inflationary situation. Empirical research result suggests that a threshold inflation rate up to 6.7 percent promotes economic growth for African countries; but inflation rate beyond this threshold may have a negative impact on the countries' economic

growth (AfDB, 2017). Given this finding, the average two-digit inflation that has become a continuing trend after 2003 in Ethiopia is also an added testimony for a negative relationship expectation.

5.4 Data and Data Sources

The study uses annual time series data from the United Nations Conference on Trade and Development (UNCTAD) and International Monetary Fund (IMF) databases for the period 1970 to 2018. Data on GDP, FDI, gross fixed capital formation, labour, trade are obtained from UNCTAD and data on CPI is obtained from the IMF database (UNCTAD, 2018; IMF, 2019). All the variables are expressed in real terms at USD 2010 constant prices. The variables are used in their log forms and therefore the coefficients of the log-log model measure the relative change in real GDP for a one unit relative change in the respective regressor, i.e., elasticities of real GDP with respect to the explanatory variables (Gujarati, 2009).

5.5 Discussion on Estimation Techniques

5.5.1 Unit Root Analysis

Checking the stationarity of time series data at the onset is very important in order to avoid spurious regression results (Granger et al. 1974). Consequently, in this study, unit root analysis is conducted with the standard Augmented Dickey-Fuller (ADF) and Phillips-Perron tests to determine the order of integration of the time series data. The Modified ADF (ADF breakpoint) unit root test is also considered with the expectation that there may be sensitivity of unit root analysis of variables for structural breaks.

(a) Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF Test)

Stationarity or non-stationarity test which has become common in empirical studies is generally made with the Random Walk Model, $Y_t = \rho Y_{t-1} + U_t$, where, Y_t is a time series dependent variable at time t, Y_{t-1} is the one-period lagged dependent explanatory variable, rho (ρ) is the coefficient of the lagged variable, and U_t is a white noise term. The stationarity of time series data requires that the rho value to be $-1 < \rho < 1$ which otherwise becomes non-stationary or explosive for $|\rho| \geq 1$. However, since measuring ρ with the usual OLS t-static results in extremely biased ρ value, the stationarity test is commonly measured with the equivalent Random Walk equation of $\Delta Y_t = \delta Y_{t-1} + U_t$. This equation is found with simple arithmetic arrangement when Y_{t-1} is subtracted from both sides of the equation, where, $\delta = (\rho - 1)$ (Gujarati, 2009). Therefore, the hypothesis testing usually considered is $\delta = 0$ rather than $\rho = 1$. Dickey

and Fuller found that the t-statistic for testing $H_0: \delta = 0$ follows a tau (τ) statistic whose critical values are compiled by themselves, and later, a more detailed critical values by MacKinnon (Gujarati, 2009). DF stationarity test considers three cases of Random Walk Models (RWM) for measurement of stationarity, i.e., RWM without drift (constant), RWM with drift, and RWM with drift and deterministic trend. Mathematically, the options are stated as:

Case 1. A RWM without drift, i.e., $\Delta Y_t = \delta Y_{t-1} + U_t$

Case 2. A RWM with drift, i.e., $\Delta Y_t = \beta_1 + \delta Y_{t-1} + U_t$

Case 3. A RWM with drift and deterministic trend, i.e., $\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + U_t$

Augmented Dickey-Fuller (ADF) test is also developed by Dickey and Fuller to improve the weakness of DF test which assumes no serial correlation. As a consequence, ADF test takes into account serial correlation problems by considering parametric adjustment via addition of differenced lagged values (ΔY_t) of the dependent variable in all three cases of RWMs. The ADF regression equation is thus stated as: $\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta Y_{t-I} + U_t$, where, $\Delta Y_{t-1} = Y_{t-1} - \Delta Y_{t-2}$, $\Delta Y_{t-2} = Y_{t-2} - \Delta Y_{t-3}$, etc., included to make the residuals uncorrelated. One of the major challenges of ADF is the determination of the optimum lag, which is handled with the use of appropriate lag information criteria. The other problem is that ADF test (and also DF) may result in false unit root test results in cases where the time series data are affected by structural breaks (Eviews, 2019).

(b) Phillips-Perron Unit Root Test

Unlike the ADF test, PP test takes a non-parametric adjustment to serial and heteroscedastic problems. As a consequence, it has advantages over ADF test in that it does not require lag-specification, and that it is a robust unit root analysis with general forms of heteroscedasticity (Stata, 2019). The PP test statistic estimates the DF statistic with $Y_t = \rho Y_{t-1} + U_t$ regression equation by modifying the t-ratio so that the asymptotic distribution of the statistic is not affected by serial correlation. In other words, PP statistic can be seen as DF statistic made robust to serial correlation using Newey-West (1987) heteroscedasticity and autocorrelation consistent covariance matrix estimator. The asymptotic distribution of PP modified t-ratio is, however, the same as that of ADF statistics (Stata, 2019).

(c) ADF Breakpoint Unit Root Test

Perron (1987) explains conventional unit root tests may result in false unit root test results when data are trend stationary with a structural break. This has spurred the development of various unit root analyses techniques of which modified ADF test with breakpoint is one that takes into account structural breaks (Eviews, 2019). ADF with breakpoint technique is used in the unit root analyses of some variables used in the study where significant structural breaks are observed.

Prior to conducting the ADF breakpoint unit root test, analysis of the outliers of the time series data is of paramount importance as inferences drawn on test statistics may be distorted if problems posed by outliers are not addressed (Kaya, 2010). Accordingly, ADF with breakpoint unit root analysis technique requires the determination of whether or not the time series data have innovation outlier (IO) or additive outlier (AO) characteristics, based on the seminal work of Fox (1972) that pioneered the two types of outlier models in time series data (Byers, 2018). Additive outliers in time series data may emanate from mistakes of people or malfunctioning of machines or equipment; whereas, IO outliers come from the randomness nature of the data itself (Kaya, 2010). Additionally, in AO, the break occurs immediately, with the full impact of break variables occurring immediately; while, in an IO model, a break occurs gradually (Eviews, 2019). In AO, only the observation at the point of error introduction is affected; while, in the IO an extraordinary disturbance at a point influences the next variables after disturbance via a dynamic system (Kaya, 2010). Though the shock in IO may be high on the next observations, the impact is tolerable as outliers emanate from natural randomness (Kaya, 2010). Additive outliers (AO), however, may engender serious consequences as they result in biased results of ARMA coefficients and variances as compared to IO whose general effect is much smaller (Chang et al. 1983). The reason is that AO disturbance is always separate from the data, and thus, when it is introduced in ARMA systems (for example, in the case of AR(1)), it also affects the next residual. In the case of IO, the residual is affected only at the date or point of an outlier. In the literature, it is recommended that AO needs adjustment; whereas, IO caused by natural randomness can be tolerated, even if the disturbance may be high (Kaya, 2010). In this study, IO model is considered as it is assumed the outliers that may exist in the time series occur naturally and the break dynamics is gradual.

Eviews (2019) models the null IO breaking dynamics as:

$Y_t = Y_{t-1} + \beta + \psi(L)(\theta DU_t\,(T_b) + \gamma DT_t(T_b) + \epsilon_t)$……..(i) , where,

ϵ_t are i.i.d innovations and $\psi(L)$ represents the dynamics of stationary and invertible ARMA error process, and β is a drift parameter.

The alternative hypothesis is: $Y_t = \mu + \beta t + \psi(L)(\theta DU_t\ (T_b) + \gamma DT_t(T_b) + \epsilon_t)$. That is, trend stationary with breaks in the intercept and trend.

For AO, Eviews (2019) models the null AO hypothesis as:

$Y_t = Y_{t-1} + \beta + \theta DU_t\ (T_b) + \gamma DT_t(T_b) + \psi(L)\epsilon_t$…….(ii), where,

ϵ_t are i.i.d innovations and $\psi(L)$ represents the dynamics of stationary and invertible ARMA error process, and β is a drift parameter.

The alternative hypothesis is: $Y_t = \mu + \beta t + \theta DU_t\ (T_b) + \gamma DT_t(T_b) + \psi(L)\epsilon_t$

Here the most important thing to note is, as discussed earlier, in IO model, the break parameters enter in the model with the same dynamics with that of ϵ_t innovations; whereas, in AO model, the full impact of breaking variables occurs immediately (Eviews, 2019).

Thus, considering innovation outliers breaking dynamics, single breakpoint determined endogenously, and level break, the general regression equation for the ADF breakpoint unit root test (modified ADF) is written as:

$Y = \mu + \beta t + \theta DU_t\ (T_b) + \gamma DT_t(T_b) + \omega D_t(T_b) + \alpha Y_{t-1} + \sum_{i=1}^{p} \mathbf{c}_i \Delta Y_{t-i} + U_t$ ……(iii)(Eviews, 2019).

Where, $DU_t\ (T_b)$ is an intercept break dummy variable that takes on a value of zero before a break and 1 on and after the break. $DT_t(T_b)$ is a trend break dummy variable that takes on a value of 0 before the trend break and 1 on and after the trend break. D_t is a dummy variable that takes on a value of 1 only on the date of the identified breakpoint (T_b) but 0 otherwise. And also,

μ = constant

β = coefficient of a trend variable

θ = coefficient of intercept break (level break)

γ = coefficient of a trend (slope) break variable

ω= coefficient of a single breakpoint dummy variable (i.e. only a single break date is considered that is endogenously determined).

α = coefficient of an AR (1) variable

c_i = coefficients of differenced lagged variables included to make the residuals uncorrelated, where, t-1, t-2, . . ., t-p are number of lags.

U_t = white noise error term.

However, because only level (intercept) break is considered in the study, the coefficient γ is set to zero in the ADF breakpoint unit root test general equation (iii). As a consequence, the equation for a trend stationary time series data with level or intercept break is given by:

$Y = \mu + \beta t + \theta DU_t (T_b) + \omega D_t(T_b) + \alpha Y_{t-1} + \sum_{i=1}^{p} \mathbf{c}_i \Delta Y_{t-i} + U_t$ .....(iv) (Eviews, 2019).

In the ADF breakpoint unit root analysis, the single breaking point or date is endogenously determined by minimizing DF t-statistic. That is, the date that minimizes the DF t-statistic is chosen. The lag selection process in the ADF breakpoint unit root (Modified ADF) test is generally governed by including as much lags it can be added to remove serial correlation subject to optimum lag selection criteria. Consequently, in the study, the high order of lag that satisfies the F-statistic joint significance of lagged variables is used to determine the optimum lag-length (Eviews, 2019).

5.5.2 Co-integration Analysis: Bounds Test Approach

The traditional Engle-Granger and Augmented Engle-Granger (EG and AEG) co-integration tests serve for co-integration tests of only I(1) time-series data. Similarly, the Johansen VAR based co-integration test method is usable for only I(1) time-series data though it has some superior features over the traditional co-integration techniques (Shrestha and Bhatta, 2018). However, ARDL is well celebrated for co-integration analyses of time series data of both dissimilar and similar order of integration (Chaudhry et al. 2006; Giles, 2011). The ARDL bounds test approach is advantageous for a number of reasons. First, it uses a single reduced form equation. Second, it is suitable for the I(0) and I(1) time-series data used in the study. Third, it is appropriate for the small number of observations used in the study (Alimi, 2014).

Considering the single equation multivariate econometric model above (equation 2), the ARDL model for co-integration, also called unrestricted ARDL ECM model, is written as:

$$\Delta lngdp_t = \beta_0 + \beta t + \sum_{i=1}^{p} \beta_{1i} \Delta lnGDP_{t-i} + \sum_{i=0}^{q} \beta_{2i} \Delta lnFDI_{t-I} + \sum_{i=0}^{r} \beta_{3i} \Delta lnGFCF_{t-I} + \sum_{i=0}^{m} \beta_{4i} \Delta lnLAB_{t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta lnTR_{t-i} + \sum_{i=0}^{s} \beta_{6i} \Delta lnCPI_{t-i} + \alpha_1 lnGDP_{t-1} + \alpha_2 lnFDI_{t-1} + \alpha_3 lnGFCF_{t-1} + \alpha_4 lnLAB_{t-1} + \alpha_5 lnTR_{t-1} + \alpha_6 lnCPI_{t-1} + e_t \ldots\ldots\ldots (3)$$

where p, q, r, m, n, s are the optimum number of lags for variables determined by appropriate lag selection information criterion, and α_1, α_2 , α_3, α_4, α_5, and α_6 are long-run cointegrating lagged parameters of variables from the long-run equation, i.e equation 2 (Odhiambo, 2009).

The main purpose of the ARDL bounds test approach to co-integration (equation 3) is to test whether or not the variables co-integrate (Odhiambo, 2009). In this study, critical values of appropriate sample size supplied by Narayan (2005) are used. In this regard, if the null hypothesis of no co-integration (i.e. H_0: α's = 0) is rejected against the alternative hypothesis (α's $\neq$ 0), with the computed F-statistic above the upper bound value, it means that there exists a long-run relationship among the variables. The computed F-statistics may also yield inconclusive results when the result falls between the lower I (0) and upper I (1) bound F-statistic values. If the F-statistic falls below the lower bound, the conclusion is that there is no long-run equilibrium relationships among the variables (Chaudhry, 2013).

5.5.3 ARDL Model to Estimate Long-run Parameters

After confirmation of long-run relationships of variables with ARDL to co-integration approach, the optimal long-run ARDL (p, q, r, m, n, s) is obtained by considering the optimum lag structure and stability conditions. The procedures used for obtaining the optimum long-run ARDL model is similar to that of the ARDL for the bounds test except that level variables (i.e. non-differenced variables) are used in the former (Odhiambo, 2009; Giles, 2011). The long-run ARDL model is given as follows:

$$lngdp_t = \beta_0 + \beta t + \sum_{i=1}^{p} \varphi_{1i} lnGDP_{t-i} + \sum_{i=0}^{q} \varphi_{2i} lnFDI_{t-i} + \sum_{i=0}^{r} \varphi_{3i} lnGFCF_{t-i} + \sum_{i=0}^{m} \varphi_{4i} lnLAB_{t-i} + \sum_{i=0}^{n} \varphi_{5i} lnTR_{t-i} + \sum_{i=0}^{s} \beta_{6i} lnCPI_{t-i} + e_t \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

5.5.4 ARDL Model for Short-run Dynamics

The existence of co-integration among the variables under consideration dictates the need for construction of a short-run model to analyse how the short-run and long-run dynamics are tied together, and what the short –run relationships are among the variables (Gujarati, 2009). Accordingly, the ARDL ECM (error correction model) is given as follows:

$$\Delta \mathbf{lngdp_t} = \boldsymbol{\beta_0} + \sum_{i=1}^{p} \boldsymbol{\beta_{1i}}\, \Delta \mathbf{lnGDP_{t-i}} + \sum_{i=0}^{q} \boldsymbol{\beta_{2i}}\, \Delta \mathbf{lnFDI_{t-I}} + \sum_{i=0}^{r} \boldsymbol{\beta_{3i}} \Delta \mathbf{lnGFCF_{t-i}}$$
$$+ \sum_{i=0}^{m} \boldsymbol{\beta_{4i}} \Delta \mathbf{lnLAB_{t-I}} + \sum_{i=0}^{n} \boldsymbol{\beta_{5i}} \Delta \mathbf{lnTR_{t-I}} + \sum_{i=0}^{s} \boldsymbol{\beta_{6i}}\, \Delta \mathbf{lnCPI_{t-I}} + \boldsymbol{\lambda ect_{t-1}} + \mathbf{e_t} \text{.....(5)}$$

where, the ect_{t-1} term is derived from the equation below:

$$ect_{t-1} = lnGDP_{t-1} - \beta_1 lnFDI_{t-1} - \beta_3 lnLAB_{t-1} - \beta_2 lnGFCF_{t-1} - \beta_4 lnTR_{t-1} - \beta_5 lnCPI_{t-1} - \beta t - \beta_0$$

The ECM is based on the Granger representation theorem that states, "if variables are co-integrated, the relationship between them can be expressed as an ECM" (Gujarati, 2009; Shrestha and Bhatta, 2018).

5.5.5 Toda-Yamamoto (TY) Causality Analysis

(a) The Pairwise TY Models

The traditional Granger Causality analysis potentially ignores variables leading to spurious results (Toda, 1995). Besides, it requires all variables to be at levels. Toda-Yamamoto causality, however, does not have such restrictions. It is an augmented VAR based causality analysis modified to suit for a mix of I(0) and I(1) time-series data (Giles, 2011; Anguibi, 2015).The pair of equations for TY causality model for FDI and economic growth is given as follows (Alimi et al. 2013).

$$Lngdp_t = \sum_{i=1}^{p} \varphi_{0i} lnGDP_{t-i} + \sum_{i=p+1}^{p+dmax} \theta_{0i} lnGDP_{t-i} + \sum_{i=1}^{p} \varphi_{1i} LnFDI_{t-i} + \sum_{i=p+1}^{p+dmax} \theta_{1i} LnFDI_{t-i}$$
$$+ \sum_{i=1}^{p} \varphi_{2i} LnGFCF_{t-i} + \sum_{i=p+1}^{p+dmax} \theta_{2i} LnGFCF_{t-i} + \sum_{i=1}^{p} \varphi_{3i} LnLAB_{t-i} + \sum_{i=p+1}^{p+dmax} \theta_{3i} LnLAB_{t-i}$$
$$+ \sum_{i=1}^{p} \varphi_{4i} LnTR_{t-i} + \sum_{i=p+1}^{p+dmax} \theta_{4i} LnTR_{t-i} + \sum_{i=1}^{p} \varphi_{5i} LnCPI_{t-i} + \sum_{i=p+1}^{p+dmax} \varphi\theta_{5i} LnCPI_{t-I} + V_{t1} \text{..... (6)}$$

Where, V_{t1} is white noise innovation process, $V_{t1} \sim N(0, \sum_{v1})$, $\sum_{v1}$ is a covariance matrix; and ϕ_i's, θ_i's are parameters.

$$Lnfdi_t = \sum_{i=1}^{p} \omega_{0i} lnFDI_{t-i} + \sum_{i=p+1}^{p+dmax} \delta_{0i} lnFDI_{t-i} + \sum_{i=1}^{p} \omega_{1i} LnGDP_{t-i} + \sum_{i=p+1}^{p+dmax} \delta_{1i} LnGDP_{t-i}$$
$$+ \sum_{i=1}^{p} \omega_{2i} LnGFCF_{t-i} + \sum_{i=p+1}^{p+dmax} \delta_{2i} LnGFCF_{t-i} + \sum_{i=1}^{p} \omega_{3i} LnLAB_{t-i} + \sum_{i=p+1}^{p+dmax} \delta_{3i} LnLAB_{t-i}$$
$$+ \sum_{i=1}^{p} \omega_{4i} LnTR_{t-i} + \sum_{i=p+1}^{p+dmax} \delta_{4i} LnTR_{t-i} + \sum_{i=1}^{p} \omega_{5i} LnCPI_{t-i} + \sum_{i=p+1}^{p+dmax} \delta_{5i} LnCPI_{t-I} + V_{t2} \text{..... (7)}$$

Where, V_{t2} is a white noise innovation process, $V_{t2} \sim N(0, \sum_{v2})$, $\sum_{v2}$ is a covariance matrix; and **ω's , δ's** are parameters.

d_{max} is the maximum order of integration of time series data.

P is the optimum lag-length for dependent and independent variables of lnGDP, lnFDI, lnGFCF, lnLAB, lnTR, lnCPI. The dependent variables for causality equations of (6) and (7) are lnGDP and lnFDI, respectively.

(b) The Steps for TY Causality Analysis

Giles (2011) identifies seven steps for TY causality analysis which is also pursued in the study. Step-1 requires determining the order of integration of time series data which is found to be a mix of I(0) and I(1). Therefore, the maximum order of integration (d_{max}) of the time series data is I(1). Step-2 requires estimating the VAR model regardless of the order of integration of the time series. Accordingly, a VAR model is developed, taking economic growth (lnGDP) and FDI (lnFDI) as dependent variables interchangeably. Gross fixed capital formation, labour, trade and inflation variables are also included as exogenous variables to consider the impact of these variables on the causal relationship between FDI and economic growth. Step-3 requires determination of the appropriate maximum lag-length for the VAR model with the aid of lag-selection criteria.

Step-4 is one of the most important steps as it requires testing whether or not there is serial correlation in the VAR model. Step-5 unfolds the test statistic that makes the TY causality approach superior to the traditional two variables and VAR based Granger causality analyses. That is, the traditional two-variable and VAR Granger causality analysis use F-statistic distribution which is no more appropriate when there is co-integration among variables of similar or dissimilar order of integration. Consequently, Toda (1995) proposed a modified Wald test (MWald test) that complies to chi-square distribution asymptotically when the ($p + d_{max}$) lags are considered, where d_{max} variables are treated exogenously. The letter p denotes the appropriate/optimum lag-length determined for VAR model in step-4, and d_{max} is the maximum order of integration of the time series data.

In step-6, a modified Wald test is made by considering $p+d_{max}$ lags to all variables exogenously. Here, according to Giles (2013b), caution should be exercised to consider only 'p' lags for variables that enter as dependent variables in the VAR model. However, both dependent and exogenous variables that enter into the VAR causality model with $p+d_{max}$ lags should be treated as exogenous variables (hence TY model is also named block exogeneity test (Eviews, 2019)). If this is not the case, the Wald test will no more approximate the chi-square distribution asymptotically. Besides, the stability of the model should be checked as there is no reason to analyse a model that is not dynamically stable (Giles, 2013b).

Here, it is important to briefly explain the Wald test both intuitively and with the test statistic. The Wald test statistic measures how the unrestricted regression comes close to the restricted assumption under the null hypothesis (Eviews, 2019). That is, it measures how far apart are the likelihood sample data estimator under unrestricted condition and the null hypothesized parameter under restricted condition. The test statistic that follows a chi-square distribution (with degrees of freedom equal to the number of restrictions) is thus given by,

$W = (\theta_{UR} - \theta_R)^2 / I_n(\theta_{UR})^{-1}$ or $(\theta_{UR} - \theta_R)^2 I_n(\theta_{UR})$,.

where θ_{UR} is the likelihood parameter estimator under unrestricted condition and θ_R is the hypothesized null value which is made zero; $I_n(\theta_{UR})^{-1}$ is the Fisher information matrix which can be seen as the curvature of the graph of logged likelihood function or the information under the null hypothesis (Pindyck and Rubinfeld, 1998).

5.5.6 Diagnostic Tests

As emphasized previously, analyses of estimation results would be in vain without stable models. Accordingly, checking the stability of models is given due attention in this study. In the following, the diagnostic tests used in the study are discussed.

(a) Regression Specification Error

(i) Ramsey RESET

RESET, Regression Specification Error Test, developed by Ramsey (1969), is a general specification error test that may include: (i) omitted variables, (ii) incorrect functional form and (iii) correlation between the explanatory variable and error term which may have been caused by measurement error, simultaneity, etc. (Eviews, 2019). The existence of these specification errors may make the least square estimators biased and inconsistent. The test is based on an augmented model (new) where powers of the original (old) sample estimator ($\hat{Y}_i^2$, $\hat{Y}_i^3$, etc.) are included, i.e., $Y_i = \beta_1 + \beta_2 X_i + \beta_3 \hat{Y}_i^2 + \beta_4 \hat{Y}_i^3 + \epsilon_i$. The null hypothesis is then, H_0: $\beta_3 = \beta_4 = 0$, $\epsilon_i \sim (0, \sigma^2 I)$ and the alternative hypothesis is H_1: $\beta_3, \beta_4 \neq 0$, $\epsilon_i \sim (\mu, \sigma^2 I)$, $\mu \neq 0$. The sample estimator (old) ,$\hat{Y}_i$, is written as: $\hat{Y}_i = \lambda + \lambda_i X_i + U_i$, where U_i is the disturbance term (Eviews, 2019).

Gujarati (2009) outlines the steps for RESET as: obtaining the estimated $\hat{Y}_i$ (step-1); inserting the appropriate powered $\hat{Y}_i$ into Y_i (i.e., the augmented regression equation, step-2); determining R^2_{new} and R^2_{old} from the residuals of the augmented regression function and the

original (old) sample regression function, i.e, Y_i and $\hat{Y}_i$, respectively, to calculate the F-statistic (step-3). The F-statistic is given by:

$$F=\frac{(R^2\text{new} - R^2\text{old})/(\text{number of new regressors})}{1-R^2\text{new}/(n-\text{number of parameters in the new model})}$$

Step-4 involves accepting or rejecting the null hypothesis with the appropriate level of significance, usually, 5%. One advantage of RESET is that it is easily applicable to identify model specification errors though it does not help to specify the alternative better model specification (Gujarati, 2009).

(b) **Serial Correlation**

Serial correlation poses a serious problem in model parameters estimation when allowing or disregarding it in OLS estimations. When allowing autocorrelation in OLS estimations, the estimators may be unbiased, consistent, and normally distributed, but they are not efficient, even asymptotically, and hence are not BLUE. As a consequence, autocorrelation distorts the hypotheses testing by declaring that the coefficients estimated are insignificant (or are not significantly different from zero) though they may be significant with confidence intervals based on GLS estimators which are efficient. This is because the confidence interval derived from OLS variance estimators in the presence of serial correlation results in a wider confidence interval than a confidence interval based on the correct GLS procedures (Gujarati, 2009). Disregarding autocorrelation in OLS estimation has also serious consequences. That is, OLS variance estimators underestimate the actual variance under serial conditions as the result of which actual t-statistic and R^2 may also be overstated. This, in turn, invalidates the t and F significance tests (Gujarati, 2009).

(i) The Durbin-Watson (d-Test)

There are various techniques to detect series correlations in time series data. Here, the major statistics, the Durbin-Watson and the LM statistics are briefly discussed with due focus on the latter. The Durbin-Watson-d-Test (d statistic) is the most popular statistic developed by Durbin and Watson, measured as the ratio of the sum of squared differences in successive residuals to the RSS. The d-statistic is given by:

$d = \sum_{t=2}^{t=n} (\hat{u}_t - \hat{u}_{t-1})^2 / \sum_{i=1}^{t=n} (\hat{u}_t{}^2)$, where, $\hat{u}_t$ and $\hat{u}_{t-1}$ are residual values at t and t-1 period. Squaring the numerator and assuming $\sum \hat{u}_t{}^2 = \sum (\hat{u}_{t-1})^2$, the statistic can be reduced to,

$d \approx 2(1-(\sum \hat{u}_t \hat{u}_{t-1})/\sum \hat{u}_t^2)$. Letting $\sum \hat{u}_t \hat{u}_{t-1}/\sum \hat{u}_t^2) = \rho$, the d-statistic can be written as $d \approx 2(1-\rho)$, where, $0 \leq d \leq 4$ (Gujarati, 2009).

One of the advantages of the statistic is that it is based on residuals which are commonly calculated in regression analysis. However, it has also the following limitations. The d-statistic has indecision zones to reject or accept the null hypothesis. The assumptions of non-stochastic independent variables; the error term follows a normal distribution; the regression models do not include the lagged values of the dependent variable; only the first-order of serial correlation is considered, are the major weaknesses of the model (Gujarati, 2009).

(ii) The Breusch and Godfrey Test

In response to the pitfalls of d-statistic, Breusch and Godfrey developed a more general autocorrelation test, commonly called, the Breusch-Godfrey or LM test. The LM test has superior features as compared to d-statistic. One is that it can be used for higher order autoregressive models. That is, autoregressive regressors (i.e lagged values of regresands) and lagged values of independent variables can also be used. The error term can be represented as simple and higher orders of moving averages of white noise error term, ε_t. The study used BG or LM test for testing serial correlations in the models due to these merits given the nature of the models.

Testing serial correlation involves three steps that include:

(1) estimation of the regression equation to obtain OLS residuals,

(2) regression of the residuals on explanatory variables to obtain R^2. Assuming the original equation contains autoregressive regressors, the auxiliary regression equation is given by:

$$\hat{u}_t = \beta_0 + \alpha_1 Y_{1-1} + \alpha_1 Y_{1-2} + \cdots + \beta_1 X + \beta_1 X_1 + \cdots + \rho_1 \hat{u}_{t-1} + \rho_2 \hat{u}_{t-2} + \cdots + \rho_p \hat{u}_{t-p} + \varepsilon_t$$

Where,

$\rho_1, \rho_2,$ are coefficients of first, second order of autocorrelation coefficients, respectively; and p is the maximum lag or p^{th} order of the moving average (MA) process considered. ε_t is a white noise error term with homoscedastic properties (Eviews, 2019).

(3) Checking whether or not the statistic values obtained with $(n-p)*R^2$ exceed the critical values. Breusch and Godfrey have shown that $(n-p)*R^2 \sim \chi_p^2$ for infinite (large samples). Based on Davidson and Mckinnon (1993), Eviews (2019) recommends setting the pre-sample values of residuals to zero to improve the finite properties of the statistic (i.e. for small samples) without affecting its asymptotic chi-square distribution, which is also similarly pursued in the

study when using the statistic. The null hypothesis is given by: H_o: = $\rho_1 = \rho_2 = \cdots = \rho_p = 0$; and the alternative H_1: ARMA process with p maximum lags for AR and MA terms (Eviews, 2019).

(c) Heteroscedasticity

Heteroscedasticity of residual values is a violation of one of the pillars of assumptions of classical ordinary least squares method for BLUE estimators. Though OLS estimators under heteroscedastic situations may not be biased and inconsistent, they are not efficient. That is, they do not give minimum variance estimators. As a consequence, allowing and ignoring heteroscedasticity has serious consequences in OLS estimation. When heteroscedasticity is allowed in OLS estimation, the variances of estimated coefficients are mostly greater than variances of coefficients estimated by the correct GLS procedures. As a consequence, the confidence intervals estimates are larger than those intervals estimated with GLS variances thereby invalidating the F and t-statistics (Gujarati, 2009). Disregarding heteroscedasticity also has serious adverse consequences in interval estimation of parameters in that the OLS variance estimator of σ^2, i.e., $\sum \hat{u}_i^{\,2}/(n-2)$ is no longer unbiased. As a result, the conventional F and t-statistics are misleading. In general, heteroscedasticity introduces inefficiency in parameters estimation and makes the covariance matrix biased thereby resulting in erroneous inferences from models (Vynck, 2017).

(i)The White Test

Firstly, the white test involves running regression model, for example, the hypothetical model, $Y_i = \beta_1 + \beta_1 X_{1i} + \beta_2 X_{2i} + U_i$, to obtain residual values with which auxiliary regression is run. Secondly, the auxiliary regression for white-test is estimated; i.e., $\hat{u} = \alpha_1 + \alpha_2 X_{2i} + \alpha_3 X_{3i} + \alpha_4 X_{4i}^2 + \alpha_5 X_{5i}^2 + \alpha_6 X_{2i} X_{3i} + v_i$, to obtain R^2. Thirdly, under the null hypothesis, $\alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$ (i.e the hypothesis of no heteroscedasticity by making the coefficients of variables, powers and cross products equal to zero), it is shown that the sample size (n) times the R^2 from the auxiliary regression approximates the Chi-square distribution asymptotically with degrees of freedom equal to the number of regressors excluding the constant term, i.e., $n*R^2 \sim_{asy} \chi_{df}^2$. Fourthly, if the white test statistic value exceeds the critical Chi-square value, the null hypothesis is rejected by accepting heteroscedasticity (Gujarati, 2009).

One of the advantages of a white test is that it does not rely on the assumption of normality; and its disadvantage is that it consumes too many degrees of freedom, for example, as

compared to Breush-Pagan-Godfrey test. In fact, such property of the statistic has made this study to rely more on BPG test as number of observations insufficiency is observed when testing the homoscedasticity of models with many dynamic variables.

(ii) Breusch-Pagan-Godfrey Test

The Breusch-Pagan-Godfrey test is a Lagrange Multiplier (LM) test of the null hypothesis against the alternative of heteroscedasticity (Eviews, 2019; Gujarati, 2009). That is, given the hypothetical regression model, $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + U_i$, and that σ_i^2 written as a function of non stochastic Z variables, i.e., $\sigma_i^2 = f(\alpha_1 + \alpha_2 Z_{2i} + \ldots + \alpha_m Z_{mi})$, it can be then stated as: $\sigma_i^2 = \alpha_1 + \alpha_2 Z_{2i} + \ldots + \alpha_m Z_{mi}$ (i.e., σ_i^2 as linear function of Z's), where some or all of X variables in the hypothetical model can serve as Z's. If $\alpha_2 = \alpha_3 = \ldots = \alpha_m = 0$, $\sigma_i^2 = \alpha_1$, which is a constant. The null hypothesis for Breusch-Pagan-Godfrey is therefore written as $H_0 = \alpha_2 = \alpha_3 = \ldots = \alpha_m = 0$ against the alternative H_1: $\sigma_i^2 = \alpha_1 + \alpha_2 Z_{2i} + \ldots + \alpha_m Z_{mi}$ (Gujarati, 2009).

The steps to be pursued for BPG (LM) test can be summarized as: (i) estimating the regression model to obtain the residuals, in this case, the hypothetical regression model, (ii) obtaining the maximum likelihood variance estimator of σ^2 (ML Var, i.e. $\sum \hat{u}_i^2/n$), (iii) constructing variables p_i , where, $p_i = \hat{u}_i^2/MLVar$,(iv) regression of p_i on Z's, i.e., $p_i = \alpha_1 + \alpha_2 Z_{2i} + \ldots + \alpha_m Z_{mi} + v_i$, where v_i is the residual term of the regression, (vi) obtaining the ESS (Explained Sum of Squares), i.e, to define $\boldsymbol{\Theta} = \frac{1}{2}(ESS)$. Assuming u_i (i.e. the residuals of the model under consideration or the hypothetical model in this case) is normally distributed, it is shown that, $\boldsymbol{\Theta} \sim_{asy} \chi^2_{m-1}$ (Gujarati, 2009). However, Koenker (1981) suggested a more easily computable statistic, i.e., observations$*R^2 \sim_{asy} \chi^2$ with degrees of freedom equal to the number of variables in Z. The Koenker and BPG statistics are used in popular packages (for example, Eviews), and hence, in this study as well.

(d) Normality

Normality test is important in modelling as many inferences are based on the assumption of normality. ARDL models are among those models that require normality as the parameters are based on OLS estimators. In the study, two types of normality tests are used: a histogram of residuals and the Jarque-Bera tests. A histogram of residuals is a simple graphic device used to learn about the shape of the probability density function (PDF) of a random variable. If the bell-shaped normal distribution curve is superimposed mentally on the histogram, some picturesque idea can be found as to whether or not the approximation of normality is

appropriate (Gujarati, 2009). The histogram divides the range of minimum and maximum residual values (i.e. the distance between minimum and maximum values) into intervals called bins against which the frequencies (count of the number of observations) are matched with rectangular bars (Eviews, 2019). Jarque-Bera (JB test) is the most frequently used formal normality test-statistic given as:

JB= n[$S^2/6$ + $(K-3)^2/24$], where S and K are Skewness and Kurtosis coefficients computed from Skewness (S)= $E(X-\mu)^3/\sigma^{3,}$ and $K=E(X-\mu)^4/[E(X-\mu)^2]^2$ measurements, respectively. Number of observations is denoted by n. JB test is basically a joint test for S=0 and K=3 in which case JB is expected to be 0. Under the null hypothesis that residuals are normally distributed, JB approximates Chi-square distribution with two degrees of freedom. Higher probabilities (p-values) above the significance levels indicate that the null hypothesis is not rejected (Pindyck, 1998; Gujarati, 2009).

(e) Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ)

CUSUM and CUSUMSQ are popular diagnostics tests used in empirical studies for testing the constancy of parameters. Brown et al. (1975) developed the test statistics based on recursive residuals that are determined sequentially in tandem with the sequential determination of endogenous variables (Pindyck, 1998). The statistic for CUSUM is given by:
$W_t = \sum_{r=k+1}^{t}(w_r/s)$, where w_r is the recursive residual, s, is the standard deviation, t varies from k+1, …, T. If the parameters sequentially determined show constancy under the null hypothesis, $E(W_t) = 0$, the cumulative recursive residuals will not diverge far from the null hypothesis $E(W_t) = 0$, oscillating within critical lines of 5% significance level. Movements of standardized cumulative residuals outside the critical lines suggest parametric instabilities (Eviews, 2019). Cumulative sum of squares of recursive residuals is given by the statistic, $S_t = (\sum_{r=k+1}^{t} {w_r}^2)/(\sum_{r=k+1}^{T} {w_r}^2)$, where, $E(S_t)$ = (t-k)/(T-k) varies from zero, when t=k, to unity when t=T(Eviews, 2019). Any movement of values of the statistic about $E(S_t)$ outside the 5% parallel critical lines indicates instability of the parameters of the model. CUSUMSQ is complementary to CUSUM for model stability tests (Brown et al. 1975).

(f) Autoregressive (AR) Polynomial Roots

Tests of stationarity usually assume AR(1) processes when testing stationarity/non-stationarity. However, higher order AR processes require more complex requirements for checking the

dynamic stability of models. In this regard, plotting more powerful AR polynomial roots has become common in most empirical researches (Giles, 2013).

The essence of stability testing by determining AR polynomial roots lies in defining the characteristic polynomial equation to solve the roots subject to requiring the latter to lie outside or inside a unit circle (in most cases the latter is used including in this study). Before determining the characteristic equation, a characteristic polynomial should be identified. A characteristic polynomial can be seen as an operator or a filter that converts the series into a white noise process (or a series without information) when applied to a series (Giles, 2013). Given the equation, $Y_t = a + b_1Y_{t-1} + b_2Y_{t-2} + \varepsilon_t$, $\varepsilon_t \sim i.i.d.(0, \sigma^2)$, where, 'a' is a constant term, b_1 and b_2 are coefficients, a characteristic polynomial for AR(2), for example, can be found with the following mathematical manipulations:

Using the lag operator, Z, where, $ZY_t = Y_{t-1}$, $Z^2Y_t = Y_{t-2}$, etc., and $Za=a$ (i.e. the lag of a constant is a constant), the AR(2) equation can be written as: $Y_t = a + b_1ZY_t + b_2Z^2Y_t + \varepsilon_t$. Collecting like terms to the left side, it can be written as: $Y_t - b_1ZY_t - b_2Z^2Y_t = a + \varepsilon_t$. Then, factoring out the equation, we get, $(1 - b_1Z - b_2Z^2)Y_t = a + \varepsilon_t$. Here, it is evident that the operator or characteristic polynomial, $(1 - b_1Z - b_2Z^2)$, serves as a filter applied to a time series Y_t to convert it into a white noise process. By equating this operator to zero, one can get a characteristic equation, $1 - b_1Z - b_2Z^2 = 0$, where upon solving the roots of the polynomial are found (Gujarati, 2009). Requiring the Z roots to lie outside the unit circle, we can solve the roots in terms of coefficients and test the dynamic stability of the AR(2) model (Giles, 2012). However, a more frequently used characteristic equation by most researchers (and thus in this study) is the reciprocated characteristic equation, $Z^2 - c_1Z - c_2 = 0$ that is used to solve the inverse roots by requiring the roots to lie inside the unit circle. The similarities of the two characteristics equations in purpose lies in the fact that AR(2) process can be expressed as MA(∞), where the latter gives rise to the characteristics equation, $Z^2 - c_1Z - c_2 = 0$, and the former gives rise to $1 - b_1Z - b_2Z^2$ (Giles, 2012). It can be proved that AR(2) process is similar to MA(∞) process, given the nature of the two characteristics equations, even though it is not indicated in this study.

Focussing on the commonly used characteristic equation, the Z roots for the quadratic equation, $Z^2 - c_1Z - c_2 = 0$, can be obtained in terms of c_1 and c_2 with the quadratic formula,

z= $\frac{c_1 \pm \sqrt{{c_1}^2 - 4c_2}}{2}$, where the roots will be real and complex number when $({c_1}^2 - 4c_2) > 0$ and $({c_1}^2 - 4c_2) < 0$, respectively.

Case-1 when the roots are real, requiring $|z| < 1$, i.e., $\frac{c_1 + \sqrt{{c_1}^2 - 4c_2}}{2} < 1$, the roots are solved as, $c_1 + c_2 < 0$, and for $\frac{c_1 - \sqrt{{c_1}^2 - 4c_2}}{2} > -1$, $c_2 - c_1 < 0$. Besides, when the characteristic equation under discussion has roots, their sum and products should be $-C_1$ and $-C_2$, respectively. Given the requirements of stationarity which requires the absolute values of the roots should be less than one, the product of the absolute values of the roots should also be less than one. This happens, however, only if the absolute value of C_2 is less than one. So, for the inverse roots of the characteristic equation of AR(2) model to be inside the unit circle, the following three conditions should be fulfilled: (i) $c_1 + c_2 < 0$, (ii) $c_2 - c_1 < 0$, and (iii) $|c_2| < 1$ (Giles, 2012).

Case-2 when $({c_1}^2 - 4c_2) < 0$ in the quadratic formula above, then the inverse roots of the characteristic equation will be complex numbers of the form, a ± bi, where a and bi are the real and imaginary part of the complex number, respectively, and 'i', is the imaginary number, $i^2 = -1$.The real and complex inverse roots are plotted with Argand diagram (a complex number plane) where the real numbers lie on the X-axis and the imaginary numbers lie on the Y-axis. When plotting, all real numbers are indicated on the X-Axis; whereas, complex numbers are plotted on X-Y complex plane (Chiang, 2005; Giles, 2012). The real and imaginary part of a complex number, Z= x + yi, can also be represented by a modulus or absolute value given by, $|Z| = |x+yi| = \sqrt{X^2 + Y^2}$(Chiang, 2005).

In general, for AR(p) model, where p=1, 2, 3,…, the dynamic stability requires all of the roots of the characteristic equation defined as, $z^p - c_1 z^{p-1} - c_2 z^{p-2} - \ldots - c_p = 0$, lie inside the unit circle (Giles, 2013).

5.6 Conclusion

Using the exogenous and endogenous theoretical foundations and Cobb-Douglass production function, this study developed log-log econometric models where economic growth is the dependent variable, and FDI, gross fixed capital formation, labor, trade and CPI are included as explanatory variables. The variables considered in the model are common in FDI-economic growth literature. The data sources for the variables are UNCTAD (i.e. for economic growth, FDI, gross fixed capital formation, labor and trade) and IMF (i.e. for CPI) data bases.

Unit root tests are made to determine the stationarity and non-stationarity of data with the traditional unit root analysis techniques (i.e. ADF and PP tests) including modified ADF (ADF with breakpoint test) to consider sensitivities of unit root test results to structural breaks. Accordingly, all variables considered are found to be of I(1) time series data except FDI which is found to be an I(0) data. Given the results of the stationarity test, ARDL co-integration test is used to check the existence of long-run relationships among variables. With ARDL to co-integration test, a well celebrated co-integration test for time series data of dissimilar order of integration (i.e. I(0) and I(1)), it is proved that there are long-run relationships among the dependent and explanatory variables.

With long-run ARDL model, the sign of the long-run relationships among the dependent explanatory variables are determined; whereas, with short-run ARDL model, the speed of adjustment of variations between short and long-run parameters is determined in one-year period. Following the co-integration test and the ARDL analysis, the causal relationship between the two variables (i.e. economic growth and FDI) is determined with TY pairwise causality model developed by Toda-Yamamoto. The two major advantages of the TY model are that TY model considers the influence of other variables when determining the relationship between economic growth and FDI, and that it guarantees that the values of the test statistic (modified Wald Test) approximate Chi-square distribution asymptotically under the situations of the use of non-stationary data or a mix of stationary and non-stationary data (as in the case of this study).

Analyses of the relationships among variables from short-run or long-run perspectives without stability tests of the models makes the exercise futile. Consequently, due emphasis is given to checking the stability of all models used in the study. Stability test techniques considered include: RESET, serial correlation, heteroscedasticity, normality tests including CUSUM, CUSUMSQ and AR polynomial inverse roots (AR roots) tests. RESET is used to test model misspecification test (i.e. omission of variables, incorrect functional relationship and measurement errors). Serial correlation and heteroscedasticity tests are of paramount importance as ignoring both has serious consequences (i.e. resulting in inefficient parametric estimators and estimates) that in turn distort the hypothesis testing. In this study, Godfrey and Godfrey-Pagan tests are used for testing serial correlation and heteroscedasticity, respectively, considering the size and nature of the data used. CUSUM and CUSMSQ tests are also used to check the constancy or oscillation of parameters within 5% critical line boundaries. AR

polynomial inverse roots are also used to check the stability of higher order models used in the study as the traditional non-stationarity test techniques that assume AR (1) processes are not good in checking stabilities of models of higher orders.

Chapter 6: Empirical Estimation and Analysis of Results, Conclusions and Recommendations.

This chapter discusses the empirical results estimated based on the methodologies discussed in chapter five. The estimation results discussed are: unit root test, bounds test, short-run and long-run coefficients, and Toda and Yamamoto causality model result. Models stability diagnostic results are also discussed. The variables considered are real GDP (lnGDP) as dependent variable, and Foreign Direct Investment (lnFDI), gross fixed capital formation (lnGFCF), labour (lnLAB), trade (lnTR), and inflation (lnCPI) as explanatory variables. The chapter also includes conclusion and policy recommendations.

6.1 Unit Root Test Results

One of the hallmarks of the autoregressive distributed lag (ARDL) approach to co-integration analysis is that it can be used to determine long-run equilibrium relationships among variables of dissimilar orders of integration, i.e, I(0) and I(1), and variables of similar orders of integration I(1). However, the approach generates spurious results with variables integrated of higher orders. As a consequence, unit root analysis is important in the ARDL approach to determine the order of integration of the series before undertaking co-integration analysis.

Applying the standard Augmented Dickey-Fuller and Phillip-Perron unit root techniques, the order of integration of the time series data are determined. ADF with breakpoint is also considered as some of variables show sensitivity to structural breaks. As a consequence, a combination of the standard unit root tests and ADF with breakpoint test (modified ADF test) results is used to determine the order of integration of all the variables considered. The appropriateness of the use of modified ADF unit root test in the study relates to the weakness of the Chow test. The Chow test requires the structural break date to be given or determined exogenously by the researcher, thus opening up possibilities of introducing an element of human error. However, in the case of ADF unit root test with breakpoint, the structural break date or point is identified endogenously subject to minimization of the DF t-statistic (Eviews, 2019). As a consequence, choosing the ideal structural break point endogenously considering different factors of breaking dynamics is better achieved with ADF with breakpoint unit root test than the Chow test. Thus, this study relies on the ADF with breakpoint. (Vogelsang, 1998; Nielsen, 2012; Eviews, 2019).

The Chow-test for the regime change and the unit root test results are indicated in the respective tables below. From table 6.1, the chow-test result indicates that there is a structural break in 1992, taking into account all the variables considered in the study. The null hypothesis of no structural break is rejected at the 1 percent significance level. This result confirms the need for unit root analysis of variables with techniques that consider structural breaks (i.e. ADF breakpoint unit root test). However, unit root test with ADF breakpoint indicates that consideration of structural break does not show contradicting results with that of standard unit root tests for all variables except for FDI. That is, unlike all other variables (i.e lnGDP, lnGFCF, lnLAB and lnCPI), only lnFDI is found to be stationary at level when structural break is considered for all variables with modified ADF unit root test. This shows FDI is boldly sensitive to structural break as compared to the rest of variables in unit root test.

The existence of pronounced sensitivity to a structural break in the FDI time series data unit root test can be intuitively explained in view of the three periods of FDI regimes that Ethiopia has experienced. In the Emperor Haile Silassie I period (before 1974), FDI inflows was just taking off with modest growth up until it was discontinued when the military regime took power in 1974. During the Derg Military Regime (post 1974), FDI inflows to the country was nil or negative and began to pick up after the EPRDF government took power in 1991. There has been, once again, sustained growth in FDI flows to the country since 1992 in line with the EPRDF/Biltsigina party government's efforts to reinstate the market economy and promote FDI inflows.

The result of unit root tests shown in table 6.2 below reveals that lnFDI is determined to be stationary at levels I(0); while the rest of the variables (lnGDP, LnCFCF, lnLAB and lnCPI) are determined to be stationary after first difference I(1).

Table 6.1 Chow-test Result Considering 1992 as a Regime Change Year

Statistics	Critical Values (5, 30)	Probability
F-Statistic	81.32	0.00

N.B. The null hypothesis: no breaks at specified breakpoint (i.e. 1992) considering all five variables,i.e.lnGDP, lnFDI, lnGFCF, lnLAB, lnTR and lnCPI.

Table 6.2: Unit Root Test Results

Variable	Difference	ADF		ADF Breakpoint (Modified ADF) with Intercept and Trend Breaking at Intercept	PP		Conclusion
		Intercept	Intercept and Trend		Intercept	Intercept and Trend	
LnGDP	Level	3.21	0.42	-1.50	3.21	0.42	I(1)
	First Difference	-4.78***	-5.59***	-8.87***	-4.77***	-5.70***	
LnFDI	Level	0.47	-2.87	-15.13***	-1.34	-2.54	I(0)
	First	-7.02***	-4.9***	-15.48***	-7.05***	-6.21***	
LnGFCF	Level	0.95	-1.61	-2.95	1.10	-1.61	I(1)
	First Difference	-7.27***	-7.74***	-8.10***	-7.26***	-7.73***	
LnLAB	Level	3.47	-0.78	-2.17	3.84	-0.71	I(1)
	First	-5.40***	-6.63***	-12.00***	-5.36***	-6.63***	
LnCPI	Level	1.07	-0.86	-3.79	0.70	-1.42	I(1)
	First	-5.12***	-5.17***	-5.71***	-5.13***	-5.18***	
LnTR	Level	-0.43	-1.85	-3.35	-0.32	-1.87	I(1)
	First	-7.01***	-6.96***	-7.04***	-7.07***	-7.03***	

N.B. Critical values for ADF with intercept at 1%, 5% and 10% are ***-3.58, **-2.92 and *-2.60respectively.
Critical values for ADF with trend and intercept at 1%, 5% and 10% are ***-4.17, **-3.51 and *3.18 respectively.
Critical values for PP with intercept at 1%, 5% and 10% are ***-3.58, **2.93 and *2.60 respectively.
Critical values for PP with trend and intercept at 1%, 5% and 10% are ***-4.17, **-3.51 and *-3.18respectively.
Critical values for ADF breakpoint with intercept and trend, breaking at intercept at 1%, 5% and 10% are*** -5.35, **-4.86, *-4.61, respectively.

6.2 Co-integration: Bounds Test Results

After determining that none of the variables are integrated of higher orders, the ARDL bounds test is undertaken. Many empirical studies reveal that the F-statistic is sensitive to the number of lags used in the differenced variables (Odhimabo, 2009; Nkoro & Uko, 2016). Nkoro and Uko (2016) explain that the determination of the appropriate lag length is important when applying ARDL to co-integration approach as it determines the conditions in which Gaussian error terms are met. Accordingly, from table 6.3 below, the Swartz Information Criterion (SIC) and Akaike Information Criteria (AIC) are used to identify the appropriate lag length of one, given the number of observations and nature of variables.

Table 6.3:Lag Selection Criteria of Unrestricted ARDL Model for Co-integration Analysis.

VAR Lag Order Selection Criteria						
Endogenous variables: D(LNGDP)						
Exogenous variables: C D(LNFDI) D(LNGFCF) D(LNLAB) D(LNTR) D(LNCPI)						
Sample: 1970 2018						
Included observations: 30						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	53.11025	NA*	0.002546	-3.140683	-2.860444	-3.051032
1	55.11013	3.066477	0.002390*	-3.207342*	-2.880396*	-3.102749*
2	55.20950	0.145757	0.002549	-3.147300	-2.773648	-3.027766
3	56.10058	1.247505	0.002583	-3.140039	-2.719679	-3.005562

N.B. * indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Narayan (2005) provides critical values which are appropriate for finite sample regimes in the ranges of 30-80. The result of the bounds test (table 6.4) indicates that the calculated F-statistic is higher than the upper bound F-critical values at all three significance levels (i.e. 10 percent, 5 percent, and 1 percent), suggesting that the null hypothesis of no co-integration among lnGDP, lnFDI, lnGFCF, lnLAB, and lnTR is rejected. That is, the results indicate that there exists long-run equilibrium relationships among the variables.

Table 6.4: Co-integration Test Result

Significance Level	**Critical Values**	
	I(0)	I(1)
*10%	2.95	4.11
**5%	3.48	4.78
***1%	4.67	6.23
Test Statistic K=5, d.f (6,18)	**7.58*** **	

N.B . Critical values are sourced from Narayan (2005) with unrestricted intercept and unrestricted trend.
. *, **, *** denote significance at the 10 percent, 5 percent and 1 percent levels of significance, respectively.

6.3 Estimation Results: Long-Run and Short-Run Coefficients

Table 6.5: Long-Run and Short-Run Coefficients

Variables	Coefficients	Probability
Long-run Coefficients		
LnGDP(-1)	0.489 (0.180)	**0.02****
LnGDP(-2)	-0.276 (0.176)	0.14
LnGDP(-3)	-0.032 (0.099)	0.75
LnFDI	-0.021 (0.008)	**0.03****
LnFDI(-1)	-0.021 (0.009)	**0.04****
LnGFCF	0.037 0.063	0.56
LnGFCF(-1)	-0.086 0.058	0.16
LnLAB	3.138 (1.428)	**0.04****
LnLAB(-1)	2.873 (1.801)	0.13
LnTR	0.055 (0.026)	**0.05***
LnTR(-1)	0.107 (0.052)	**0.06***
LnCPI	-0.078 (0.102)	0.45
LnCPI(-1)	-0.010 (0.093)	0.92
LnCPI(-2)	0.165 (0.080)	**0.06***
Short-run coefficients		
D(lnGDP(-1))	0.485 (0.159)	**0.01****
D(lnFDI)	-0.016 (0.008)	**0.08***
D(lnGFCF)	0.111 (0.048)	**0.03****
D(lnLAB)	0.945 (1.199)	0.44
D(lnTR)	0.039 (0.030)	0.20
D(lnCPI)	0.096 (0.079)	0.23
ECT(-1)	-0.616 (0.141)	**0.00*****
Diagnostics		
Ramsey RESET	0.13	R-Squared 0.99
Jarque-Bera Normality Test	0.89	Adjusted R-Squared 0.99
Breusch-Godfrey Serial Correlation	0.11	
Breusch-Pagan-Godfrey	0.37	

N.B. The dependent variable is real GDP; and *, **, *** indicate 10 percent, 5 percent and 1 percent levels of significance, respectively; and the figures in parentheses are standard errors.

6.4 Discussion of Short-Run and Long-Run Results

From table 6.5 above, the result indicated by the error correction term (ECT) shows that 62 percent of the discrepancy between long-run and short-run elasticities[3] of real GDP is adjusted within a year. The error correction term is negative as expected and statistically significant at one percent level of significance.

The coefficient of FDI is negative and is significant at the 10% percent level of significance in the short-run. The negative sign of the coefficient of FDI indicates that FDI has an adverse impact on economic growth in Ethiopia in the short-run. The result is provided with credence from the World Bank (2012) report that explains foreign exchange shortage, the problem of land availability, red-tape, corruption problems in investment bureaus, power interruptions, infrastructure and logistics problems as factors for the ineffectiveness of FDI in Ethiopia. These may have contributed to the negative and significant relationship in the short-run.

A negative relationship between FDI and economic growth is not uncommon in the empirical literature. This is, in fact, in compliance with the expectation that there is ambiguity in the relationship between FDI and economic growth. Melak (2018), for example, finds a negative relationship between FDI and economic growth in the short-run for Ethiopia. The author attributes this finding to the absence of adequate liberalization policy and political stability in different parts of the country. Kedir (2012) also concludes a negative relationship between FDI and economic growth in Ethiopia mentioning crowding out effect of FDI on domestic investment, repatriation of profits and low human capital as major reasons for the relationship. Dessie (2016) and Melak (2018) also arrive at negative FDI-economic growth relationship results for Ethiopia. Similar findings on the impact of FDI on economic growth from other countries are also provided by Ayanwale (2007) and Simionescu (2016). The former finds that FDI in Nigeria has a negative impact on the growth of the manufacturing sector that has adverse impact on the country's economic growth. Simionescu (2016) also finds that FDI has a negative short-run impact on economic growth of advanced nations that include: Denmark, Estonia, Ireland, Cyprus, Austria, Portugal, Sweden, and U.K.

As expected, Gross fixed capital formation has a positive and statistically significant impact on economic growth in Ethiopia in the short-run. This suggests that increased investments fosters

[3] It is noted that when variables are differenced, long-run information is lost. Some authors suggest that the signs of the coefficient should therefore not be interpreted. This study discusses the short-run results with this in mind.

higher economic growth in the short-run. This finding is similar to Gebru (2015) who concluded that gross capital formation has a positive impact on economic growth in Ethiopia in the short-run as it promotes employment related to infrastructural development. Hundie (2014) also arrives at similar conclusion for Ethiopia.

Though the short-run relationship between labour and economic growth is expected to be positive in general, the result shows insignificant relationship. The result is explainable by very low productivity of labour in Ethiopia that resulted in insignificant contribution to country's economic growth. Woldekidan (2015) also confirms that the majority of unskilled labour in Ethiopia with low productivity has no contribution to country's economic growth.

Short-run result on the relationship between trade and economic growth also indicates insignificant relationship though positive result is expected in general. Gizaw (2015) also arrived at similar conclusion. One possible explanation for insignificant relationship is that Ethiopia's balance of trade is quite unbalanced, with growing import and poorly performing export, which has led to insignificant contribution of trade to country's economic growth (Getie and Haiyun, 2019). However, the contribution of trade on economic growth is more impactful in the long-run rather than the short-run as predicted with neo classical trade-growth hypothesis where trade impacts economic growth via production, consumption and saving effects (Deme, 2002). As a consequence, the short-run coefficient of trade variable is insignificant while the long-run coefficient is significant as in the case of this study.

The positive relationship between inflation and economic growth, though not significant, is attributable to the government's fiscal and expansionary policy for continued economic growth. Mekuria (2013) suggests that more than a quarter of the increase in general price level is attributable to the country's economic growth, inflation expectation and expectation on the real exchange rate. This result is in compliance with the conventional short-run Phillips curve that asserts higher economic growth tolerates higher inflation (Demille, 2015).

Turning to the long-run result, FDI is negatively related to economic growth at the 5 percent level of significance. Taking the net effect, a one percent increase in FDI would result in 0.042 percent decrease in economic growth. Findings of a negative relationship between FDI and economic growth in the long-run are not uncommon in the FDI-economic growth literature. Similar findings are reported by Arif et al. (2017) for eight emerging and growth leading economies, and Mazenda (2014) for South Africa. Todaro and Smith (2009) also provide a plausible explanation of how FDI retards growth. They posit that FDI may have a negative

impact on economic growth of developing economies by stifling competition, inhibiting indigenous firms and entrepreneurship. They also argue that FDI may deplete foreign exchange reserves in the long-run via repatriation of profits, under-pricing and importation of intermediate good.

For Ethiopia, specifically, there are a number of reasons that support this finding. One of the reasons for the negative impact of FDI on economic growth is the misuse of government incentives by foreign investors. According to Dessie (2016), the use of tax incentives for the unintended purpose by a notable number of foreign investors is one of the major reasons for the negative relationship between FDI and economic growth in the country. In Ethiopia, some foreign investors intentionally leave the country only after the period of tax incentive schemes (for example, tax holiday, duty-free imports) has elapsed by reporting that their businesses are not profitable. Kedir (2012) explains that many foreign investors are illegally deployed in investment and business areas reserved for domestic entities which indicates misuse of country's scarce resources for unintended purposes. Issues relating to the types of FDI that flow into Ethiopia also provide some explanations for the negative findings. According to Persson (2016), FDI in large-scale agriculture in Ethiopia is not pro-poor and environmentally sustainable contributing to the negative impact of FDI on the country's economic growth.

The result also seems to have been provided with credence from the World Bank (2012) report that explains foreign exchange shortage, the problem of land availability, red-tape, corruption problems in investment bureaus, power interruptions, infrastructure and logistics problems as factors for the ineffectiveness of FDI in Ethiopia.

The negative relationship between FDI and economic growth is in compliance with the expectation that there is ambiguity in the relationship between FDI and economic growth. Kedir (2012) concludes a negative relationship between FDI and economic growth in Ethiopia mentioning crowding out effect of FDI on domestic investment, repatriation of profits and low human capital as major reasons for the relationship. Dessie (2016) and Melak (2018) also arrive at negative FDI-economic growth relationship results for Ethiopia. Woldekidan (2015) and Chanie (2017), however, conclude that FDI has positive impact on Ethiopia's economic growth.

Domestic investment is negatively related to economic growth in the long-run in Ethiopia. When the net effect is considered, a one percent increase in gross fixed capital formation leads to a 0.049 percent decrease in economic growth. One possible explanation for the negative

relationship relates to the findings that conclude corruption not only damages the productive efficiency of fixed capital investment, but also depletes the fixed capital investment itself thereby exerting negative effects on economic growth (O'Toole, 2014; Onyinye, 2017). In this regard, World Bank (2012b) confirms there is significantly damaging corruption in Ethiopia in construction, mining and power sectors that puts pressure on country's economic growth.

The impact of labour on economic growth in Ethiopia is positive in the long-run. The net effect indicates that a one percent increase in labour force results in a 6.01 percent increase in economic growth in the long-run. The positive long-run relationship between labour and economic growth is explainable from the general perspective that increased labour force brings about economic growth (Kargi, 2014). In addition, primary and secondary education has been expanding in Ethiopia in the past two decades which enabled the country's primary and secondary education coverage to reach 90 percent and more than 45 percent, respectively (World Bank 2015; NPC 2018). This may have helped increase the employability of the middle-class labour force thereby positively contributing to the economic growth of the country in the long-run (NPC, 2018). Zerihun (2014) and Chanie (2017) also provide support for the finding of a positive relationship with similar results for Ethiopia.

The long-run relationship between trade and economic growth is positive and statistically significant (taking the net effect). Bekele (2017) reports a similar finding and concludes that trade has a positive relationship with economic growth in Ethiopia. Since 1992, the country has implemented a series of trade reforms to integrate its economy to the world in tandem with its efforts to reinstate market economy following the demise of the central command economy. Ethiopia's international trade volume has dramatically increased since 1992 (i.e. trade volume increased from USD 436 Million in 1992 to USD 6 Billion in 2016) (UNCTAD, 2018). The contribution of trade on economic growth is thus more impactful in the long-run rather than the short-run as predicted with neo classical trade-growth hypothesis where trade impacts economic growth via production, consumption and saving effects (Deme, 2002).

The negative coefficients of CPI and CPI(-1) comply with a prior expectation of the negative relationship between inflation and economic growth in the long-run as evidenced in many empirical studies (see Chanie, 2017; Babalola, 2019). The general consensus among researchers is that inflation up to a certain threshold is pro-economic growth; whereas, inflation beyond the threshold level has an adverse impact on the economic growth (AfDB, 2017). The AfDB (2017) estimates the African inflation threshold to be around 6.7 percent. Ethiopia's

inflation had been below this threshold prior to 2003 with the exception of drought periods (World Bank, 2009). The post-2003 period, on the contrary, witnessed higher inflation that peaked at 34 percent in 2008 though the level had decelerated to 16.8 percent in 2018, and 10.9 percent in 2019 (World Bank, 2019). This two-digit inflation during the post-2003 period, accentuated by monetary expansion, domestic currency devaluation, has been above a threshold level that adversely affected consumption, investment and trade (AfDB, 2017), resulting in negative relationships as indicated with the signs of the coefficients.

However, the relationship between inflation and economic growth in the long-run based on the net effect of all CPI coefficients deviates from the general expectation showing a positive relationship between inflation and economic growth in Ethiopia. This indicates inflation is not a problem to economic growth from long-run perspective, especially, when all its distributed impacts are considered.

The positive relationship between inflation and economic growth is attributable to the government's fiscal and expansionary policy for continued economic growth. Mekuria (2013) suggests that more than a quarter of the increase in general price level is attributable to the country's economic growth, inflation expectation and expectation on the real exchange rate. This result is in compliance with the conventional Phillips curve that asserts higher economic growth tolerates higher inflation (Demille, 2015).

6.4.1 Diagnostic Test Results

In order to ensure the validity of the results, various tests are carried. The Ramsey RESET F-statistic value of 0.13 indicates that the null hypothesis that the coefficient of power of the dependent variable introduced in the system to check specification errors is zero is not rejected indicating that the model does not suffer from specification errors. Results of p-values subject to the null hypotheses of normality (0.89), no serial correlation (0.11) and no heteroscedasticity (0.37) suggest that the model does not suffer from problems of non-normality, serial correlation, and heteroscedasticity, respectively. The R-squared (0.99) and adjusted R-squared (0.99) suggest that 99 percent of the variation of the dependent variable is explained by explanatory variables, where the former takes into account the mere number of independent variables while the latter considers the usefulness of independent variables, respectively. The polynomial inverse root AR/MA test (for long-run model) also indicates that the characteristic equation of the model has three inverse roots that lie within a unit circle (i.e, a pair of conjugate complex numbers and one real number that lie within the circle).

As emphasized in different parts of this study, testing the stability of model is of paramount importance as generalizations made with unstable models may lead to unwarranted conclusions. Accordingly, Cumulative Sum of Recursive Residuals (CUSUM), Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ), and Inverse Roots of AR Polynomials are used to test the stability of models used in the study. As indicated in Appendix 1.1, the CUSUM and CUSUMSQ tests of ARDL model for co-integration analysis, show that the model is a stable model as the graphs of cumulative sum of recursive residuals and cumulative sum of squares of recursive residuals lie within boundaries of critical lines drawn at 5 percent significance levels, respectively. Similarly, analysis on the inverse roots of AR (Autoregressive) polynomials indicates that the model's characteristic equation has one real number inverse root (i.e. -0.00047). Graphically, this number is indicated lying on the X-axis of Argand diagram, where real and complex numbers are plotted on the X and Y axes, respectively. That is, the number plotted lies within the unit circle. Analysis on normality of residuals also indicates the null hypothesis of normality is not rejected with JB and p- values of 0.77 and 0.68, respectively.

Diagnostic results on the long-run ARDL model also show that the model is dynamically stable. Accordingly, CUSUM and CUSUMSQ results show that the corresponding graphs lie within the boundaries of 5 percent significance critical lines (see appendix 1.2). The inverse roots AR/MA diagram also shows that the model's characteristic equation has one real number and a pair of conjugate complex numbers that lie within the unit circle. In terms of modulus, the inverse roots for a pair of conjugate complex numbers is 0.67 for each, and -0.67 for the real number inverse root. Modulus is the absolute value of a complex number; whereas, conjugate complex numbers are complex numbers with identical magnitudes but opposite signs (Chiang, 2005; Giles, 2013b; Eviews, 2019). Analysis on normality of residuals also indicates that the null hypothesis of normality is not rejected with JB and p- values of 0.24 and 0.89, respectively.

Diagnostic analysis results on short-run ARDL model (ECM) also show that the model is dynamically stable as the CUSUM and CUSMSQ results show the graphs of the respective diagnostics lie within the 5% critical lines (see appendix 1.3). Similarly, the inverse root AR/MA diagram shows the model's characteristic equation has one real root that lies within the unit circle, i.e., 0.58. Analysis on normality of residuals also indicates the null hypothesis normality is not rejected with JB and p- values of 0.07 and 0.96, respectively.

6.5 Causality Analysis Results

According to the empirical literature, if there is co-integration among two or more variables of non-stationary time series or a mix of stationary and non-stationary data, there should also be causal relationships among the variables though the reverse assertion is not guaranteed (Giles, 2011). As a consequence, the Toda –Yamamoto (TY) causality test is carried out to determine the direction of the causal relationship. The result confirms the existence of unidirectional causality from FDI to economic growth. The TY approach considers the influence of gross fixed capital formation, labour, trade, and inflation on causality relationships. As indicated in table 6.7, the null hypothesis that FDI does not Granger cause economic growth is rejected at the 5 percent level of significance showing that there is causality from FDI to economic growth in the Ethiopian case. However, the null hypothesis that economic growth does not Granger cause FDI is not rejected indicating that there is only unidirectional causality running from FDI to economic growth in Ethiopia. Studies that show similar results include Dessie (2016), Woldekidan (2015) and Gizaw (2015).

In TY model, intercept is not considered. Appropriate lag-structure is also chosen with information criteria along with all other necessary steps discussed in the methodology section. Accordingly, all the three popular lag-determination information criteria, i.e., Schwartz Information Criteria (SIC), Akaike Information Criteria(AIC) and Hannan Quinn (HQ) unanimously and consistently show one lag as appropriate lag-length given the exogenous variables considered and the number of observations (see Table 6.6). Besides, the one-lag TY model is checked to have no serial correlation problem that justifies the model is optimum with this lag structure.

Table: 6.6 VAR Based Lag Selection Criteria for TY Model.

VAR Lag Order Selection Criteria						
Endogenous variables: LNGDP LNFDI						
Exogenous variables: LNGFCF LNLAB LNTR LNCPI						
Date: 10/11/19 Time: 11:53						
Sample: 1970 2018						
Included observations: 30						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-19.02972	NA	0.020846	1.801982	2.175634	1.921516
1	35.28112	86.89734*	0.000734*	-1.552074*	-0.991595*	-1.372772*
2	36.18910	1.331703	0.000916	-1.345940	-0.598634	-1.106870
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Table: 6.7 TY Causality Test Results

Null hypothesis	Included Variables	Statistic Value (Chi-Square)	P-Value	Conclusion
lnFDI does not Granger cause lnGDP.	lnGDP as dependent variable and lnGFCF, lnFDI, lnTR, lnLAB, lnCPI as explanatory variables.	5.07**	0.02	Rejected
lnGDP does not Granger cause lnFDI	lnFDI as dependent variable and lnGFCF, lnGDP, lnTR, lnLAB, lnCPI as explanatory variables.	0.13	0.72	Not Rejected

N.B. ** indicates a 5% significance level.

6.5.1 TY Diagnostics Test Results

The TY causality model, which is ideal for causality analysis of variables of dissimilar order of integration, is also found to be a robust model as it proves to be diagnostically stable when checked with polynomial AR/MA characteristic equation inverse roots unit root test, as shown in appendix 1.4. The characteristic equation of the model has two real inverse roots, i.e., 0.62 and 0.78 that lie within the unit root circle. The TY model has also shown satisfactory serial correlation, heteroscedasticity and joint normality test results as the null hypotheses of no serial correlation, no heteroscedasticity, and normality are not rejected with p-values of 0.37, 0.31 and 0.41, respectively.

6.6 Conclusion and Policy Recommendations

6.6.1 Conclusion

This study examined the impact of FDI on Ethiopia's economic growth for the period 1970 to 1918 with the objectives of (i) comprehending the trend of FDI and economic growth in Ethiopia for the period considered in the study, (ii) determining the relationship between FDI and economic growth, (iii) determining the causal relationship between the two variables, and (iv) providing policy recommendations based on the findings of the study. To achieve these ends, the study employed FDI-economic growth trend analysis, ARDL bounds test approach to co-integration, short-run and long-run ARDL Models, and the Toda Yamamoto (TY) causality analysis, in tandem with other components of the study.

The result of FDI and economic growth trend analysis indicates that FDI inflows trend for the period 1970 to 2018 is characterised by three regimes, namely, the imperial regime (1960/70-1973), the Derg regime (1974-1991) and the EPRDF/Biltsigina regime (1992 to present). FDI inflow showed a gradual take off during the imperial regime in line with the growing capitalism system that was taking a root then. However, the rising trend of FDI inflow was not only discontinued, but also plummeted into a negative inflow during the Derg regime due to capital flight in line with the nationalization of private investments. FDI inflow began to revive during the EPRDF/Biltsigina regime on which the inflow increased from nil to USD 3.6 Billion in 2017.

Result on ARDL bounds test to co-integration technique reveals that there is a long-run relationship between economic growth as dependent variable, on one hand, and FDI, gross fixed capital formation, labour, trade and inflation as explanatory variables, on the other. Furthermore, both the short-run and long-run models reveal that FDI is negatively related to economic growth in Ethiopia. The TY causality analysis indicates that there is a unidirectional causality running from FDI to economic growth in Ethiopia.

The results cast doubts on the general conception that FDI in Ethiopia is contributory to the country's economic growth as the results of econometric models indicate negative relationships between FDI and economic both in the short and long run. As discussed earlier, the problem of land availability, red-tape, corruption problems in investment bureaus, power interruptions, infrastructure and logistics problems may have contributed to the negative relationship between FDI and economic growth. Misuse of government incentives on the part of foreign investors, coupled with the use of local bank loans for unintended purpose, may have also contributed to

the negative relationship between FDI and economic growth as such activities may have entailed diversion of scarce resources from productive use strategic to country's economic growth to unproductive or less productive trading activities.

6.6.2 Policy Recommendations

The negative impact of FDI on economic growth signals a wake-up call for the Ethiopian government to devise appropriate policies to reverse the situation by harnessing the benefits of FDI to Ethiopia's economic growth. In this regard, the unidirectional causality running from FDI to economic growth is highly informative as it signals policy makers and the government that FDI is vital for growth, and that there should be intervention from the government side to reverse the present negative impact.

One possible intervention area for policy makers and the Ethiopian government is to formulate policy and devise strategies to fight corruption and reduce red-tape that have depressing effects on the impact of FDI on economic growth. The corruption related to land provision to foreign investors, as evidenced from investment, land administration authorities, and foreign investors themselves, is an added testimony to the depressing effects of corruption on the impact of FDI on economic growth. In fact, corruption not only has a depressing effect on the contribution of FDI to economic growth, but it also depletes the FDI resource itself.

What made the situation even worse is the intermittent ethnic conflicts and riots in the country that made the land distribution to foreign investors not only difficult and corrupt, but also that severely affected the smooth operations of foreign companies. Therefore, the government should do well to promote peace and tranquillity in the country, especially, in the industrial zones, to make them safe destinations for FDI.

It is also important that the government investigate whether the investment promotion incentives allocated to foreign investors are properly utilised for productive purposes, and that foreign investors are engaged in investment activities as per the FDI policy of the country.

Another important intervention area for the Ethiopian government and policy makers is to make sure that the benefits of FDI to economic growth are enhanced via FDI-growth channels in order to foster the country's economic growth. In this regard, policies should be crafted to redress the ineffectiveness of channels discussed with (Moura 2013; OECD, 2002) FDI-growth channels framework in section 2.2.2.3, i.e., technology and know-how transfer, human capital, global integration and competition channels. It is argued that inasmuch as these channels

enhance the economic growth of developing economies, they may also negatively affect economic growth of developing economies if there are no proper FDI policies and strategies to mitigate negative effects and harness positive effects of FDI (OECD, 2002; Moura, 2013).

Accordingly, one of the reasons for limited technology and know-how transfer in Ethiopia is related to the fact that most of FDI inflow to Ethiopia is of low and medium technology industry that requires less knowledge intensive technology. It is discussed that in these type of industries technology transfer is low. So, the policy of government should focus on promotion of knowledge-intensive industries that have higher technology and know-how transfer effect. It is also mentioned that foreign investors show reluctance to have linkages with domestic entrepreneurs thereby hampering the efforts of technology know-how and transfer from FDI to domestic businesses. This problem should also be addressed by the government with appropriate policy and measures to create collaborative environment between FDI and domestic investment.

With regards to harnessing the impact of human capital development channel, policy makers and the government should give due attention to retain FDI skilled workforce in the country. Studies show that there is ample possibility for the highly skilled labour of FDI to migrate to other countries equipped with better R and D facilities (Moura, 2013; Tesfachew, 2019). The government and policy makers should also focus on measures that aim at addressing the skill gap of workers with proper training to uplift the skills of the right labour force per FDI demands. That is, even though FDIs may come up with training packages that have positive impact on the development of the country's human capital, the government and policy makers should also make efforts to ensure commitment of the country's resources to assist the human capital development activities to satisfy the needs of FDI.

Related to FDI's global integration channel as having impact on economic growth, it is discussed in section 2.2.2.3 that there is a possibility that increasing FDI in developing economies may increase imports rather than exports as most of the raw materials and inputs may be imported from abroad for reasons of inferior quality of local materials. This may harm the economic growth of Ethiopia, via many linkages, for example, depletion of country's foreign exchange reserves and widening of balance of payments. Besides, when the nature of increased global integration by FDI has a focus, largely, towards the supply of raw materials and inputs, it may put pressure on economic growth as the backward linkage effect is minimized. Therefore, the government should take measures to ensure domestically available

materials and inputs are up to the quality standards of the FDI to strengthen the level of integration.

Increased repatriation of profits, as a part and parcel of increased global integrated channel, can also be seen as contributory factor to a negative relationship between FDI and economic growth by putting pressures on foreign exchange reserves and widening the balance of payment. Therefore, policy-makers and the government should assess to know whether or not such possibilities may have depressing effect on the impact of FDI on economic growth in Ethiopia. The government should also devise policies and strategies that encourage foreign investors to spare most of their profits as plough-back investments in the country.

Related to discussion on the integration channel (i.e. the role of FDI to integrate the domestic economy to global economy to increase openness), it is discussed that the unsatisfactory performance of FDI in the so called the engine of growth, the manufacturing sector, not only has a depressing effect on the performance of technology and know transfer channel, but also exerts negative pressure on economic growth via the integration channel as its contribution to export, and hence global integration is negligible. This calls for the need for the government and policy makers to devise policies that aim at harnessing the impacts of manufacturing FDI on integration and technology transfer channels.

Increased competition, as FDI-growth channel, is contributory to economic growth, especially, by eliminating domestic monopolies. However, competition with FDI may also wipe out emerging domestic companies having negative impact on economic growth (Zhang, 2001; Moura, 2013). In this regard, the possibilities of crowding-out effect should also be investigated and addressed. When net effect is considered, the long-run econometric model result indicates a negative relationship between a variable that proxy domestic investment and economic growth, perhaps, indicating the possibilities of crowding out effect of FDI on domestic investment. In fact, some studies indicate that some foreign companies are engaged in investment activities that are reserved for only domestic investors, a manifestation of possibilities of FDI crowding out effect that should be reckoned with.

6.6.3 Limitation of the Study

As similar studies on other countries, where the sector impact of FDI is considered indicate, the impact of FDI on economic growth is better explained when the sectoral impact of FDI are measured. The econometric models used in this study measure the impact of FDI on economic growth on aggregate terms without consideration of the impact of FDI on the different sectors.

This is the weakness of this study. The limitation arose because of the unavailability of sector specific FDI data from reliable international and domestic data sources. The effectiveness of FDI in enhancing a country's economic growth can vary across sectors. Therefore, the policy recommendation based on the empirical results from this study would have been more acute with the sectoral analysis results. Therefore, it is recommended that future FDI-economic growth research should also focus on the impact of FDI on Ethiopia's economic growth with the former's effect on different sectors with disaggregated data.

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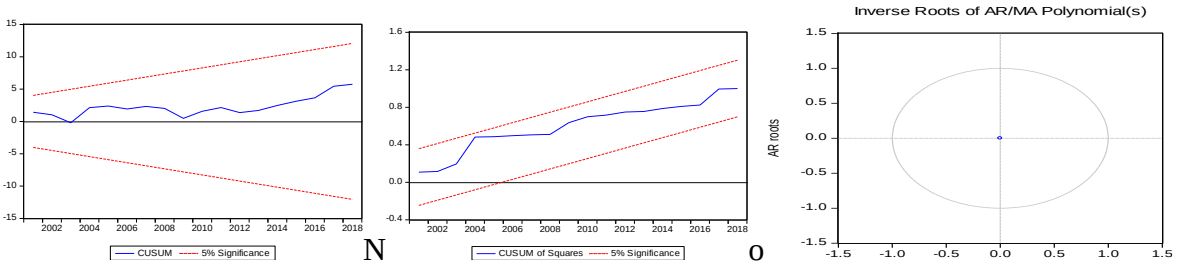
APPENDICES

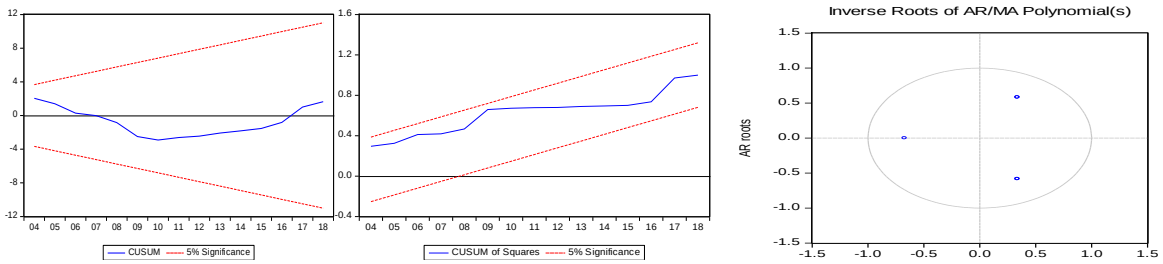
Appendix-1

1.1 Bounds Test Model (Unrestricted ECM Equation) CUSUM, CUSUMSQ, Inverse Roots of AR/Ma Polynomials

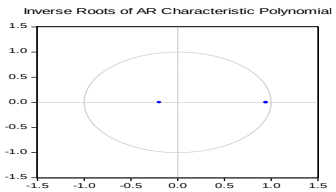


N o

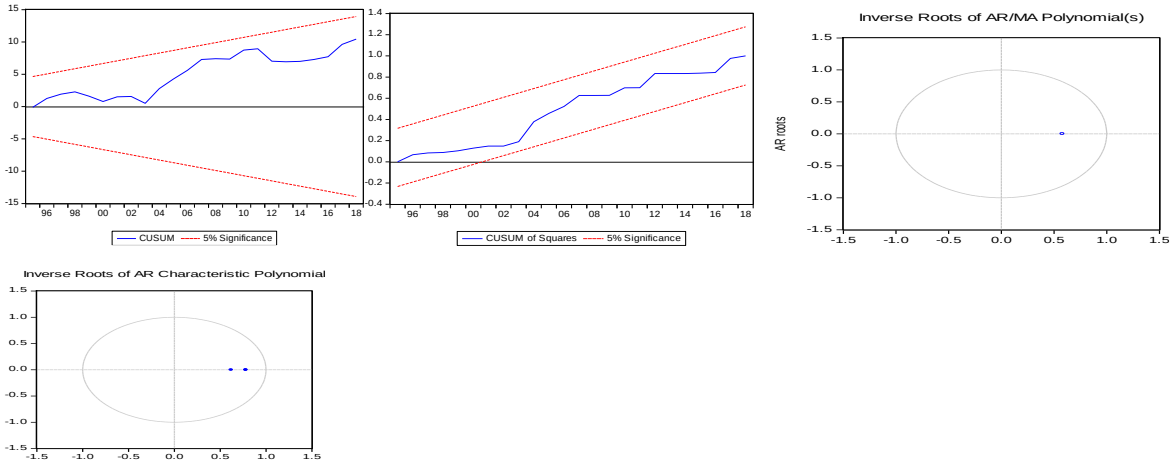
1.2 Long-run Equation ARDL (311112) CUSUM, CUSUMSQ, Inverse Roots of AR/Ma Polynomials



Stability (AR/MA Polynomials) test for Long-run ARDL lag-selection criteria



1.3 Short-run Equation ARDL (ECM) CUSUM, CUSUMSQ, Inverse Roots of AR/Ma Polynomials



1.4Toda-Yamamoto(TY)

N.B. The graph shows lnGDP and lnFDI have real inverse polynomial roots that lie within the circle when the two variables are used as dependent variables in the TY model/s