UNIVERSITY OF EDUCATION, WINNEBA

EFFECTS OF INFLATION AND INFLATION TARGETING POLICY ON FOREIGN DIRECT INVESTMENT INFLOWS IN GHANA

RANSFORD EKOW BAIDOO

A Thesis in the Department of Economics Education, Faculty of Social Science Education, submitted to the School of Graduate Studies, in partial fulfillment

of the requirements for the award of the degree of Master of Philosophy (Economics) in the University of Education, Winneba

MAY, 2020.

DECLARATION

STUDENT'S DECLARATION

I, **RANSFORD EKOW BAIDOO,** declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature: ……

Date: ……..……

SUPERVISOR'S DECLARATION

We declare that, the preparation and presentation of this thesis work was supervised in accordance with the guidelines for supervision of thesis as laid down by the University of Education, Winneba.

Dr. Emmanuel Carsamer (Principal Supervisor)

Signature: ….…….

Date: ……

Dr. Peter Borkly Aglobitse (Co-Supervisor)

Signature: ...…….…….

Date: ……..…

DEDICATION

To my beloved mother Madam Dora Abban who laid the foundation of my education.

ACKNOWLEDGEMENTS

My sincere gratitude goes to my supervisors Dr. Emmanuel Carsamer and Dr. Peter Borkly Aglobitse for their guidance, suggestions, constructive criticisms and commitment to the work throughout the study. Their willingness to assist has made it possible for me to complete this thesis.

I express my sincere and special thanks to my friends and colleagues especially, Felix Oteng, Emmanuel Owusu-Kwarteng, Elsie Hayfron and Andrews Osei Bonsu for their motivation and prayers towards the completion of this work. May the Almighty God richly bless you all.

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ABBREVIATIONS

ACP	African, Caribbean and Pacific
AGC	Ashanti Goldfields Company
AGOA	African Growth and Opportunity Act
AIC	Akaike Information Criterion
ARDL	Auto-regressive Distributed Lag
BoG	Bank of Ghana
CPI	Consumer Price Index
COICOP	Classification of Individual consumption by purpose
DOLS	Dynamic Ordinary Least Squares
ECM	Error Correction Model
ERP	Economic Recovery Programme
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GIPC	Ghana Investment Promotion Centre
GLSS	Ghana Living Standard Survey
GSS	Ghana Statistical Service
HQC	Hannan- Quinn Criterion
IMF	International Monetary Fund
INT	Interest Rate
IT	Inflation Targeting
LDCs	Less Developed Countries

LR	Long Run
MDGs	Millennium Development Goals
NEPAD	New Partnership for African Development
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
OPIC	Overseas Private Investment
PNDCL	Provisional National Defense Council Law
RBC	R-Bar Squared Criterion
RER	Real Exchange Rate
SBC	Schwarz Bayesian Criterion
SDGs	Sustainable Development Goals
SR	Short Run
SSA	Sub Saharan Africa
TNC	Trans National Cooperations
UNCTAD	United Nations Conference on Trade and Development
UN	United Nations
VAT	Value Added Tax
VAR	Vector Auto-Regression
VECM	Vector Error Correction Model
WDI	World Development Indicator
WTU	World Trade Union
YOY	Year On Year Inflation

ABSTRACT

Ghana, like other developing countries, relies on external financial assistance for budgetary support as well as capital projects. It is therefore anticipated that Foreign Direct Investment (FDI) will continue to play a critical role in bridging the financial gap and support government's quest to provide public infrastructure and services for Ghanaians. This study sought to establish relationship among macroeconomic variables, specifically between inflation, FDI inflows and the policy of inflation targeting in Ghana. This study was modeled on the Accelerator theory of investment. The sample consisted of annual time series data spanning 26 years from 1990 – 2015. The study used Error Correction Mechanism to integrate long run and short run effect of inflation and other macroeconomic variables on FDI. The results indicated significant negative long run relationship between inflation and FDI in Ghana. Also, FDI is significantly error correcting at 43% annually while inflation targeting has both short and long run positive effect on FDI. However, the result from the DOLS estimation shows that inflation has no effect on FDI inflows. The policy implication of the study is that Ghana needs to implement inflation lowering policies in order to be able to attract FDI inflows. Also, strong GDP growth leads to larger market size, the government need to initiate policies to maintain the momentum in GDP growth necessary for Ghana to attract FDI. The study therefore concluded that Inflation Targeting should be continued and not truncated since it affects the inflow of FDI positively.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Globalisation has made it possible for capital to flow freely to different parts of the world mostly from the developed to the less developed countries because of Fisher Effect. According to Fisher (1911) capital flows to where interest rate is relatively high. Thus, capital flows to economies that yields high interest rate and ceases when interest rates differential becomes zero. Capital inflow is pivotal for development because capital inflows serve as a source of external capital which stimulates technology transfer and foster exchange of managerial know-how (Kokko et al., 1996). Capital inflow also helps to enhance productivity and output growth through increased competition in sectors where multinational corporations operate (Marksusen & Venables, 1999; Alguacil & Orts, 2003). However, the existence and nature of capital inflow is one of the most significant macroeconomic controversies. Capital inflows come in three forms which include Foreign Direct Investment (FDI), Portfolio investment and Loans. The International Monetary Fund (IMF, 1993), defined FDI as: "the category of international investment that reflects the objective of a resident entity in one economy obtaining a lasting interest in enterprise resident in another economy". FDI offers a lasting interest in business and managerial control to the investor. The flow of foreign direct investment is much prevalent in most African countries which accounted for two thirds of all net inflows in the world with the purpose of generating employment and promoting development. FDI is said to generate employment in two ways: direct employment within MultiNational Enterprises (MNEs) and indirect employment through backward and forward linkages of MNEs in host countries (Asiedu, 2004). In terms of the indirect employment

generation, it comes through supply chain value. Africa is extremely dependent on informal economic development (Chen, 2012). A large proportion of workers are engaged in informal activities particularly in the resources sector and small-scale manufacturing units, as well as low-skilled jobs in the services sector. In terms of direct employment created by FDI, Maseland, Rochell and Spaliviero (2018) reveal that the highest number of investment-generated jobs has been in Egypt, followed by Morocco, South Africa, Nigeria and Tunisia. The lowest values are found in Mauritania, Guinea, Benin, Central African Republic, Eritrea and Somalia. Sectorally, studies show that the hi-tech sector, which is the smallest sector has the fastest growing FDI-generated employment, followed by manufacturing.

However, there seems to be an assertion that FDI fuel inflation such that there is a tradeoff between inflation and unemployment as explained by the Philip's curve which undermines the impact of FDI inflows on the economy. There is also a positive effect of inflation such as high employment rate and economic growth. Stable and low inflation help firms, investors, businesses etc. to be more optimistic and confident in the line of investment they want to invest. It is obvious that when the aggregate demand in an economy increases, there is an increase in the output level. Thus, the increase in market size as a result of increase in aggregate demand makes it attractive to investors to invest in the economy in the form of foreign direct investment which indirectly affect prices. However, foreign direct investment (FDI) is a major channel through which inflation can transmit to the economy as a whole (Huybens & Smith (1999) and Boyd et al (1992)). In most developing countries like Ghana, because of scarcity of capital for investment various governments have now showed much interest to attract investment, particularly foreign direct investment which in essence promote development (Omankhanlen, 2011).

Notwithstanding, government efforts fail to fully attract FDI owing to structural rigidities (OECD, 2002) because of various fundamental conditions that hinder FDI inflows. These conditions can be classified into economic, political, social and lawful factors. The constituents of the economic factors include good financial policies, sound fiscal policies, commerce and exchange rate strategies as well as improved infrastructural facilities. Financial and sound fiscal policies such as regulation of tax system in a country might send signals to investors as where to direct their investment. Also, the provision of top notch infrastructure facilities such as proper roads, supply of energy and ready access to skilled labour might attract FDI. Furthermore, providing access to credit by reforming domestic financial markets might attract FDI (Craigwell, 2006). The government must set up a business friendly financial system to help MNEs to respond to challenges they face in the cause of doing business. This will help the firms grow to impact on the economy.

Nevertheless, one factor foreign direct investors consider before engaging in investment is the level of inflation in the country. Inflation might affect the returns on investment negatively and as a result remains the focus of many investors. Inflation brings along uncertainty regarding the direction of investment. This is because there will be uncertainties regarding future cash flows, which make investment in periods of high inflation unreliable.

Several policies have been implemented by various governments especially the government of Ghana to control inflation and provide a conducive environment which might attract FDI. Notable ones are; exchange rate targeting and monetary aggregates targeting. In monetary targeting system, the money supply is only allowed to grow by a certain percentage which coincides with a given level of inflation. No matter the

type of monetary policy framework, they are all based on an inflation stabilisation where usually inflation is kept within a specific range. However, one factor which has readily not been considered to have a potential effect on FDI inflow is the adoption of inflation targeting. Inflation targeting as a monetary policy has been adopted widely by many countries both developed and developing (IMF, 2006). Inflation targeting is characterized by the public announcement of official quantitative target or target range over one or more time horizons and by the explicit acknowledgement that low, stable inflation is the monetary policy's primary long run goal. Bank of Ghana adopted Inflation Targeting policy in 2007, making Ghana the second country to adopt Inflation Targeting policy in Africa after South Africa. BoG moves to inflation targeting regime owing to its success in countries such as South Africa as a way of attracting Foreign Direct Investment. Inflation targeting provides a rule-like framework within which the central bank has the discretion to react to shocks. In emerging markets, inflation targeting appears to have been associated with lower inflation, lower inflation expectations and lower inflation volatility relative to countries (IMF, 2005).

1.2 Problem Statement

Foreign Direct Investment (FDI) improves the general dearth of capital availability for investment in most developing countries. It also results in positive externalities that often serve as a catalyst to the growth of an economy. Therefore, in order to boost investors' confidence and attract FDI, it was envisaged that the reduced macroeconomic policy uncertainty would enhance expected return rates for investors. The data available on inflation rate show that inflation rate fell from an average 16.4% between 2002 and 2006 to an average of 11.9% between 2007 and 2013 (BOG,

2019). However, in the same period, net FDI inflow increased to about US$1.4 billion in 2007 to US$3.2 billion in 2015 (WDI, 2019).

Ball and Sheridan (2005) have questioned the viability of inflation targeting on major macroeconomic variables, including FDI inflow. More recently, Brito and Bystedt (2010) demonstrated that in most developing countries, lower inflation levels due to inflation targeting have been achieved at the cost of the real output growth rate. Amoah (2015) found that single digit inflation had no significant effect on FDI inflows. Accordingly, the question still remains as to whether inflation and the strategy of inflation targeting could indeed be credited to some extent with the heightened levels of FDI inflow witnessed since the policy's inception or not. Therefore, the study sets to find out the effect of inflation and inflation targeting policy on Foreign Direct investment (FDI) inflow into Ghana.

1.3 Research Objectives

The general objective of the study was to assess the relationship between foreign direct investment, inflation and inflation targeting policy in Ghana. Specifically, the study sought to:

i. examine the effect of inflation on foreign direct investment inflows into Ghana.
ii. examine the effect of inflation targeting policy on FDI inflow into Ghana.

1.4 Hypothesis

The study sought to test the following hypotheses, accordingly.

1. H_0: There is no effect of inflation on foreign direct investment inflow into Ghana.

2. H_0: The policy of inflation targeting has no effect on FDI inflow in Ghana.

1.5 Significance of the Study

The effect of inflation on FDI must be studied for several reasons. First, FDI is an important determinant of growth in Ghana; hence a literature that will empirically examine the link between FDI and inflation is important because high inflation might harm FDI inflow while ineffective use of these capital inflows may also affect domestic inflation, thus slowing the growth process. The relationship between FDI and inflation in a single country case will be crucial for the formulation of policies that will encourage foreign investors or deter them. Hence, the study will close this obvious research gap that already exists in the literature. It will also serve as a point of departure for further research in addition to providing information to future researchers who may be interested in studying the inflation-FDI-growth nexus in Ghana.

1.6 Scope and Limitations

The study was limited to economic factors that affect inflation in Ghana. The time periods under consideration are from 1990-2015. The brevity of the sample period was dictated by the availability of consistent data, most of which are compiled on an annual basis. The study utilized the Autoregressive Distributive Lag (ARDL) model otherwise known as the bounds testing approach to co-integration developed by Pesaran, Shin and Smith (2001) to test whether long run relationship between the variables exists or not. The study employed the following variables: Inflation, FDI, gross domestic product growth rate, inflation targeting, real exchange rate and interest rate.

1.7 Organisation of the Study

The study is organized into five main chapters. Chapter one is the introduction which deals with problem statement, research objectives, hypothesis, justification of the study and the scope and organisation of the study. Chapter Two reviews both theoretical and empirical works on foreign direct investment and inflation. Chapter Three deals with the methodology, which includes, types and sources of data, the model specification, variable description, the unit root test, the ADF test and ARDL. Chapter Four analyses the data and presents the findings of the study. Finally, Chapter Five concludes the study by summarizing the findings, and enumerating the policy implications and recommendations and conclusion.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Overview

This chapter reviewed literature on the concept of FDI and inflation. Theoretical and empirical literature on inflation and FDI is also provided.

2.2 FDI Inflow and Trends

Foreign direct investment is defined as international investment made by one economy's resident entity, in the business operations of an entity resident in a different economy, with the intention of establishing a lasting interest (IMF, 1993). According to the World Trade Organisation (1996), foreign direct investment (FDI) occurs when an investor based in one country (the home country) acquires an asset in another country (the host country) with the intent to manage that asset. The management dimension is what distinguishes FDI from portfolio investment in foreign stocks, bonds and other financial instruments. The portfolio investment, bonds and other financial instruments are passive investments and do not entail active management or control of the issuing company. Foreign investors have a relatively short-term interest in the ownership of these passive investments such as bonds and stocks. The purpose of this kind of investment is solely financial gain. Alternatively, FDI can be considered as the ownership of 10 percent or more of the ordinary shares or voting stock of an enterprise which is usually considered to indicate 'significant influence' by an investor. If an investor owns less than 10 percent, it is regarded as part of portfolio stock (IMF, 2000). This however differs from country to country determined by their policies, some of which restrict the levels of shareholdings of foreigners in local firms. In Ghana, the maximum FDI a firm can hold is 49% shares

(GIPC, 2006). The World Bank (2004) also defines Foreign Direct Investment as the investment that establishes a lasting interest in or effective (active) management control over an enterprise. In the publication of OECD (2008), FDI is defined as the net inflows of investment undertaken to acquire a lasting management interest (10% or more of the voting stock) in a firm conducting business in any other economy than the investor's home country. Emphasis is also placed on the fact that the 10% threshold commonly referred to is to ensure statistical consistency across countries. In sum, FDI is the official flow of all direct investment over a period of time with a lasting relationship in an economy. The OECD definition of FDI is adopted for the study since it encompasses the international movement of elements that are complementary to capital such as skills, process, management, technology etc.

Global FDI flows have followed diverse trends over the last four decades as a lot of poor economies have grown at faster rates than relatively richer economies (Buchanan, Le, & Rishi, 2012). There has been a speedy but unstable flow of FDI globally, since the late 1980s (Chakrabarti, 2001). There was a global increase of FDI flows by 39% in 1998 with a total of US$844 billion. It increased further to US$ 1,491 billion in the year 2000 and this marked a significant increase of 49.5%. After the global economic crisis that started in 2007, global FDI flows decreased significantly but in 2010 it recovered by a modest 5% to $1.24 trillion (UNCTAD, 2013a).

However, flows have generally increased since this time but they have not been able to rise to the pre-crisis average though industrial output had returned to normal. About 30% of the total FDI inflows were reinvested earnings because of improved profits of foreign affiliates, remarkably in developing economies. This was partially due to the

increase of flows to developing economies, which accounted for more than half of the worldwide FDI inflows.

Recently, there has been tremendous shift of FDI flows to the developing economies. For instance, developing economies for the first time in 2010 attracted close to half of global inflows and at the same time, had significant outflows which were mostly directed to the South. For example, in 2010, FDI to developing economies increased by about 21% and stood at 29% of FDI. In addition, more than ten of the top recipients of FDI in the world in 2010 were developing economies. This exhibits the increasing significance of developing economies to the world economy (UNCTAD, 2013a).

According to Farla et al. (2016), it has become a chief source of external finance for developing economies since the mid-1990s. One third of the global FDI inflow were attributable to developing economies in 1997 compared to the record of one-fifth share in 1990. These economies made the greatest gains in the 1990s since their shares and values of global flows were extremely rising: there was an increase from US$34 billion (17% of global inflows) in 1990 to US$149 billion (37% of universal inflows) in 1997.

For the purpose of diversifying investment and searching for new market for investment, developing economies received an upsurge of FDI flows in 2004 which accounted for a rise of 40% and thus, led to a 36% share of global FDI, marking the highest since 1997 (UNCTAD, 2005). In 2007, these economies had a significant level of FDI inflows which was US$500 billion, a 21% growth over 2006 whereas the least developed countries (LDCs) attracted US$13 billion in the same year (UNCTAD, 2008). In addition, in 2008, there was a surge in investments to

developing economies. This increased their share to 43% in global flows that year. According to the World Investment Report (UNCTAD, 2009), half of global FDI inflows was attracted by developing economies in 2009.

According to the 2012 World investment Report (WIR), more than two thirds of the Greenfield investments was hosted by developing economies (UNCTAD, 2012). Thus, making a new record as these economies exceeded expectation shown by the FDI Potential Index. Greenfield investments provide the highest degree of control to the organisation and offer an opportunity for companies to employ and train human resources as per company standards as well as design and monitor its operational processes. UNCTAD predicted that developing economies would receive about half of the total global FDI flows due to the essential role played by FDI in terms of job creation and the economic boost it offers to an economy. As reported in the 2013 edition of the WIR, developing economies attracted more FDI than developed economies in 2012, which accounted for 52% and a total of US$142 billion of global flows (UNCTAD, 2013c). The global rate of return on FDI was 7% and developing economies had higher returns of 8% to 13% as compared to developed economies (5%). Additionally, developing economies have experienced this surge and recorded the highest retained earnings of 40% of FDI income, which serves as a vital source of financing.

There has been a stabilization in Africa's FDI inflows at markedly higher levels relative to the start of the 1990s; improved flows of US$5.2 billion during 1994-1996 as compared to US$3.2 billion during 1991-1993. In the 1997 period, inflows were significantly high with seven exceptional African countries contributing to this rise especially during the 1992-1996 period; Ghana, Namibia, Uganda, Equatorial Guinea, Botswana, Tunisia and Mozambique (UNCTAD, 1998b). Due principally to

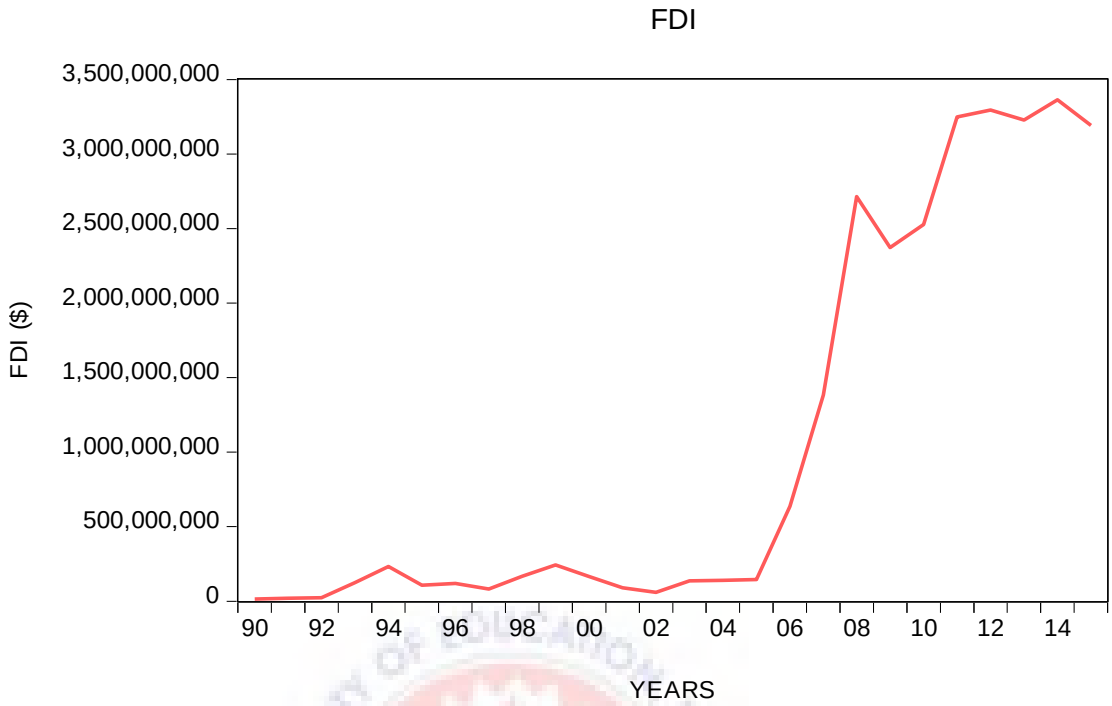
extraction of natural resources and improved policy environments, FDI inflows increased to US$53 billion and US$88 billion in 2007 and 2008 respectively (UNCTAD, 2008). Major investors in Africa were from Europe and the United States followed by African investors principally from South Africa. The oil and gas extraction as well as infrastructure was done mainly by Transnational Corporations (TNCs) from Asia. Amidst this influx of inflows, Africa's share of FDI was just about 3%. A survey by UNCTAD in 2008 showed that almost all TNCs either maintained or increased their levels of investment in the region. The World Investment Prospects Survey (2010-2012) discovered that TNCs viewed developing economies as attractive markets for their investments and that they will prefer them to developed economies in choosing places for investments. Further, the survey found that the primary sector is considered better and profitable for FDI location than the manufacturing and others. In 2008, inflows to the continent rose to a record level with West Africa attaining highest increase of 63% over 2007 (UNCTAD, 2009). The growing concern of FDI in Africa is primarily due to its potency in contributing to economic growth and development (Cleeve, Debrah, & Yiheyis, 2015). For Sub-Saharan Africa, FDI inflows rose significantly because of New Partnership for African Development (NEPAD) with the objectives to eradicate poverty, promote sustainable growth and development, integrate Africa in the world economy and accelerate the empowerment of women.

According to KPMG's report in 2015, there have been several attractive aspects of Africa that draw FDI into the continent relative to other destinations. These include high increasing consumption of foreign goods, massive tracts of unused land, the presence of precious minerals and other resources, improved access to the judiciary system and more matured politically. Overall, there was a 260% change in Greenfield

FDI projects in petroleum, quarrying and mining, which was as a result of a significant increase from US$6.1 billion to US$22.0 billion. FDI inflows into Southern Africa increased by 209% over the past five years, East Africa increased by 50% within the same period while Central Africa increased by 33% (KPMG, 2015).

Considering the FDI inflows to Ghana, from 1980, three phases can be identified as shown in figure 2.1 below where phase one was from 1980-1993, phase two from 1994-2005 and phase three started from 2006-2015. According to Asante et al. (2006), the first phase, which spans 1980 to 1993, had slow FDI net inflows, averaging $4 million per annum. The second phase, which is characterized by moderate inflows, started from 1994 to 2005. The year 1994 to 1996 experienced significant but fluctuations in FDI net inflows, which was at its peak (for the period) in 2005. In 1996, FDI inflow witnessed significant and oscillatory FDI net inflows because of privatization of Ashanti Goldfields Company (AGC), however, the inflows fluctuate over the period. Between the year 2000 and 2002, the value fell owing to the global FDI drop of 41% in 2001 and 21% in 2002 and recovered again in 2003. The recovery to $137 million (almost 2% of GDP) according to UNCTAD Statistics (2014) was as a result of the merger of AngloGold and Ashanti Goldfields which boosted FDI with commencement of a $400 million gold mine investment by Newmont, a US based firm. The periods following from 2005 through to 2008 saw an upward trend in FDI inflows (measured as a percentage of GDP) throughout the period, reaching an all-time peak of about 10% of GDP in 2008 with a net inflow of about $3,295 million (UNCTAD dataset) . It then started reducing and rising again through the 2008 to 2015 period.

Figure 2.1: FDI trends for Ghana from 1980-2015



The change in FDI inflows is attributable to numerous social, economic and political factors. In developing countries like Ghana, GDP per capita, trade, use of technology, labour cost, degree of openness, risk and corporate tax rates may determine the FDI inflow. In addition, macroeconomic factors such as interest rates, inflation rates, exchange rates and competitiveness have been shown to determine the level of FDI.

According to UNCTAD's Inward FDI Potential Index, an index which measures a country's potential attractiveness for FDI inflows, the level of FDI to Ghana has not been commensurate with its potential, even in comparison with other African countries. This notwithstanding, Ghana has political stability and is free from social conflicts prevalent among its major neighbours: Nigeria, Liberia, Sierra Leone, Burkina Faso and Cote d'Ivoire. It has larger natural resources and agricultural potential than its Sahelian neighbours, and labour cost is much lower than in other parts of the developing world (GIPC, 2017).

In a continent where many countries are landlocked, Ghana has good ports that allow shipping directly to the United States and Europe. It is a member of the WTO, benefits from trade preferences accorded by the EU to African, Caribbean and Pacific (ACP) countries and is beneficiary of the African Growth and Opportunity Act (AGOA) of the United States. It has a liberalized telecommunications sector and many Internet providers. It also has one of the few well-functioning stock exchanges in Africa, and provides a wide range of incentives such as tax holidays offered to newly established companies. Therefore, Ghana is expected to attract more FDI inflow to help propel growth and development.

2.3 Ghana Investment Promotion Centre (GIPC)

In 1983, the Ghana Investment Promotion Centre (GIPC) was also established under the GIPC (Act 478) to be responsible for the encouragement and promotion of investments in the Ghanaian economy. It is a one-stop-centre for investors with the broad functions to promote, facilitate and supervise investments in Ghana. Several polices which included tax holidays, accelerated depreciation allowances, arrangements for profit repatriation and property rights were developed by GIPC to promote investment. The centre sends investment missions abroad to host major investment fairs that focus on foreign direct investment in Ghana. Notable among these events were the 5th African-American Summit and the 3rd Pan African Investment Summit held in May and September 1999 respectively. These events generated much renewed interest in Ghana (Ghana Investment Promotion Centre, 2013). The American Summit, which was under the theme “Trade and Investment”, saw approximately 4000 delegates from the United States and Africa participating in the meeting. At the end of the Summit, pledges of $500,000 were received, with a projection of $1 million by the end of 1999.

Even though the GIPC law governs investment in all sectors, sector-specific laws also regulate those sectors such as banking, non-banking financial institutions, insurance, fishing, securities, and real estate. A foreign investor is required to satisfy the provisions of the investment act as well as the provisions of the sector-specific law. The GIPC law applies to foreign investment through acquisitions, mergers, takeovers, as well as new investments. The law is also applicable to portfolio investment in stocks, bonds, and other securities traded on the Ghana Stock Exchange. It also specifies the minimum foreign capital requirement for non-Ghanaians. The law further sets out incentives and guarantees that are applicable to enterprises registered under the law. These incentives and guarantees relate to taxation, transfer of capital, profits and dividends and guarantees against explorations.

Investment in minerals and mining is regulated by the Minerals and Mining Law, 1986 (PNDCL 153) as amended by the Minerals and Mining Amendment Act, 1994 (Act 475). Essentially, the law regulates investment in mining with the exception of investment in small-scale mining, which is reserved for Ghanaians. Also, the law specifies different types of mining rights, issues relating to incentives and guarantees, and land ownership. The Minerals Commission is the government agency that implements the Minerals and Mining law.

The Petroleum Exploration and Production Law 1984 (PNDCL 84), known as the Petroleum Law, regulates the exploration and production of oil and gas in Ghana. The law deals extensively with petroleum contracts, the rights, duties, and responsibilities of contractors and compensation payable to those affected by activities in the petroleum sector. The Ghana National Petroleum Corporation (GNPC) is the government institution that administers this law.

2.4 Concept of Inflation and Trends

Inflation simply means more money chasing few goods. Economists agree that inflation is a rise in general price level. Pigou (1947) reconciles this fact by defining inflation as the continuing or persistent tendency for the price level to rise. McMahon (2007) defined it as an increase in the price a person pays for goods, while Amadeo (2012) cited it as when the prices of most goods and services continue to creep upward. Inflation can therefore be defined as persistent and appreciable increase in the general price level. This definition better suit Ghana because the country has experience a persistent general price rise. When this happens, the standard of living falls. The main types of inflation that are typically considered are demand-pull inflation and cost-push inflation.

Demand-Pull inflation occurs when the demand for a product exceeds supply. For demand-pull inflation to occur full-employment must be in place so that any increase in demand cannot be met simply by employing more resources to produce more of a product. Cost-Push inflation occurs if there is a drop in output of a product usually due to an increase in costs or taxes, or through some other kind of adverse shock such as pandemic and natural disaster. In this case, the economy will experience shortages of products, hence price increase.

Inflation is measured by the changes in the consumer price index. The inflation rate of a country is calculated using Consumer Price Index (CPI) and the Gross Domestic Product (GDP) deflator. To measure inflation using CPI, a number of goods that are representative of the economy are put together into what is referred to as a ‘market basket’. The cost of this basket is then compared over time. This results in a price index, which is the cost of the market basket today as a percentage of the cost of that identical basket in the base year. Changes in the Price levels can be obtained through

consumer price index (CPI) which is an index that measures the average price level of goods and services typically consumed by household.

Ghana uses the Consumer Price Index in its computation of the inflation rate. The Consumer Price Index can be said to be an index which measures the change in the price level of goods and services over time that households acquire for the purpose of consumption with reference to the price level in the base year which has an index of 100 (GSS statistical bulletin, 2014).

The Ghana Statistical Service rebased the economy using 2012 as the base year. This was done to reflect current household consumption patterns which change from one period to another based on changes in products and/or household incomes. This is the fifth time the CPI has been rebased in Ghana with the first one being done in 1963. It is advised that rebasement be done within every five years or at a time when the consumption patterns of the population is observed to have changed.

The GDP deflator can be said to be a way of presenting the inflation rate which shows the rate of price change within an economy as a whole. It is the ratio of GDP in current local currency to GDP in constant local currency (World Bank, 2013). The GDP deflator may be said to be more comprehensive of the two ways of representing inflation since a wider array of goods and services are taken into account in its measure. This however does not give a true reflection on consumer welfare since it does not include imported goods and services in its computation which form a large chunk of what people consume especially in Ghana.

Before Ghana attained independence, inflation was very low. Where the average rate was below 1%, pressure started mounting on inflation when Nkrumah government undertook rapid modernization and development of infrastructure in the economy

(Aryeetey & Fosu, 2005). Ghana experiences varied and volatile rate of inflation which is coupled with different reasons. The highest inflation rate of 123.06% was recorded in 1983 and the lowest of -3.88% in 1967. Inflation rate continue to oscillate until the 1990s. Between 1991 to 1994 the rate of inflation rose from 18.03% to 24.87% respectively and it continued to record the highest of 59.56% in 1995 which was explained as result of introduction of value added tax (VAT) by the government and it received a lot of severe criticisms because the introduction of the VAT lead to extreme increase in prices since the VAT rate was higher than the prevailing sale tax it came to represent (Marbuah, 2011).

However, inflation declined continuously between 1996 to 1999 thus, declining from 46.56% in 1996 to 12.41% in 1999. Unfortunately, the fall could not continue at the end of 2000 recording a shoot-up of 25.19%. The rise could be explained as result of expansion in monetary policies, depreciation of the domestic currency and extensive borrowing from the central bank to finance the 2000 election (Marbuah, 2011). Ghana recorded a single-digit inflation of 8.73% in 2011 and 9.15% in 2012, after which it subsequently rose to 15.50% in 2014. The single–digit could be as a result of appreciation of the cedis, growth in money supply and the adjustment in the petroleum prices in those years. With regard to the annual trend of inflation in Ghana, the trend in inflation poses two distinctive features. The first communicates it cyclical nature and the second has to do with its observable episodes of peaks (1995, 2001 and 2003), troughs (1992, 1999 and 2002) and a range of moderate inflation rates (2004-2015). Therefore, the rate of inflation in Ghana revolved around a cyclical and a downward trend which is basically influence by a mixture of monetary, demand and other external pressures such as exchange rate and the inflow of foreign direct investment.

Figure 2.2: Inflation trends for Ghana from 1980-2015

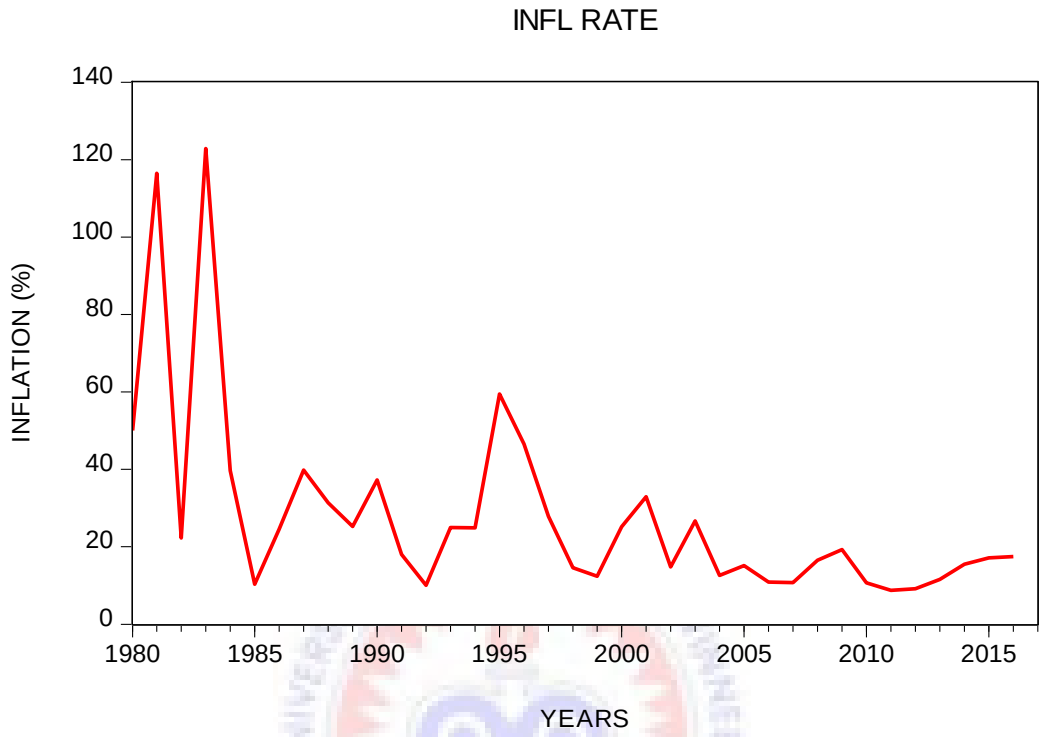


Figure 2.2

2. 5 Effect of Inflation

Inflation has series of influence on an economy. It can cause the decline of purchasing power and the waste of resources due to the decline of the value of money; inflation can cause redistribution effects and output effects, lead to the distortion of price system and also might induce tax and some other economic indicators disorder (Hongye Gao, 2004). Moderate inflation effects on an economy depend on series of relevant factors. Galloping inflation and hyperinflation have huge negative effect on an economy; the extreme condition of hyperinflation will lead to unemployment and eventually the collapse of the economy. Economists over the years try to interpret the linkage between inflation and unemployment which serves as two major macroeconomic variables. Unemployment on the other hand can also be used to

determine how healthy an economy is and it can be measured by the rate of unemployment. Thus, one can say an economy is doing well when active policies are put in place to reduce unemployment. Ghana has recorded a total average of 12.05% of unemployment from 2001 to 2005, where the lowest rate was recorded in 2001 at 11.20% and the highest rate in 2005 at 12.90% (Ghana Statistical Service, 2016). The Phillips curve was an empirical model of a single equation that described the linkage between inflation and unemployment by an economist known as A. William Phillips. He described the link as a tradeoff between the two variables. Though it was generally accepted by many economists, it was at the same time met by many criticisms by other economists like Milton Freidman. His findings show that, the Phillips curve can be accepted mostly in short run case because in the long run the tradeoff between inflation and unemployment cannot be widely supported. Other economists on the hand like Irving Fisher 1920s, Paul Samuelson and Robert Solow 1960 made advanced research into the Phillips curve model and concluded that, there was a permanent tradeoff between inflation and unemployment and that government could adopt the Keynesian policy to control inflation and unemployment (Guglielmo & Marinko, 2011). Considering Okun's law relating to unemployment and the growth of output, which states that a percentage increase in unemployment will lead to a percentage fall in the level of output of a country, shows that the higher the level of unemployment, the lower the level of output and this will eventually lead to an increase in the level of inflation. Juxtaposing the okun's law to that of the Philip's curve implies that the overall effect of inflation can lead to unemployment growth.

2.6 Concept of Inflation Targeting (IT)

Bernanke et al. (1999) define inflation targeting as a framework for monetary policy characterized by the public announcement of official quantitative targets or target

ranges for the inflation rate over one or more time horizons and by the explicit acknowledgement that low and stable inflation is monetary policy's primary long run goal. Mishkin (2007) argues that inflation targeting involves 5 main elements, and these are; Public announcement of medium-term numerical targets for inflation, an institutional commitment to price stability as the primary long run goal of monetary policy and a commitment to achieve the inflation goal, an information-inclusive strategy in which many variables and not just monetary aggregates are used in making decisions about monetary policy, increased transparency of the monetary policy strategy through communication with the public and the market about the plans and objectives of monetary policy makers and increased accountability of the central bank for attaining its inflation objectives.

Inflation targeting as a monetary policy strategy has advantages over other monetary policy strategies, in that, inflation targeting is easily understood by the general public due to the periodic communication between the monetary authorities and the general public. Inflation Targeting to a large extent increases the credibility and accountability of the monetary authorities. It also helps the monetary authorities concentrate more on the domestic shocks and hence the domestic economy as opposed to a monetary aggregates strategy.

The first country to formally adopt inflation targeting was New Zealand in 1990. Since then countries such as Canada in 1991, the UK in 1992 and Sweden in 1993 have adopted it. In Africa, South Africa was the first country to adopt Inflation Targeting whiles Ghana was the second. The Bank of Ghana adopted inflation targeting in 2002 but made a formal announcement of its use in May 2007. Ghana adopted inflation targeting as part of its efforts in preventing the slump of the economy which was necessary due to the unstable and unsustainable inflation levels.

Over time, most countries have moved to adopt inflation targeting for the conduct of monetary policy. Under inflation targeting, the central bank releases a targeted rate of inflation. The central bank then tries to move actual inflation towards the target mostly through the use of interest rate. Inflation Targeting gives the monetary authority direct control of the likely path of inflation by reducing the role of intermediary guidelines. Inflation targeting relies on targeting inflation using an inflation forecast. The monetary authority will forecast the future path of inflation and then use monetary policy to deal with any deviations that may occur between the forecasted inflation rate and the actual inflation rate. The size of the deviation will determine the adjustment that has to be made to monetary policy. To be able to determine the path that inflation may likely take, the monetary authority has to take a thorough look at factors that may have affected inflation in the past. Inflation targeting takes into account many macroeconomic variables in its forecasting not just the money supply which occurs in monetary aggregates targeting.

2.7 Regimes of Inflation Targeting

There are basically three inflation targeting regimes which are classified according to the central bank's credibility and clarity when it comes to its commitment to the set inflation target. Clarity is measured by the announcements of set inflation targets to the general public as well as institutional frameworks put in place to support accountability to the set target. The market ratings of long term local currency government debt and the actual inflation outturn are used as proxies to measure the level of credibility within an economy (Carare & Stone, 2003). These three regimes are:

1. Full-fledged Inflation Targeting (FFIT)
2. Eclectic Inflation Targeting (EIT)

3. Inflation Targeting Lite (ITL)

Full-fledged Inflation Targeting is a regime of inflation targeting where the Central Bank of a country makes a full commitment to the target and is totally accountable for the inflation target (Carare & Stone, 2003). The Full-fledged inflation targeting regime is the best known form.

Countries using this form of inflation targeting have their credibility levels falling between medium and high and as such show a clear commitment to this framework through the institutionalization of transparent monetary frameworks which hold the central bank accountable for its actions. One major advantage of the full-fledged inflation targeting regime is its ability to improve on the central banks time inconsistency problem which may often lead to higher inflation levels if not checked. New Zealand was the first country to adopt the full-fledged inflation targeting regime followed by countries like Norway, Poland, Australia, Canada and the United Kingdom have also adopted this regime.

Eclectic Inflation Targeting is a regime of Inflation Targeting where the central Bank of a country does not state an explicit target and no intermediate targets are used (Gerlach and De Menil, 1999). Countries that practice eclectic inflation targeting are seen as having very high credibility so much that they can achieve and maintain low levels of inflation without necessarily being fully transparent or accountable when it comes to a set inflation target. Their past experiences of achieving and maintaining low levels of inflation and their high levels of financial stability gives them the ability to pursue both output and price stabilization. Very few central banks fall within this category. The United States is one such country. Other central banks seen to be

practicing this regime of inflation targeting are the central banks of Denmark and Switzerland.

Stone (2002) defines inflation targeting lite regimes as ones where the central bank "announces a broad inflation objective but owing to its relative low credibility it is not able to maintain inflation as the foremost policy objective." Inflation targeting Lite (ITL) countries give out broad inflation objectives. These countries have low levels of credibility owing to the fact that they are susceptible to large economic shocks and are usually financially unstable and lack the requisite institutional frameworks. Because of their low levels of credibility, these countries cannot maintain inflation as their foremost objective when it comes to policy. This regime is seen as a transitional one. Many countries fall within this category, most of them emerging economies. Some central banks seen to be practising Inflation Targeting Lite are the central banks of Albania, Croatia, Guatemala and Mauritius (Stone, 2003).

2.8 Inflation Targeting and FDI

According to Kuttner & Mosser, (2002) Inflation targeting affects FDI by providing a transmission mechanism for monetary-policy operations. Assuming the imperfect asset substitutability, monetary policy can affect the outstanding asset values that will translate into relative asset prices. The interest rate is just one of the many relative prices, according to the proponents of this mechanism, the monetarists. The transmission mechanism work essentially for the domestic economy. However, for the analysis of FDI, it may seem implausible to look at this mechanism in their globality. As for the link between inflation targeting (IT) and FDI, one factor that seems to bond the two together is macroeconomic stability in a recipient country. Proponents of inflation targeting passionately argue that IT mitigates uncertainty and brings overall macroeconomic stability to the adopting country. For example, Svensson (2000)

credits IT for enabling the public and the markets to evaluate the credibility of policymakers and hold them accountable for their commitments. In addition, Bernanke et al. (1999) admire IT for its explicitly defined objectives, greater transparency, and enhanced accountability due to the fact that the general public is periodically briefed about the policy objectives. They also credit IT for mitigating the 'pass through' effects of unexpected shocks and keeping the nominal interest rates stable. Mishkin (2007) credits IT for obliging the policymakers to increase the level of transparency by openly communicating with the general public and the markets regarding policymakers' objectives. Mishkin also adds to IT the enhanced level of accountability of policymakers' announced objectives.

Several other benefits have also been attributed to the inflation-targeting regime: IT rejuvenates the motivations for institutional reforms; IT reduces uncertainty and the confusion over the policy stance; IT builds and lends credibility to the policymakers; and IT has 'state of the art' nature, which helps in combating the prevailing uncertainty in the economy and enhances macroeconomic stability (Gavin, 2003; Schaechter et al., 2000; Truman, 2003; Hammond 2012). In light of the benefits stated above, the IT-adoption should favor and attract more FDI.

As for the impact of IT on FDI, there are a handful of studies on the topic, perhaps because inflation targeting is considered to be an inward-looking policy framework. A summary of these studies follows, which portrays the nexus among foreign investment and macroeconomic policies, particularly monetary policy in the form of inflation targeting.

2.9 Theories Underlying FDI inflow and Inflation

2.9.1 The Irving Fisher Equation

Irving Fisher equation explains the relationship between nominal and real inflation rates. It is a useful theory because it includes inflation into the system. It is expressed in the form;

$i = r + \pi$

Stated differently;

$r = i - \pi$

Where i is the nominal interest rates, r is the real interest rate and π is a representation of the expected inflation.

The fisher equation thus served as a means for investors to determine their required rates of return before any investment is made. This is because when there are nominal interest rate differentials between two economies, money or investment moves to the economy with the highest nominal interest rate. An increase in inflation rates would cause the nominal interest rate to also increase thus the anticipated rates of return on investment would be low as the real value of the return tends to fall.

However, the cost associated with capital would increase leading to the overall decline in the rates of investment as lending rates are now high. Since foreign investors try to reduce their financial cost in order to maintain price competitiveness, the availability of capital at high lending rates may be signal of redirection of investment opportunities to other better partners in different countries with sufficient domestic investment to supplement. Thus inflation is inversely related to investment according to Fisher. Hence a lower nominal interest rate, thus low inflation, is a requirement to ensure the attraction of foreign investment. Thus, a lower nominal

interest rate is the implication of a low inflation according to the fisher equation which results in a low financial cost on FDI and a high rate of return to investment.

2.9.2 The Flexible Accelerator Model

The theory of investment demand is the accelerator model formulated by Clark (1917). In its simplest form, the theory states that investment is proportional to the change in output which is proxy by changes in demand in the coming period. Thus, the accelerator model relates investment to changes in demand because increases in a firm's output will require a proportionate increase in its capital stock.

The theory assumes that firms' desired capital-output ratio is roughly constant and net investment takes place when output changes. In effect, the theory implies that the level of output or the changes in aggregate demand determines investment or the change in capital stock. Mathematically, this proposition of the theory is expressed as $K_t = \sigma Y_t$, where σ is the desired capital-output ratio which is assumed to be constant, K_t is the desired capital stock in period t, and Y_t is the level of output in the same period.

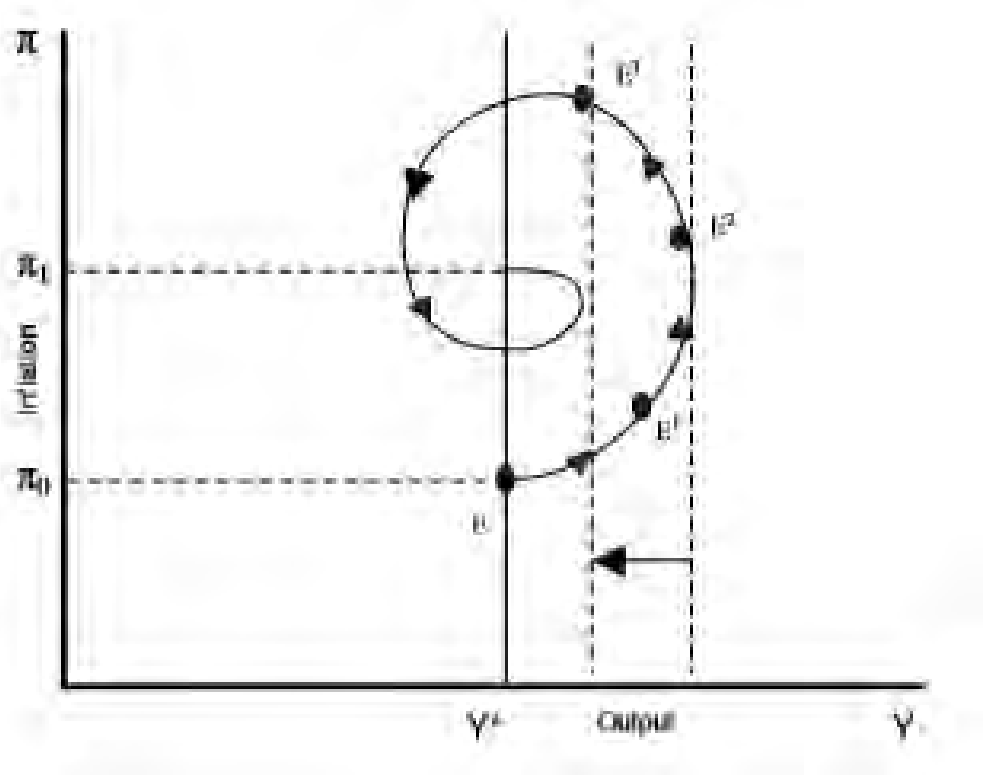
However, Chenery (1952) and Koyck (1954) modified the accelerator model. The theory removed one of the major weaknesses of accelerator theory that capital stock is optimally adjusted without any time lag. The flexible accelerator model shows that the relationship between investment and output need not to be fixed but can be affected by other variables like the cost of investment funds, that is, interest rates. The model makes room for other variables that influence investment apart from output. Some of these variables include real interest rate, foreign exchange rate and inflation (Ndanu, 2018).

2.9.3 Neoclassical Theory of output and price

The neoclassical model comprises of the Aggregate Demand (AD) and Aggregate Supply (AS) curves, which aptly illustrates the inflation – output relationship. According to this model, in the short run, the (AS) curve is upward sloping rather than vertical, which is its critical feature. If the AS curve is vertical, changes on the demand side of the economy affect only prices. However, if it is upward sloping, changes in AD affect both prices and output, (Dornbusch, et al, 1996). This holds with the fact that many factors drive the inflation rate and the level of output in the short-run. These include changes in: expectations; labour force; prices of other factors of production, fiscal and/or monetary policy. In moving from the short-run to the hypothetical long-run, the above-mentioned factors, and its 'shock' on the 'steady state' of the economy are assumed to balance out. In this 'steady state' situation, 'nothing is changing', as the name suggests. The 'dynamic adjustment' of the short-run AD and AS curves yields an 'adjustment path4', which exhibits an initial positive relationship between inflation and output, however, it turns negative towards the latter part of the adjustment path. The initial positive relationship between output and inflation, illustrated by the movement from point E0 to E1 in Figure 2.3, usually happens due to the 'time-inconsistency problem'. According to this concept, producers feel that only the prices of their products have increased while the other producers are operating at the same price level. However, in reality, overall prices have risen. Thus, the producer continues to produce more and output continues to rise. Blanchard and Kiyotaki (1987) also believe that the positive relationship can be due to agreements by some firms to supply goods at a later date at an agreed price. Therefore, even if the prices of goods in the economy have increased, output would

not decline, as the producer has to fulfil the demand of the consumer with whom the agreement was made.

Figure 2.3 Inflation and Changes in Output



Two further features of the adjustment process are also important to note. Firstly, there are times when the output decreases and the inflation rate increases, for example, between E2 and E3. This negative relationship between inflation and output is important, as it quite often occurs in practice, as ascertained by empirical literature. This phenomenon is stagflation, when inflation rises as output falls or remains stable. Secondly, the economy does not move directly to a higher inflation rate, but follows a transitional path where inflation rises then falls. Under this model, there is a short-run trade-off between output and the change in inflation, but no permanent trade-off between output and inflation. For inflation to be held steady at any level, output must

equal the natural rate (Y*). Any level of inflation is sustainable; however, for inflation to fall there must be a period when output is below the natural rate.

2.10 Empirical Review

Numerous researchers have examined inflation, inflation targeting and FDI relationship for cross country, developing and developed economies using a wide variety of approaches. In this section, a selected number of the empirical studies are reviewed.

2.10.1 Inflation Targeting and FDI

Previous studies like Khan (2016) and Ball and Sheridan (2005) have shown that adoption of the inflation targeting policy is not just lowering inflation, but also has an effect on FDI inflows. Tapsoba (2012) investigates the effect of inflation targeting adoption on FDI. His sample includes 53 developing countries over a 28-year period (1980-2007). Employing the treatment effects methodology, he finds a significant positive effect of the inflation targeting-adoption on FDI inflows. In this model, policies in favor of lowering inflation could increase FDI inflow.

Khan (2016) shows that foreign investment, particularly foreign direct investment (FDI) is attracted to countries that exhibit good governance, low uncertainty and a high degree of macroeconomic stability. Inflation targeting (IT) mitigates uncertainty, enhances governance and brings macroeconomic stability to the adopting countries. Using a panel of OECD and middle-income countries, the empirical findings show that the inflation targeting-adopters do better than the non-adopters in attracting the FDI inflows. For the middle-income countries, inflation targeting-adoption appears to have the opposite effect; it reduces FDI inflows.

Singhania and Gupta (2011) used a dummy variable for inflation targeting on FDI inflows in India. The study found GDP, inflation rate and scientific research had impact on FDI inflows. They employed an autoregressive integrated moving average model and revealed that 63 percent of the variation in FDI inflows was explained by the explanatory variables. Results like that depend on a number of circumstances such as the economic policies and regulatory environment in the country.

Moreover, Mason and Vracheva (2017) study using a panel data discovered that inflation targeting had a more significant impact on FDI in developed than developing countries. Inflation targeting was also found to have had a more positive effect on FDI inflow in lower middle income developing countries in comparison to upper middle income developing countries. For inflation targeting, developed countries drive the results than developing countries.

2.10.2 Inflation and FDI

Awan et al. (2010) examined the effect of inflation on FDI inflows in Pakistan using a quarterly data from the period of 1971 to 2008 and detected that inflation is statistically significant in explaining FDI inflows. Results also indicated that exchange rate has a negative effect on FDI. However, Xaypanya et al (2015) found that FDI was negatively influenced by inflation in the ASEAN region while exchange rate and GDP have no effect on FDI. The effect of inflation in different economic regions turns to have different effect on FDI inflow.

Ndanu (2018) employed ordinary least square technique to determine the effect of real interest rate, exchange rate and inflation on FDI in Kenya. The study concluded that inflation has insignificant influence on FDI but real interest rate and exchange rate have negative and significant effect on FDI inflow.

Alshamsi et al (2015), using Autoregressive Distributive Lag (ARDL) model concluded that inflation had no significant effect on FDI in the United Arab Emirates but GDP impacts FDI inflows. Also, Uygur (2015) investigated the determinants and importance of FDI for Turkey from 1992-2004. The study employed the VAR model and established that only the real interest rate of official treasury department and consolidated budget balance have a positive effect on FDI inflow in Turkey. Both studies concluded that inflation has no effect on FDI inflow.

Mehmet (2011) explored the association between growth, FDI, trade and inflation in Turkey using annual time series data over the period from 1970 to 2008 employing Johansen cointegration test revealed that inflation has a positive effect on FDI as well as growth. Similarly, Faiza et al. (2009) also investigated the effect of growth and inflation in Pakistan using annual data over the period of 1990 to 2011 on foreign direct investment. The study concluded that inflation has no effect on FDI inflows.

Sajib et al. (2012) also analysed the role of FDI and trade on the growth in Pakistan by employing the Simple Least Square Method using annual time series data from 1990 to 2008. The results indicated a positive and statistically insignificant effect of inflation on FDI. Shumaila et al. (2012) agreed with Sajib et al. (2012) when they took a step further to study the impact of capital inflows on domestic inflation in Pakistan.

From the African perspective, many studies have been done due to the over dependence of African countries on foreign capital flows as well as the inability to mobilize sufficient funds domestically for growth and economic development. Yasmin, Hussain and Chaudhary (2003) a study on factors affecting foreign direct investment in less developed countries. The study used panel data model found that

inflation, current account among some other noneconomic factors affect FDI negatively in low-income countries. Similarly, Hailu (2010) study on demand side factors affecting the inflow of FDI to African countries argued that high rates of inflation can be a business cost as foreign firms may decide to invest in the long term in the host economy. When the actual inflation rate differs greatly from the forecasted inflation rate, foreign firms may lose greatly as their purchasing power decreases. The study found rate of inflation to have a negative effect on inward FDI.

Also, Manyanza (2012) examined the factors that influence FDI flows into Kenya, using Ordinary Least Squares (OLS) revealed that the exchange rate was the most significant variable in determining FDI inflows in Kenya. Other significant variables were trade balance, wage rate, savings rate, openness of the economy and policy incentives. Of these, the trade balance and wage rate, inflation, GDP growth rate, external debt and macro-economic reforms had negative effect on FDI inflows.

However, Wanjiru (2013) investigated the effect of inflation volatility and economic growth on foreign direct investment in Kenya. A linear regression analysis was used and results suggest that there is no relationship between foreign direct investment and inflation, whereas a negative relationship exists between foreign direct investment and gross domestic product. Similarly, Obiamaka et al (2011) used a multiple time series regression analysis to access the impact of inflation in Nigeria and concluded that inflation rate had no influence on FDI.

Taiwo (2011) examined the long-run cointegration relationship between inflation, investment and growth in Nigeria over the period 1980 to 2006. The results indicated that inflation has a negative effect on FDI and positive effect on growth. Omankhanlen (2011) explored the effect of exchange rate and inflation on foreign

direct investment and its relationship with economic growth in Nigeria using annual time series data over the period 1980 to 2009. Government expenditure and gross fixed capital formation were added as control variables. The study reveals that inflation has no effect on FDI but FDI positively affect economic growth in Nigeria.

Udoh and Egwaikhide (2008) used annual time series data covering the period 1970 to 2005 to examine the effect of exchange volatility and inflation uncertainty on FDI in Nigeria. Employing GARCH model indicated that inflation has a negative effect on FDI and it is statistically significant. In addition, Ade et al., (2011) explored the effect of inflation, corruption and growth on FDI in Nigeria using annual time series data over the period 1990 to 2009. The Johansen approach to cointegration lends support that low and stable inflation attracts FDI inflows into developing countries to spur growth. The granger causality test however, proves the absence of any directional causality between inflation and FDI.

Andinuur (2013) study the relationship between inflation, FDI and growth in Ghana using the VAR model, found that Lower levels of inflation provided a favourable economic environment that in turn guarantees significant FDI inflows into Ghana. He found a positive relationship between FDI and the growth of GDP. The study focused much on FDI and growth nexus and ignores the policy implication of inflation targeting of which this study seeks to address. Djokoto (2012) investigated the effect of investment promotion on foreign direct investment inflow in Ghana over the period 1970 to 2009 and discovered a negative effect of inflation on FDI. Luther (2014) conducted a study on the causality analysis of FDI, exchange rate and interest rate volatility in Ghana. The study stipulated that interest rate volatility directly affect exchange rate and market attractiveness that in turn affects FDI positively in the long

run. The study also established that stable exchange rate improves FDI inflow and that high FDI inflow improves stability of exchange rate.

According to Assiamah et.al (2011), both the long-run and short-run results are statistically significant and had a negative effect of inflation, exchange rate and interest rate on FDI in Ghana whiles gross domestic product, electricity production and Trade Union had a positive effect on FDI. The Johansen's approach to cointegration within the framework of vector autoregressive was used for the data analysis.

However, Amoah et al (2015) used Vector Error Correction Model (VECM) to access the effect of inflation on FDI but concluded that both FDI and inflation had no effect on each other in Ghana. This result contradicts conclusions of Assiamah et al (2011) but both study fail to consider the impact of the policy of inflation targeting which this research seeks to fill this gap.

2.11 Conclusion

This chapter reviewed theoretical and empirical literature on FDI, inflation and inflation targeting policy. From the growing bodies of empirical literature, the effect of inflation on FDI is mixed as a result of institutional, policy and specific characteristics of countries, type of variables employed, data span as well as the methodological differences. Some studies present a negative effect of inflation on FDI inflows. Other studies present a positive effect of inflation on FDI inflows while others did not find any impact of inflation on FDI inflows. Most of the reviewed studies failed to consider the effect of inflation targeting policy on FDI. For this reason, it is imperative to empirically investigate the effect of inflation and inflation

targeting policy on Foreign Direct Investment (FDI) to fill this gap by presenting the Ghanaian case.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the methods used for the study. The first section presents the theoretical framework followed by the empirical model for the study. The chapter also deals with the estimation techniques, measurement of the data and the expected signs of the variables.

3.2 Theoretical Framework

The study follows the flexible accelerator model of investment by Chenery (1952) and Koyck (1954). The flexible accelerator model of investment states that the relationship between investment and output need not be fixed but can be affected by other variables like the cost of investment funds (Hicks 1956; Eisner et al. 1963). Hence, to produce any given level of output there must be an optimal or cost minimizing level of desired capital that is required by a firm.

The flexible accelerator model of investment was operationalized to explain the effect of inflation on FDI which explains that net capital inflow is a function of changes in demand and a change in demand relate to goods and services (GDP). Therefore, net capital inflow is a function of changes in GDP. The equilibrium capital stock K is given mathematically as a function of output, the user cost and the price of output.

$K = f(Y, C, P)$ ..... (3.1)

Where K is the equilibrium capital stock, Y is the Output, C is the User Cost (interest rate) and P is Price of output.

From (equation 3.l) an investment demand function can be derived from changes in K. The investment demand function can be specified as;

$K_t = K_{t-1} - \alpha K_{t-1} + I_t^g$ ..... (3.2)

Rearranging in terms of gross investment gives,

$I_t^g = (K_t - K_{t-1}) + \alpha K_{t-1}\ or\ \Delta K_t + \alpha K_{t-1} = I_t^g$ ..... (3.3)

$I_t^g = I_t^n + \alpha K_{t-1}$ ..... (3.4)

Where, I_t^g gross investment, $I_t^n = \Delta K_t$ is the net investment and αK_{t-1} is the Replacement investment.

Similarly, equation 3.4 can be written as;

$I_t^g = \Delta K_t + \alpha K_{t-1}$ ..... (3.5)

Since the preposition of accelerator theory is that net investment is related to output implies that a change in the capital stock is the changes in the level of output. Hence,

$I_g = \Delta K_t = \alpha \Delta Y_t$ ..... (3.6)

From the neoclassical point of view, changes in output affect price system. A change in output is a function of price. The neoclassicals believe that prices and wages are not sticky in the long run and that a rise in aggregate demand will lead to inflationary rise in the price level. In the quest to produce more of the output, more labor will be employed to work with the machinery and other form of capital investment (Foreign direct investment). As economic output rises above full employment and there is shortage of labour, eager employers will bid for increase in wages. High demand for labour will drive up wages. As wages do rise, although it will cause output to

increase, the real output remains the same but will lead to an inflationary increase in the price level. Hence, a change in output is dependent on the level of investment which in turn affect price levels. Thus, gross investment is related to change in output (ΔY) and α denotes marginal productivity of capital. The gross investment is a function of output (Y) and real cost of capital and price of output. However, the call for extra investment which is dependent on the real cost of capital is affected by interest rate and inflation.

In this study, foreign direct investment will be proxy to gross investment which will be dependent on output, cost of capital and price of output. FDI comes with associated relative factors which include the real exchange rate. The inflow of FDI has an interaction with the exchange rate hence its inclusion in the model.

3.3 Model Specification

Following Ndanu (2018) model for FDI and inflation, the implicit model is stated as

$$FDI = f(INFL, GDP, RER, INT) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (3.9)$$

Foreign Direct Investment (FDI) was regressed against inflation (INFL), GDP growth rate, interest rate (INT) and exchange rate (RER) empirically as:

$$FDI_t = \alpha_0 + \alpha_1 INFL_t + \alpha_2 GDP_t + \alpha_3 RER_t + \alpha_4 INT_t + \alpha_5 \gamma + \varepsilon_t \ldots. \quad (3.10).$$

Where FDI_t is the foreign direct investment at period t, $INFL_t$ is the level of inflation, GDP_t is Gross domestic income growth rate at period t, RER_t is the real exchange rate and INT_t is the 91 days treasury bill rate used as a proxy to interest rate. The model include a dummy variable γ representing inflation targeting policy and ε_t is the error term which is assumed to be independently and identically distributed with mean zero and constant variance. The coefficients $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ are the parameters of the respective variables, α_0 is the constant term (drift) and t denotes time. The

values and the signs associated with these parameters guided by literature will help address the objectives of the study.

3.4 Research Design

Research design refers to the collection and analysing of data in order to meet the research objectives through empirical evidence (Cooper & Schinder, 2008). The study adopted a quantitative research design. Quantitative research aims at testing relationship between variables and predicting outcomes (Van der Merwe, 1996). The study adopted a quantitative research design specifically regression because it is more reliable to establish relationship between variables: FDI and inflation (Weinreich, 2009).

3.5 Sources of Data

The study employs annual time series data covering the period 1990 to 2015. The brevity of the sample period was dictated by the availability of data. All data series are taken from Bank of Ghana, IMF and World Bank World Development Indicators. These are sources that have the experts that come out with data which are reliable. The study utilises the same or similar proxies for the different variables in the studies literature.

3.6 Data Analysis

The study employed quantitative analysis. Graphs and tables were used for the descriptive analysis. Also, the study adopted the ARDL methodology for both short run and long run co-integration analysis. All estimations were conducted using Econometric views (E-views version 10).

3.7 Variable Description and Expected Signs

3.7.1 Foreign Direct Investment (FDI)

FDI refers to the investment where residents of one country acquire ownership of assets for the purpose of controlling the production, distribution and activities of a firm in another country (IMF, 1993). This involved investments of foreign funds into an enterprise that operates in a different country other than that of the investor's country. The study used FDI inflow rather than FDI stocks because policy recommendations are usually formulated to boost FDI inflows rather than to accumulate FDI for a given period. In this study, FDI inflow is measured by current US$ in millions net basis (capital transactions credit less debits between direct investors and their foreign affiliates).

3.7.2 Real Exchange Rate (RER)

Real exchange rate is the ratio of a foreign price level and the domestic price level, multiplied by the nominal exchange rate. it is sourced from World Development Indicator, (2015). Real exchange rate movement influences FDI by affecting home country's currency of acquiring new asset in host countries. An appreciation of host country's currency has negative impact on FDI inflows. Therefore, the relationship is expected to be negative especially if the host country's currency appreciates but positive if host country's currency depreciates. This is supported by Awan et al. (2010) and Xaypanya et al. (2015). Therefore, the expected sign is indeterminate.

3.7.3 Gross Domestic Product (GDP) Growth Rate

GDP growth rate measures the changes in annual GDP of an economy like Ghana. Continuous growth in GDP implies increase in market size and increase in market size directly increase consumption. Since FDI inflow refers to increase in investment,

it will boost GDP growth. Therefore, there is a positive relationship between FDI inflow and GDP growth. This is supported by Andinuur (2013) who found a positive relationship between GDP growth and FDI in Ghana.

3.7.4 Inflation (INFL)

It is defined as the rate of increase in the overall general price level in an economy. But we have come to comprehend that, it is not just a general increase in price but a 'sustained' increase in the general price level. The inflation rate gives an indication of how prices of goods and service are changing within an economy. Inflation is measured by the changes in the Consumer Price index (CPI) over a time period. The relationship is therefore expected to be negative. ((Djokoto (2012), Assiamah et al. (2018), Manyanza (2012) and Taiwo (2011)).

3.7.5 Interest Rate

Interest rate can be defined as the return or yield on equity or opportunity cost of deferring current consumption into the future (Uchendu, 1993). Some of which are; savings rate, discount rate, lending rate and Treasury bill rate.

Apart from this, interest rate can also be categorized as nominal or real. This categorization credited to Irving Fisher who tried to accommodate the moderating influence of inflation on interest rate. Nominal interest rate is the observed rate of interest incorporating monetary effects while real interest rate is arrived at by considering the implications of inflation on nominal interest rate (Uchendu, 1993 & Essia, 2005). The real interest rate is the rate of interest adjusted for either current or expected inflation. It is calculated by comparing the interest rate with the current or predicted inflation rates.

However, the premise of the complementarity hypothesis posed by McKinnon-Shaw, postulated a positive relationship between the real interest rate and private investment. The argument is that financial markets in most developing countries are financially repressed, thus investment funds may not be readily available to potential private investors. In such a case, the only way to induce people to mobilize investment funds through savings is by offering high interest rates. This in essence implies that the higher the interest rate offered by financial intermediaries, the more funds would be available for investment through savings and hence the higher the level of private investment. Consequently, a user cost of capital effect will imply a negative coefficient while a positive coefficient would support the complementarity hypothesis. In the Ghanaian case however, it is expected that the complementarity hypothesis will be applicable which implicitly assumes that consumers will be more sensitive to interest rate changes and save more when the interest rate rises. The 91 days Treasury bill is used as a proxy for real interest rate because it's risk-free. Positive relationship is therefore expected between FDI and interest rate (Uygur, (2015).

3.7.6 Inflation Targeting (IT)

The policy of inflation targeting is represented by a dummy which would be one when the policy is adopted otherwise zero (Singhania and Gupta (2011), Mason and Vrachera (2017) and Lin and Ye (2007)). With regards to the policy of 'inflation targeting', it may be considered as a pull factor in terms of FDI inflow, since a vast strand of empirical literature found evidence to support the notion that 'inflation targeting' results in a more transparent and predictable macroeconomic framework with reduced policy uncertainty, thus making it easier for investors to infer the intentions of the central bank from its monetary policy announcements and hence,

appropriately plan their future investment decisions (Hodge, 2006). Consequently, the creation of a more investment-friendly environment would indeed have a positive impact on the level of FDI in a country.

A Priori Expectation

Table 3.1 A Priori Expected Sign of Variables

Independent Variables	Expected sign	Explanation
Real Exchange Rate	(-)	RER is expected to have a negative effect on FDI inflow
Interest Rate	(+)	INT is expected to have a positive effect on FDI inflow
Inflation	(-)	INF is expected to have a negative effect on FDI inflow
Real Gross Domestic Product	(+)	GDP is expected to have a positive effect on FDI inflow
Inflation Targeting (IT)	(+)	IT is expected to have positive effect on FDI inflow

3.8 Estimation Techniques

The study used Bounds test approach to co-integration in the ARDL framework. Co-integration techniques such as Engel and Granger (1987) procedure, Johansen (1995) full information maximum likelihood procedure and Bounds testing procedure are widely used in economic literature to empirically determine the relationship among time series variables (Pesaran et. al, 2001).

The Engel-Granger method has been criticized in the literature for several shortfalls which include the following: (a) problem of normalization in systems with more than two variables, (b) small sample bias due to the exclusion of short-run dynamics, and (c) the inability to test hypotheses concerning the estimated coefficients in the long-

run relationship. Due to these weakness of Engel-Granger method, Johansen and Phillips-Hansen developed cointegration test to avoid some of these problems, however the cointegration test (along with the Engel- Granger method) requires that the variables included in the model are integrated of order one (that is the variables are *I* (1)) which is a major problem.

The most important advantage of the Bound test procedure is that it is applicable irrespective of order of integration (*I* (0), *I* (1) or fractionally integrated). Furthermore, traditional co-integration methods may also experience a problem where the explanatory variable is correlated with the error term whereas the ARDL method can distinguish between dependent and explanatory variables and eradicate such problems that may arise. ARDL co-integration estimates short-run (SR) and long-run (LR) relationship simultaneously and provides unbiased and efficient estimates. The appropriateness of utilizing ARDL model is that the model is based on a single equation framework. The ARDL model takes sufficient number of lags and enable best capturing of data generating process in a general to specific modeling framework to produce accurate results (Harvey, 1981). Unlike further multivariate co-integration techniques such as Johansen and Juselius (1990), ARDL model permits the co-integration relationship to be estimated by OLS once the lag order is identified. Error Correction Model (ECM) can also be drawn from ARDL approach (Yildirim & Sezgin, 2003) to join together SR adjustments with LR equilibrium without losing LR information" (Pesaran & Shin, 1998) which other traditional co-integration techniques do not provide such types of inferences.

The estimation procedure involved was as follows;

i. First, stationarity test based on Augmented Dickey-Fuller and Philip-Person (PP) test was conducted. This was done to determine the order of integration of the variables.

ii. Second, test for short run and long run relationships among the variables was conducted.

iii. Thirdly, the stability and diagnostic test statistics of the ARDL model was done to ensure the reliability and the goodness of fit of the model.

3.9 Stationary Test

Most macroeconomic time series data are often non-stationary at their levels and using them for analysis leads to spurious results. If a series is non-stationary then the variable is found to be non-static, hence its estimation may yield spurious results which have no economic meaning. It must be then differenced *d* times before it becomes stationary and it is said to be integrated of order *d*. This would be written as I (*d*). An I (0) series is a stationary series, while an I (1) series contains one-unit root. An I (2) series contains two unit roots and so would require differencing twice to induce stationarity. I (1) and I (2) series can deviate from their mean value and cross this mean value rarely, while I (0) series would cross the mean frequently. If non-stationary variables are employed in a regression, then the standard assumptions for asymptotic analysis will not valid. Thus, the usually T-ratios will not follow a t-distribution and the F-statistic will not follow an F-distribution. As a result of spurious and or meaningless regression, unit root or stationarity tests would be checked for all the variables before estimating the parameters and testing for co-integration. Various tests of stationarity exist.

In this study the Augmented Dickey-Fuller (ADF) and Philip- Perron (PP) unit root tests are employed. This was done to ensure reliable result of the test for stationarity.

The ADF and PP test are similar except that they differ with respect to the way they correct for autocorrelation in the residuals and also the ADF test has a low power in small samples (Cheung and Lai, 1993). The Philips-Perron nonparametric test generalises the ADF procedure, allowing for less restrictive assumptions for the time series in question.

The Augmented Dickey Fuller (ADF) test adds lagged dependent variables to the Dickey Fuller equation to make the P values more accurate in order to match the assumed null distribution to the actual null distribution. With the purpose of checking for stability of the variables captured in the model, the ADF test is employed where the regression equation is developed as follow:

$$\Delta Y_t = \alpha_0 + \alpha_1 + \boldsymbol{\delta} Y_{t-1} + \beta_i \sum_{i=1}^{p} \gamma_k \Delta Y_{t-i} + \varepsilon_t$$

Where Y_t denotes the series at time t, Δ is the first difference operator $\alpha, \gamma, p,$ are parameters to be estimated, ε is the stochastic random disturbance term and p is the lag length included in the estimation process. The lag length is chosen using the Akaike Information Criterion (AIC) or the Schwarz Information Criterion (SIC). Both the AIC and SIC have the objective of selecting a model that produces the error that approaches a white noise process as much as possible, subject to the constraint that smallest possible number of lag terms or estimated parameters is included to ensure parsimony as well (Bashiru, 2011). The ADF unit roots test assumes that the error term is independent with a constant variance.

The null hypothesis to be tested is that the variable under investigation has a unit root against the stationary alternative.

$H_O: \boldsymbol{\delta} = 0$ $(y_t\ has\ a\ unit\ root\ or\ is\ nonstationary)$

$H_1: \boldsymbol{\delta} \neq 0$ $(y_t\ does\ not\ have\ a\ unit\ root\ or\ is\ stationary)$

The null hypothesis is that the series contains a unit root which implies that the series is non-stationary against the alternative hypothesis that it does not contain unit roots, implying that the series is stationary. The decision rule is that, if the test statistics of the ADF is higher (in absolute terms) than the critical value of the test at the significance level under consideration, we fail to accept null hypothesis and conclude that there is no unit root implying that the series is stationary. In a different domain, if the p- value for Z_t of the ADF test is greater than the significance level of the test statistic, we fail to reject the null hypothesis of the presence of unit root and conclude that there is unit root, hence the series is non-stationary. However, if the p-value for the Z_t of the ADF test is less than the significance level at which the test was conducted, then we fail to accept the null hypothesis and conclude that the series has no unit root, hence the series is stationary.

The study further employed the Philips-Perron unit roots test to check the robustness of the ADF. The Philips-Perron unit roots test assumes that the errors are weakly dependent and heterogeneously disturbed. This assumption of the PP unit roots test over the constant and independent error terms of the ADF test makes the PP test to be superior to the ADF test. The PP unit roots test is specified as follow:

$$\Delta Y_t = \alpha + \delta_t + \rho X_{t-1} + \sum_{i=1}^{p} \lambda_i \Delta X_{t-1} + \varepsilon_t$$

Where Y_t denotes the series at time t, Δ is the first difference operator α, δ ,ρ, λ are parameters to be estimated and ε_t is the stochastic random disturbance term. The ADF

and PP test the null hypothesis that a series contains unit root (non-stationary) against the alternative hypothesis of no unit root (stationary).

That is:

$$H_0: \rho = 0$$

$$H_1: \rho \neq 0$$

If the rho (ρ) value or t-statistics is more negative than the critical values, we reject the null hypothesis and conclude that the series is stationary. Conversely if the rho statistics is less negative than the critical values, we fail to reject the null-hypothesis and conclude that the series is non-stationary. The critical values for this t-statistics are given in Mackinnon (1993). The test hypothesis, the estimation process and the decision criteria of PP unit roots test are the same as that of the ADF unit root test. The ADF test was used because it handles bigger and more complex model while the PP test is a modification of the ADF test and corrects for autocorrelation and heteroscedasticity in the errors.

Graphical Method

This method is used to check for unit root by plotting time profiles of variables in the model over the sample period 1990-2015 in order to examine the trends of the variables to detect whether they exhibit constant mean and variance. If the plotted time profile does not move around the mean, the observed movements suggest non-constant mean and variance. According to Harris (1995), this is evidence for either deterministic or stochastic trends which implies non-stationarity.

3.10 Estimation Technique

Step 1: ARDL Bounds test of Cointegration

In the first step, the long-run relation between the variables under study is mapped out by computing the F-test for joint significance. In practice, testing the cointegration between the variable(s), in the ARDL model is the same as hypothesis testing of the long-run relationship among the underlying variables. In doing this, current values of the underlying variable(s), are excluded from the ARDL model approach to cointegration. ARDL is generically specified as ARDL (p, q) regression with I (d) as expressed below

$$Y_t = \emptyset_1 Y_{t-1} + \cdots + \emptyset_p Y_{t-p} + \emptyset_0 X_t + \emptyset_1 X_{t-1} + \cdots + \emptyset_p X_{t-p} + U_t$$

Where t= 1, 2;…, T; μt~iid (0,δ^2); $\emptyset$, and $\emptyset$ are unknown parameters, and

Y_t (or X_t) is an I (d) where U_t and ε_t are uncorrelated for all lags such that Y_t strictly exogenous with respect to U_t. P represent the maximum number of lags for the dependent variable and q represent the maximum number of lags for the regressor variables .The cointegration or the dynamic stability condition is that $/\emptyset/< 1$. This assumption is similar to the stationarity condition for an AR (1) process and implies that there exists a stable long-run relationship between Y_t and X_t. If $\emptyset$ = 1, then there would be no long-run relationship. In practice, this can also be denoted as follows:

The ARDL (p, q_1, q_2…q_k) model approach to cointegration testing is expressed as below

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{k} \alpha_1 \Delta Y_{t-1} + \sum_{i=1}^{k} \alpha_2 \Delta X_{t-i} + \delta_1 Y_{t-1} + \delta_2 X_{t-1} + \varepsilon_t$$

Where k is the maximum lag length and is chosen based on information criteria. The regress and a vector of a series of explanatory variables are given by Y_t and X_t

respectively. ε_t is the error term and Δ is the difference operator. X_{t-1} and Y_{t-1} are the lags of the independent and dependent variables and α represent the coefficient of the vector of independent regressors. The null hypothesis of no long-run relationship is defined by;

H_0: $\delta_1 = \delta_2 = 0$ (that is the long run relationship does not exist).

H_1: $\delta_1 \neq \delta_2 \neq 0$ (that is the long run relationship exists).

This is tested in each of the models as specified by the number of variables. This can also be denoted as in equation below.

$$F_Y\langle Y_1 | X_1 \ldots X_K \rangle$$

The hypothesis is tested by means of the f-statistic of the F-statistic (Wald test) in equation. The distribution of this F-statistics is non-standard, irrespective of whether the variables in the system are I (0) or I (1). The critical values of the F-statistics for different number of variables (K), and whether the ARDL model contains an intercept and or trend are available in Pesaran and Pesaran (1997) and Pesaran et al. (2001). They give two sets of critical values. For every situation, the upper bound is centred upon the intuition that all explanatory variables are I (1), and the lower bound is centred upon the intuition that all explanatory variables are I(0). If the calculated F-statistic falls below the lower bound critical value, then we do not reject the null hypothesis that there is no cointegration among the variables. However, if the F-statistic exceeds the upper bound critical value, then we reject the null hypothesis that there exists a long-term association (cointegration) among the variables under study. Finally, if the calculated F-statistic lies within the lower and upper bound critical values, then the test is inconclusive. Once the bounds test leads to a conclusion of

cointegration, a meaningful estimate of the long-term association among the variables can be done. However, according to Narayan (2005), the existing critical values in Pesaran et al. (2001) cannot be applied for small sample sizes as they are based on large sample sizes. Hence, Narayan (2005) provides a set of critical values for small sample sizes, ranging from 30 to 80 observations. The critical values are 2.496 – 3.910, and 4.068 -5.250 at 90%, 95% and 99%, respectively. Also, if the variables are I (2), the computed F-statistics of the bounds test are invalid because they are based on the assumption that the variables are I (0) or I (1) or mutually cointegrated (Chigusiwa et al, 2011). However, to avoid invalid test result, it may be advisable to first perform unit roots, though not as a necessary condition, in order to ensure that none of the variables is I (2) or beyond, before carrying out the bound F-test.

Step II: Estimation of the Long Run Estimates of the Selected ARDL Model

The issue of finding the appropriate lag length for each of the underlying variables in the ARDL model is very important because we want to have Gaussian error terms (i.e. standard normal error terms that do not suffer from non-normality, autocorrelation, heteroscedasticity, etc.). In order to select the appropriate model of the long run underlying equation, it is necessary to determine the optimum lag length (k) by using proper model order selection criteria such as; the Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) or Hannan-Quinn Criterion (HQC). By applying the Error Correction Model (ECM) version of the ARDL, the speed of adjustment to long run equilibrium from short run shocks will be estimated. Following Pesaran et al. (2001) which is an Unrestricted Error Correction. Model (ECM) is adopted and specified below:

$$FDI_t = \alpha_0 + \alpha_1 \sum_{i=1}^{\rho} \lambda_{1i} \Delta FDI_{t-1} + \alpha_2 \sum_{i=1}^{q} \lambda_{2i} \Delta INFL_{t-1} + \alpha_3 \sum_{i=1}^{q} \lambda_{3i} \Delta GDP_{t-1} + \alpha_4 \sum_{i=1}^{q} \lambda_{4i} \Delta RER_{t-1} + \alpha_5 \sum_{i=1}^{q} \lambda_{5i} \Delta INT_{t-1} + \alpha_6 \sum_{i=1}^{q} \lambda_{7i} \Delta \gamma_{t-1} + \alpha_1 FDI_{t-1} + \alpha_2 INFL_{t-1} + \alpha_3 GDP_{t-1} + \alpha_4 RER_{t-1} + \alpha_5 INT_{t-1} + \alpha_6 \gamma_{t-1} + \omega_t \quad \ldots\ldots (3.11)$$

Where Δ denotes the first differences operator, α_0 and β_0 are the drift parameter, λ's are the short run parameters, α's are the long run multipliers, p, q are the maximum lag length of ARDL (p, q) model selected by using Akaike Information Criterion (AIC) and or Schwarz Bayesian Criterion (SBC), ω_t is white noise error term which is normally distributed with zero mean and constant variance (i.e. $\omega_t \sim N(0, \delta^2)$).

Equation 3.11 is the empirical model with the bounds test by applying the OLS method which is normally the first procedure in the ARDL relationship among the variables in equation given as follows: the null hypothesis of no long-run relationship among the variables in equation is tested against the alternative hypothesis of a long-run relationship as follows:

$$H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$$

$$H_0 : \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq 0$$

The existence of cointegration between the variables under consideration is tested based on the F-statistics (Wald statistics). Given that the asymptotic distribution of F-statistics is non-standard without considering the independent variable being I (0) or I (1), Pesaran and Pesaran have provided two set of critical values for the different regressors (k), and whether the ARDL contains an intercept and or trend. Therefore, the computed F-statistic is compared with these sets of critical values developed on the basis that the independent variables are I (d) with $(0 \leq d \leq 1)$.

In order to obtain the optimal lag length for each variable, the ARDL methodology estimates $(p+1)^{k+1}$ number of regressions, where p is the maximum number of lags to be used and k is the number of variables in the equation. The lag of the ARDL is based on the Schwarz- Bayesian Information Criterion (SBIC) or the Akaike Information Criterion (AIC) or the Hannan Quinn (HQ) criterion.

$$FDI_t = \alpha_0 + \alpha_1 \sum_{i=1}^{\rho} \Delta FDI_{t-1} + \alpha_2 \sum_{i=1}^{q} \Delta INFL_{t-1} + \alpha_3 \sum_{i=1}^{q} \Delta GDP_{t-1} + \alpha_4 \sum_{i=1}^{q} \Delta RER_{t-1} + \alpha_5 \sum_{i=1}^{q} \Delta INT_{t-1} + \alpha_6 \sum_{i=1}^{q} \Delta \gamma_{t-1} + \mu_t$$

Finally, the short-run dynamics coefficients are acquired by estimating the error correction model related with the long term estimates. The ECM is specified as equation;

$$FDI_t = \alpha_0 + \alpha_1 \sum_{i=1}^{\rho} \theta_1 \Delta FDI_{t-1} + \alpha_2 \sum_{i=1}^{q} \theta_2 \Delta INFL_{t-1} + \alpha_3 \sum_{i=1}^{q} \theta_3 \Delta GDP_{t-1} + \alpha_4 \sum_{i=1}^{q} \theta_4 \Delta RER_{t-1} + \alpha_5 \sum_{i=1}^{q} \theta_5 \Delta INT_{t-1} + \alpha_6 \sum_{i=1}^{q} \theta_6 \Delta \gamma_{t-1} + \rho ECT_{t-1} + \mu_t$$

Where θ_i's represent the short-run dynamic coefficients of the model's convergence to equilibrium. ECT_{t-1}, ρ measures the speed of adjustment to equilibrium in the event of shocks to the system. The coefficient of the error correction term, ρ is expected to be negative to confirm the existence of the co-integrating relationship among the variables in the model. The absolute value of ρ is expected to be greater than zero but less than or equal to one (i.e. $0 < |\rho| \leq 1$). If the estimated $\rho = 1$, then

100% of the adjustment takes place within the period, or the adjustment is instantaneous and full.

3.11 Dynamic OLS Model

Dynamic ordinary Least Square (DOLS) was estimated to check for the robustness of the model. This alternative method was used to test the sensitivity of the results with respect to different estimation techniques. The ARDL equation is estimated by OLS and may lead to a biased estimator of the parameters unless the regressors are strictly exogeneous. Kao and Chiang (2000) and Mark and Sul (2001) recommended the dynamic ordinary least squares as alternative methods of cointegration estimation. The DOLS procedure is employed to estimate the single cointegrating vector that characterizes the long run relationship among the variables in Ghana. The model is specified as follows:

$$Y_t = \beta_o + \vec{\beta}X + \sum_{j=-q}^{p} \bar{d}_j \, \Delta X_{i-j} + \mu_t$$

Where Y_t is dependent variable, X is the matrix of explanatory variables and $\vec{\beta}$ is the cointegration vector which represent the long run cumulative multipliers or alternatively, the long run effect of a change in X on Y. p and q represent the lag length and lead length respectively. Lags and Lead terms included in DOLS regression have the purpose of making its stochastic error term independent of all past innovations in stochastic regressors. Stated differently, DOLS uses a parametric adjustment to the errors by augmenting the static regression with leads, lags and contemporaneous values of the regressors in first difference. The DOLS estimator have a normal limiting properties and very useful estimator for small samples.

3.12 The Granger Causality Test

Granger causality was developed in the 1960s and has been widely used in economics studies (Seth, 2007). Granger causality is a "bottom-up" procedure, with the assumption that the data-generating processes in any time series are independent, then the data sets are analyzed to see if they are correlated. The opposite is a "top-down" method which assumes the processes are not independent; the data sets are then analyzed to see if they are generated independently. Granger causality test is used to determine the direction of effect of a variable on another.

According to Granger causality, if a signal X_1 "Granger-causes" (or "G-causes") a signal X_2, then past values of X_1 should contain information that helps predict X_2 above and beyond the information contained in past values of X_2 alone. Its mathematical formulation is based on linear regression modeling of stochastic processes (Granger, 1969). More complex extensions to nonlinear cases exist, however these extensions are often more difficult to apply in practice. For instance, assume two stochastic processes x_t and y_t. It is said that variable x_t Granger-causes variable y_t if and only if the lagged value of x_t has better forecasting capability on y_t than just lagged values of y_t on itself.

Granger-causality has several components. The first component is based on the principle that only past values of X can Granger-cause Y because the future cannot cause the past or the present. If X occurs after Y, then we know that X cannot cause Y. Similarly, if X occurred before Y then that does not necessarily imply that X caused Y. The second component of Granger-causality is exogeneity; Sims (1992) stated that for variable X to be exogenous of variable Y, X must fail to Granger-cause Y; this component was confirmed by Engle, Hendry, and Richard (1983). Independence is the third component of Granger-causality because variables X and Y

are only independent of each other if both fail to Granger-cause the other. The final component of Granger-causality is that of asymmetry; if X Granger-causes Y, then changes in Y has no effect on the future values of X.

The Granger causality test was used to check the direction of causality of the variables (Engle and Granger, 1987; Hayashi, 2000). Causality test was performed to examine the causal relationship between Foreign Direct Investment (FDI) and Inflation as well as the control variables. The Granger causality based on error correction model helps not only to know the direction of causation but also to identify the variables that are exogenous and endogenous. The null hypothesis tested was Inflation does not Granger cause FDI and the alternative hypothesis was inflation Granger-cause FDI. The test involved estimating the following pairs of regression specifications:

$$\mathrm{FDI}_t = \alpha_i INFL_{t-i} + \beta_i FDI_{t-i} + \mu_{it}$$

$$INFL_t = \rho_i FDI_{t-1} + \omega_i INFL_{t-j} + \mu_{jt}$$

where FDI_t and $INFL_t$ are stationary series of dimensions of foreign direct investment and inflation respectively; μ_{it} and μ_{jt} are mutually uncorrelated with error terms.

3.13 Stability Tests

Two tests of stability of the long-run coefficients together with the short dynamics are conducted, following Pesaran and Pesaran (1997) after estimating the error correction model. The diagnostic test examines the serial correlation, functional form, normality and heteroscedasticity associated with the selected model. This technique is known as cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ). The CUSUM and CUSUMSQ statistics are updated recursively and plotted against the break points. Plots of Cumulative Sum (CUSUM) and Cumulative Sum of Squares

(CUSUMQ) test as postulated by Brown et al (1975) are employed. If the movement of the CUSUM and CUSUMQ residuals lies outside the critical line, then it can be concluded that there is instability in the estimated coefficient and parameter variance over the sample period. On the contrary, if the movements of the CUSUM and CUSUMQ lie within the critical lines then it can be concluded that there is stability among the estimations.

3.14 Conclusion

This chapter formulated the model to be estimated for the study and specified the technique to be used for estimation. This chapter developed and presented the methodological framework suitable for conducting the study. The model was developed from the flexible accelerator theory of investment where FDI was seen as part of net investment. Annual time series data on inflation, gross domestic product growth rate, Foreign Direct Investment, interest rate and real exchange rate from 1990 to 2015 were employed for the study. A dummy variable was used to represent the policy of inflation targeting since before and after its inception under the study period. Stationarity test was conducted using graphical approach, ADF and PP tests. Finally, ARDL approach to cointegration was used to examine the long-run and short-run dynamics among the variables and error correction models are used to find out the adjustment to equilibrium in case there is disequilibrium in the model. Furthermore, the study described the source and variables used in the study. The next chapter presents results and discussion of the estimated results.

CHAPTER FOUR

DATA PRESENTATION AND RESULTS DISCUSSIONS

4. 1 Introduction

This chapter presents the results of the study and its corresponding discussions. The ARDL Cointegration and the unit root tests were discussed accordingly. The discussion ended with the diagnostic test of the model.

4.2 Distribution of Descriptive Statistics of the Variables

This section reports descriptive statistics of the variables in Table 4.1. This comprises mean, median and standard deviations. The result shows that GDP growth rate recorded a mean value of 5.49 with a median of 4.65 and lies between 3.30 and 14.05. Its standard deviation was about 2.39 which is an indication of a higher tendency to deviate from its actual mean and thus more volatile.

Also, inflation averaged 0.1737 with a median of 0.1671 and lies between -0.711 and 0.7078 with a standard deviation of approximately 0.224 which depicts a lower volatility level. Furthermore, the real exchange rate also had 110.50 average value with a maximum value of 164.54 and a minimum of 69.46. It recorded a standard deviation of 25.85 with a median of 102.099. The variables FDI and interest rate recorded a mean of 1.07E+09 and 26.04 respectively. FDI recorded a maximum inflow of 336000 and a minimum inflow of 148000 under the study period. Likewise, the interest rate ranges from 9.6 to 47.88. Also, the median of FDI and interest rate is 1.67E+08 and 25.245 respectively.

A careful observation of the mean and the median of the variables show that the variables are close to each other which indicates that there is minor symmetry of these variables. The result shown in Table 4.1 indicates that all the variables have positive

average values (means). There is minimal deviation of the variables from their means as shown by the standard deviations. In addition, the result in Table 4.1 again reveals that almost all the variables show signs of positive skewness with the exception of inflation. Inflation and GDP growth rate have a leptokurtic kurtosis which produces more outliers than the normal distribution while FDI, RER and interest rate have a platykurtic kurtosis (a flatter curve) which does not produce outliers. The Jarque-Bera statistic also shows the null hypothesis of the normally distributed series therefore cannot be rejected for all the variables, except inflation and GDP growth rate.

Table 4.1: Descriptive Statistics

	FDI	INFL	GDPRATE	RER	TBILL_RATE	DUMMY
Mean	1.07E+09	0.173798	5.490251	110.4960	26.04423	0.346154
Median	1.67E+08	0.167122	4.651426	102.0994	25.24500	0.000000
Maximum	3.36E+09	0.707880	14.04600	164.5439	47.88000	1.000000
Minimum	14800000	-0.711390	3.300000	69.45990	9.600000	0.000000
Std. Dev.	1.35E+09	0.223751	2.390228	25.85216	11.28521	0.485165
Skewness	0.806688	-1.890140	2.090092	0.602198	0.400129	0.646762
Kurtosis	1.817111	11.62286	7.496628	2.451065	2.390570	1.418301
Jarque-Bera	4.335723	96.03117	40.83474	1.897892	1.096135	4.522890
Probability	0.114422	0.000000	0.000000	0.387149	0.578066	0.104200
Sum	2.78E+10	4.518749	142.7465	2872.896	677.1500	9.000000
Sum Sq. Dev.	4.55E+19	1.251618	142.8298	16708.36	3183.900	5.884615
Observations	26	26	26	26	26	26

4.3 Unit Root Test Results

The ADF and the PP tests for unit root were conducted for all the variables as presented in Tables 4.2. The unit root test was conducted to ensure stationarity of the series to avoid spurious results. At levels, inflation and real exchange rate were stationary at 1% and 5% in ADF test while the PP test shows that only inflation is significance at 1% level. All the other variables were not significant at levels. However, at first difference, all the variables were stationary at 1% and 5% significance level as indicated in Table 4.3 by both methods. It therefore follows that all the variables were integrated to the order of one (I (1)).

Table 4.2: Results of Unit Root Test with Intercept and Trend (ADF and PP) at Levels

	ADF				PP			
Var.	Statistics	Lag	Prob.	I(d)	Statistics	Prob.	BW	I(d)
FDI	-1.527736	1	0.7921	I(0)	-1.527736	0.7921	1	I(0)
INFL	-4.628699	0	0.0057	I(0)	-4.713597	0.0047	4	I(0)
GDP RATE	-3.14872	1	0.1173	I(0)	-3.148772	0.1173	3	I(0)
RER	-3.831958	1	0.0323	I(0)	-2.666311	0.2573	2	I(0)
TBILL RATE	-2.209168	1	0.4645	I(0)	-2.190145	0.4742	1	I(0)
DUMMY	-2.023771	1	0.5607	I(0)	-2.023771	0.5607	0	I(0)

Table 4.3: Results of Unit Root Test with Trend and Intercept (ADF and PP) at First Difference

	ADF				PP			
Var.	Statistics	Lag	Prob.	I(d)	Statistics	Prob.	BW	I(d)
D(FDI)	-3.868914	1	0.0300	I(1)	-3.826263	0.0327	2	I(1)
D(INFL)	-7.291253	0	0.0000	I(1)	-11.59782	0.0000	10	I(1)
D(GDP RATE)	-6.487226	1	0.0001	I(1)	-6.748403	0.0001	3	I(1)
D(RER)	-4.332207	1	0.0114	I(1)	-4.342573	0.0112	1	I(1)
D(TBILL RATE)	-5.140622	1	0.0020	I(1)	-5.207380	0.0017	3	I(1)
D(DUMMY)	-4.842753	1	0.0038	I(1)	-4.842634	0.0038	1	I(1)

Note: D denotes the first difference, I(d) is the order of integration and BW is the bandwidth

4.3 Lag Order Selection

The lag length selection is determined by the information criteria such as Akaike and the Swartz-Bayesian information Criterion (SBIC). From Table 4.4, the lag length is one by the Akaike information criteria for most of the variables. All the information criteria selected a lag of one therefore in the model of estimation; a lag one was used with the exception of inflation with a lag of zero. This is because the AIC is useful when it comes to small sample size as in the case of this study.

Table 4.4: Lag Length of Variables

VAR	Lag	LogL	LR	FPE	AIC	SBIC	HQ
FDI	1	-506.2147	59.08888*	1.45e+17*	42.35123*	42.44940*	42.37727*
INFL	0	1.498156	NA*	0.056172*	-0.041513*	0.007573*	-0.028491*
GDP	1	-51.72474	6.067951*	5.152964*	4.477062*	4.575233*	4.503107*
RER	1	-94.81059	22.92577*	186.8039*	8.067549*	8.165720*	8.093594*
TBILLRATE	1	-81.82713	19.69021*	63.31387*	6.985594*	7.083765*	7.011639*

4.4 Co-integration Test

The Cointegration test results is shown in Table 4.5 and it illustrates the existence of cointegration relationship between FDI inflows, inflation, GDP growth rate, interest rates, real exchange rates and inflation targeting policy since F statistics is significant at 1%. The result of the F statistic is compared with the two critical values (upper bound and lower bound). The null hypothesis of no cointegration is rejected by the condition of the F-statistic being higher than the critical values.

Table 4.5: ARDL Bounds Test for the Existence of Cointegration

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	7.977471	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
Actual Sample Size	25		Finite Sample: n=30	
		10%	2.578	3.858
		5%	3.125	4.608
		1%	4.537	6.37

4.5.1 Results of the Long-Run Relationship

The results of the ARDL cointegration test are presented in Table 4.6. Inflation has a negative effect on FDI inflows in the long run and is statistically significant at 5%. However, the coefficient of -1.46E+09 means that when inflation increases by 1%, FDI inflow is decreased approximately by zero over a year. The result is similar to Yasmin, Hussain and Chaudhary (2003), Manyanza (2012) and Taiwo (2012). Djokoto (2012) who revealed negative relationship between FDI flows and inflation in Ghana.

Inflation targeting has a positive relationship with the FDI inflow in the long run with coefficient of 2.30E+09 which is statistically significant at 1% level of significance. This means that well managed inflation targeting policy would attract FDI inflow to promote development. The result shares with other studies such as Mason and Vracheva (2017) and Singhania and Gupta (2011), Tapsoba (2012) and Khan (2016) who conclude that reliable inflation targeting policy will lead to high inflow of FDI.

GDP growth has the expected sign and it is significant at 5%. GDP growth rate has a long run positive effect with a coefficient of 1.14E+08 on FDI in Ghana. However, the coefficient is very small which means that though GDP growth rate has effect on FDI inflow; it influence is minimal in determining FDI inflow which call for alternative policy to attract FDI. The result means that 1% increase in GDP growth in a year will lead to less than 1% increase in FDI inflow. The result shares with the work of Andinuur (2013) who found that GDP growth rate positively affect FDI inflows in Ghana.

Interest rate has a positive effect on FDI with a coefficient of 5391531 but statistically insignificant in Ghana. However, the findings of Uygur (2015) established that the real interest rate has a positive significant relationship on FDI inflows in Turkey.

Real exchange rate has a negative relationship with foreign direct investment in the long run. The coefficient was – 4448528. but statistically insignificant. The study result is in line with Asiamah et al (2011) and Awan et al (2010) who found that exchange rate has a negative effect on the inflow of FDI in Ghana and Pakistan respectively. However, their result show that exchange rate has a significant effect on FDI due to differences in the data span.

Table 4.6: Long Run Relationship

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFL	-1.46E+09	6.23E+08	-2.346884	0.0331**
GDP_RATE	1.14E+08	58753403	1.934912	0.0721*
RER	-4448528.	4372110.	-1.017479	0.3251
TBILL_RATE	5391531.	12138648	0.444162	0.6633
DUMMY	2.30E+09	2.74E+08	8.398667	0.0000***

Note: ***, **, * shows significance level at 1%, 5%, and 10% respectively

4.5.2 Short Run Analysis

The short run interaction between the dependent variable and the regressors is displayed in Table 4.7. The ECM has a coefficient of -0.434161 at 1% significance level. The negative sign implies that the process is converging in the long run, that's the speed of adjustment is towards equilibrium. This means that any deviation in foreign direct investment inflow in the long run is likely to be corrected annually by 43% from the short run towards the long run.

In the short run, inflation has a negative relationship with FDI inflow having a coefficient of -2.29E+08. This is consistent with the long run dynamics. GDP growth rate and FDI are also positively related in the short run at 1% significance. The coefficient of 90568718 indicates that a 1% increase in growth of GDP will result in approximately 9056871 increases in FDI inflow in the short run.

Interest rate has a positive relationship with FDI. This means that within the short run, interest rate will be a motivating factor to investors and will be able to attract FDI inflow into Ghana.

Table 4.7: Short Run Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.80E+08	29643905	0.000000	0.0000***
D(INFLRATE)	-2.29E+08	1.18E+08	0.000000	0.0000***
D(GDPRATE)	90568718	12306995	0.000000	0.0000***
D(TBILL_RATE)	11156748	4105980.	0.000000	0.0000***
ECM(-1)*	-0.434161	0.054347	-7.988728	0.0000***

Note: ***, **, * shows significance level at 1%, 5%, and 10% respectively

4.6 Results of the Granger Causality Test

The Granger causality test results show that there is unidirectional causality from foreign direct investment inflow to inflation at 10% significant level as displayed in Table 4.8.

Table 4.8: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
Inflation does not Granger Cause FDI	24	0.51261	0.6070
FDI does not Granger Cause Inflation		2.92420	0.0781
Inflation Targeting does not Granger Cause FDI	24	9.54390	0.0014
FDI does not Granger Cause Inflation Targeting		3.04153	0.0715

Note: ***, **, * shows significance level at 1%, 5%, and 10% respectively

The result is consistent with Omankhanlen (2011) who found a unidirectional causality between FDI inflow and inflation. The result is also in consonance with Djokoto (2012) who also found a unidirectional causality between FDI and inflation in Ghana.

However, there is bidirectional causality between inflation targeting policy and FDI. The inflation targeting policy granger cause the inflow of FDI while FDI also granger cause inflation targeting. This means that the government must be circumspect in the

implementation and management of inflation targeting policy to ensure that Ghana derive the maximum benefits. The policy of inflation targeting policy must be well managed through proper implementation of a well-managed monetary policy to help achieve specific targeted inflation level in Ghana.

4.7 Robustness Checks

The Dynamic Ordinary Least Square (DOLS) estimation method was employed for robustness check. In the DOLS estimation, sufficient lags and leads of first difference terms were included to eliminate the problem of serial correlation. The empirical results show robust results from above. The coefficient of multiple determination shows 83% of the variation in FDI inflow is accounted for by the explanation variables. In addition, the F-statistic indicates that jointly the independent variables explain the changes in the dependent variable of FDI inflow.

All the independent variables have the expected signs. The coefficients of the independent variables are all positive with the exception of inflation and real exchange rate, which have negative coefficients. The estimated coefficients are statistically significant at 5% for GDP growth rate and real exchange rate and 1% level significance for interest rate and inflation targeting policy. Though the result of the long run estimate of the ARDL for the variables under estimation GDP growth rate, real exchange rate, interest rate and inflation targeting policy differ, it confirms the existence of the effect of GDP growth rate, real exchange rate, interest rate and the policy of inflation targeting on FDI inflow in Ghana. However, the DOL estimation result for robustness check does not show a statistical significance for inflation. This means that inflation has no effect on FDI in the long run.

Table 4.9: Dynamic Least Squares (DOLS) Estimation

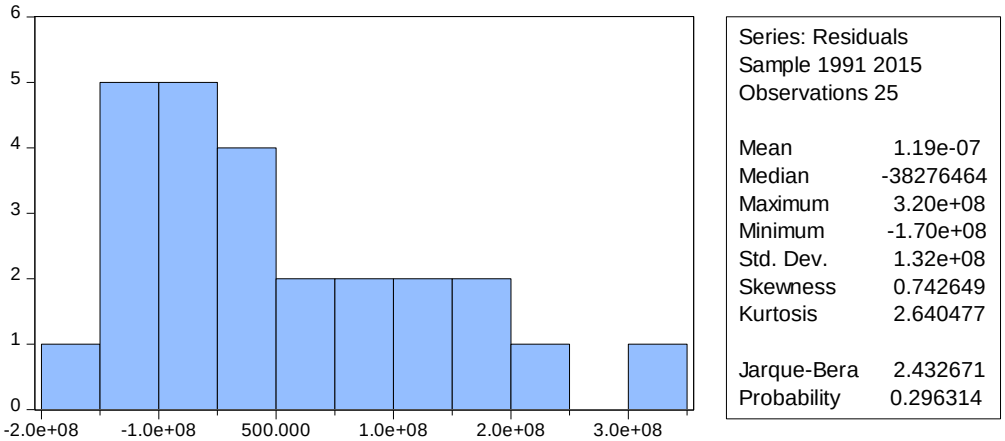
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLRATE	-3848616.	1468816.	-2.620218	0.1200
GDPRATE	2.86E+08	29283279	9.773883	0.0103**
RER	-4353894.	526862.0	-8.263821	0.0143**
TBILL_RATE	16293933	1465475.	11.11853	0.0080***
DUMMY	1.90E+09	80613758	23.59041	0.0018***
C	-1.13E+09	1.55E+08	-7.294529	0.0183**

R-squared	0.858332	Mean dependent var	1.27E+08
Adjusted R-squared	0.829998	S.D. dependent var	3.51E+08
S.E. of regression	1.45E+08	Akaike info criterion	40.59495
Sum squared reside	4.19E+17	Schwarz criterion	40.83872
Log likelihood	-502.4368	Hannan-Quinn criter.	40.66256
F-statistic	30.29368	Durbin-Watson stat	2.446230
Prob (F-statistic)	0.000000		

4.8 Model Diagnostics

The data is also normally distributed according to the Jarque-Bera results. The Jarque-Bera statistic of 2.432671 and a p value of 0. 296314 shows that the data is normally distributed. The skewness has a value of 0.742649 also indicating that the model is normally distributed. The result is displayed in Figure 4 below.

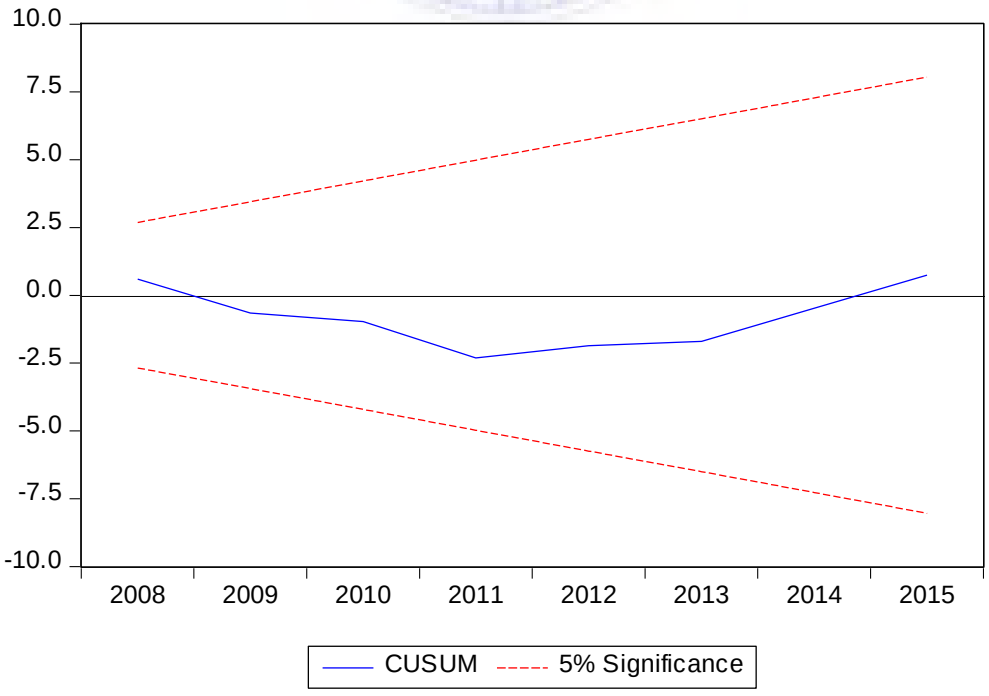
Figure 4.3: Normality Test of the Model

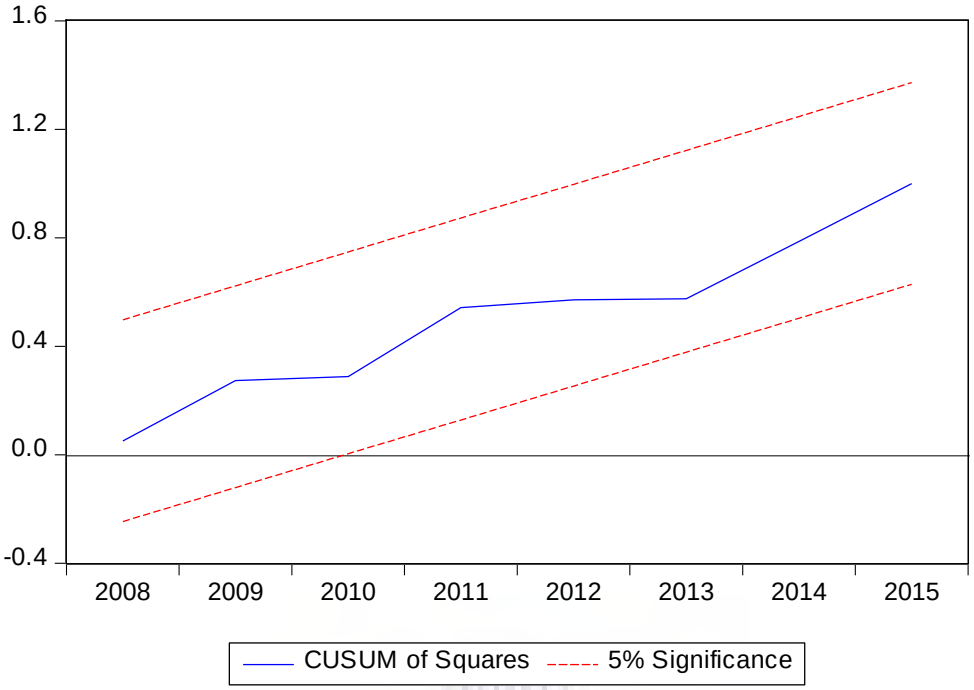


The Breuch-Godfrey serial correlation LM test and Breusch-Pagan Godfrey heteroscedasticity test were conducted to ensure that the model is not serially correlated and not heteroskedastic. The test statistics indicate that the data set is not serially correlated and heteroskedastic since the probability values are greater than the rule of thumb (5%). Results in Table 2 in Appendix D revealed that the null hypothesis of no serial correlation cannot be rejected at a critical p value of 0.05 since the reported value was 0.4112. Similarly, the Breusch-Pagan Godfrey heteroskedastic test with a P-value of 0.9832 also shows that the data did not suffer from heteroskedasticity.

Finally, the stability test was conducted using CUSUM and CUSUMQ squares. The null hypothesis that all coefficients in the model are stable cannot be rejected. The cumulative sum of squares of the residuals stability test depicts that all the coefficients of the estimated model are stable over the period under the study since they all fall within the critical boundary.

Figure 4.4: Stability Test





4.9 Conclusion

In this study, the empirical results show strong evidence of long run relationship among the variables in estimated model and follow the sign restriction embodied in the theoretical and empirical model. The ARDL results had inflation with the correct sign of positive whereas the DOLS estimation says otherwise.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the study, conclusion and recommendation. The policy implications from the findings and areas for further research are also presented.

5.2 Summary of the Study

The objectives set for the study were to determine the effect of inflation on FDI inflows and also to ascertain the effect of inflation targeting on FDI inflows in Ghana. Extensive literature was reviewed on FDI, inflation and inflation Targeting. The study found no significant relationship between FDI inflows (Ndanu (2018), Sajib et al. (2012), Shumaila et al. (2012)) and inflation while others (Awan et al. (2010), Xaypanya et al. (2015), Mehmet (2011)) concluded that there is a significant impact of inflation on FDI.

To examine the effect of inflation on FDI and the effect of inflation targeting on FDI, ARDL cointegration approach was employed. Granger causality within VECM was also used to examine the causal effect of inflation and FDI.

5.3 Findings

The study finds evidence of cointegration among the variables understudy. The ARDL results revealed that the coefficient of inflation was negative and statistically significant at 5 percent level of significance. This means that in order to increase FDI inflows, low rate of inflation is vital for Ghana.

The results for long-run showed a positive relationship between inflation targeting and FDI inflow at 1% significance. It was also revealed that inflation targeting

promotes FDI inflows in Ghana. Hence, one can conjecture that the IT-adopting countries should be the most successful in attracting FDI.

The ARDL estimation revealed that the coefficients of real exchange rate and interest rate were negative and statistically insignificant at 1 percent, 5 percent and 10 percent level of significance. This demonstrates that real exchange rate and interest rate in the long run have not been an important factor in attracting FDI in Ghana.

GDP growth rate has a positive effect and is statistically significant. As strong GDP growth leads to larger market size, maintaining the momentum in GDP growth is necessary for Ghana to attract FDI.

However, from the result of the DOLS estimation, the coefficient of real exchange rate and interest rate were negative and positive respectively and statistically significant. Also, inflation was found to have no effect on the inflow of FDI.

The error correction term coefficient of approximately 43 percent shows the speed of adjustment is toward equilibrium where any deviation in foreign direct investment inflow in the long run is likely to be corrected annually in the current year.

The Granger causality within VECM also revealed that there is a bidirectional causality between inflation targeting and FDI inflow whiles a unidirectional causality was found between FDI inflow and inflation.

5.4 Conclusion

From the findings, the study concluded that there is a positive relationship between inflation targeting policy and FDI inflow and that inflation targeting policy influences foreign direct investment inflows. There is bi-causality between inflation targeting policy and FDI whiles there is a unidirectional causality between FDI inflow and inflation.

5.5 Recommendations

Foreign direct investments play a significant role in the economic growth and development of countries. The following policy implications emerged from the findings of the study.

As lower inflation rate promote FDI inflow, the Central Bank of Ghana should develop inflation lowering policies and appropriate strategies to ensure that the level of inflation is favorable to foreign investors. Existing policies such as monetary policies rate and exchange rate should be reinforced. With favorable inflation rate, foreign investors will be willing to make more investment in the domestic market and hence lead to increase in FDI inflows to Ghana.

The policy of inflation targeting must be pursued and not truncated since it has proven to lower inflation to stimulate wider participation by private sector in economic growth and increase in FDI.

5.6 Area for Further Research

Further research should be conducted on cross-countries to compare whether the same factors influencing FDI in Ghana, affect FDI in the other countries. Political governance and unemployment effect on FDI is an area that requires further research, to investigate whether the different political regimes have any impact on FDI inflows. Also the research recommends further studies on the relationship between FDI and unemployment to access whether the result can confirm the relationship existing between FDI and inflation through the use of the Philip's curve.

5.7 Contribution to Knowledge

The findings of this study helps to bring clarity on the relationship between FDI and macroeconomic factors, which was found to be contradictory in previous studies. For

instance, while some studies found no relationship of inflation on FDI, this study found a negative effect of inflation on FDI. Therefore, the study supports previous studies that found similar results.

Further, the study contributes to knowledge through analysis of the effect of inflation targeting on FDI. In as much as Ghana has tried to control inflation in the past years to help attract FDI, not many scholars have sought to examine the adoption of inflation targeting and it impact on FDI flows to Ghana. This study, therefore, adds to the knowledge of impact of inflation targeting policy on FDI.

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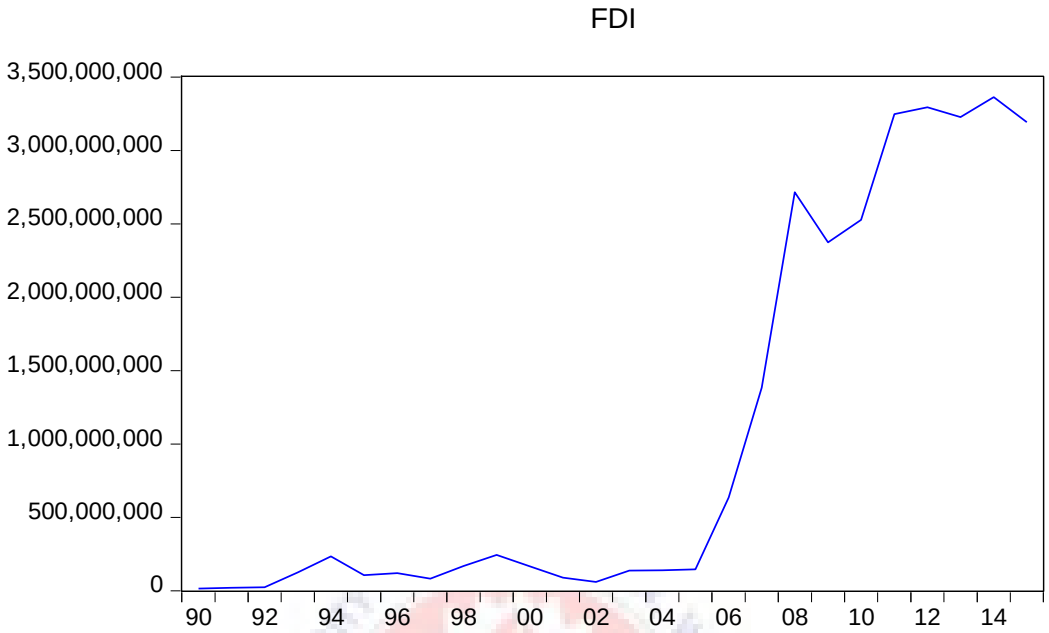
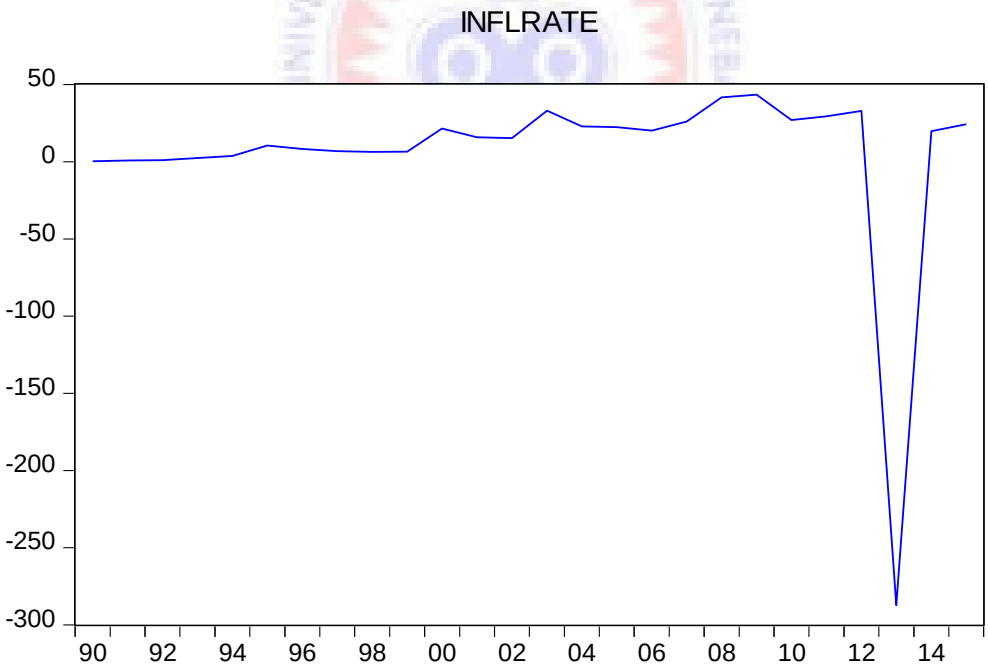
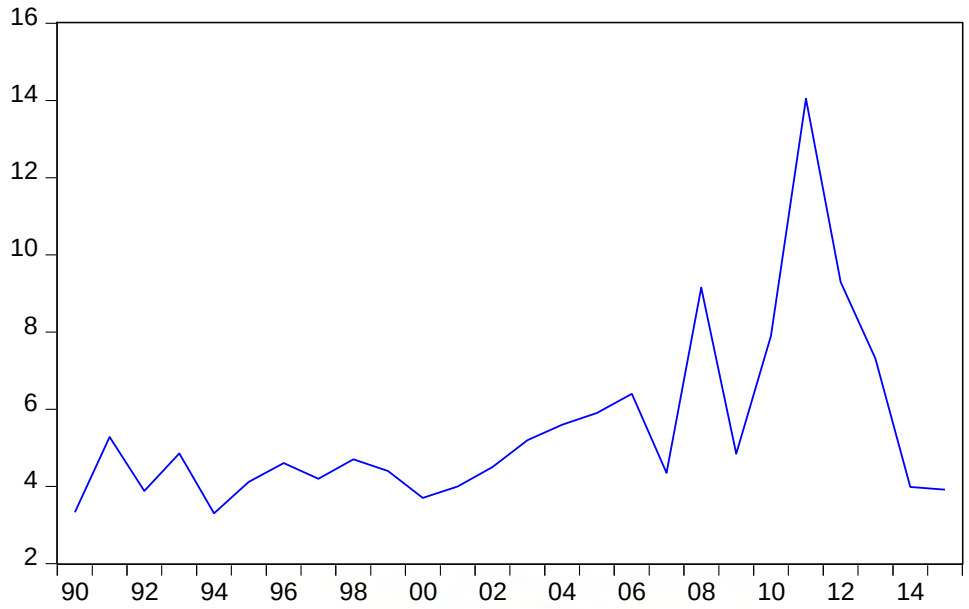
APPENDIX A

Plots of Variables in levels from 1990-2015

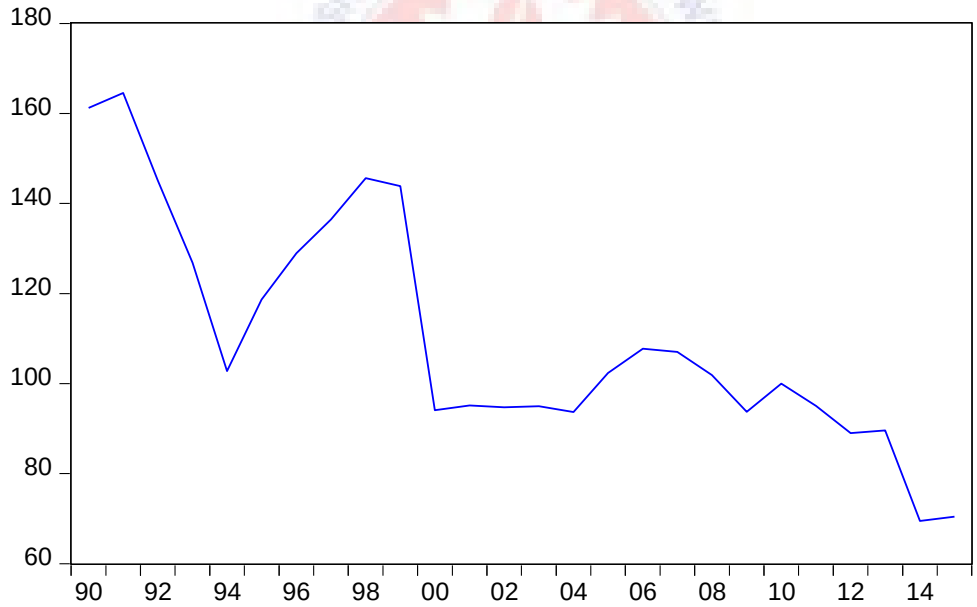


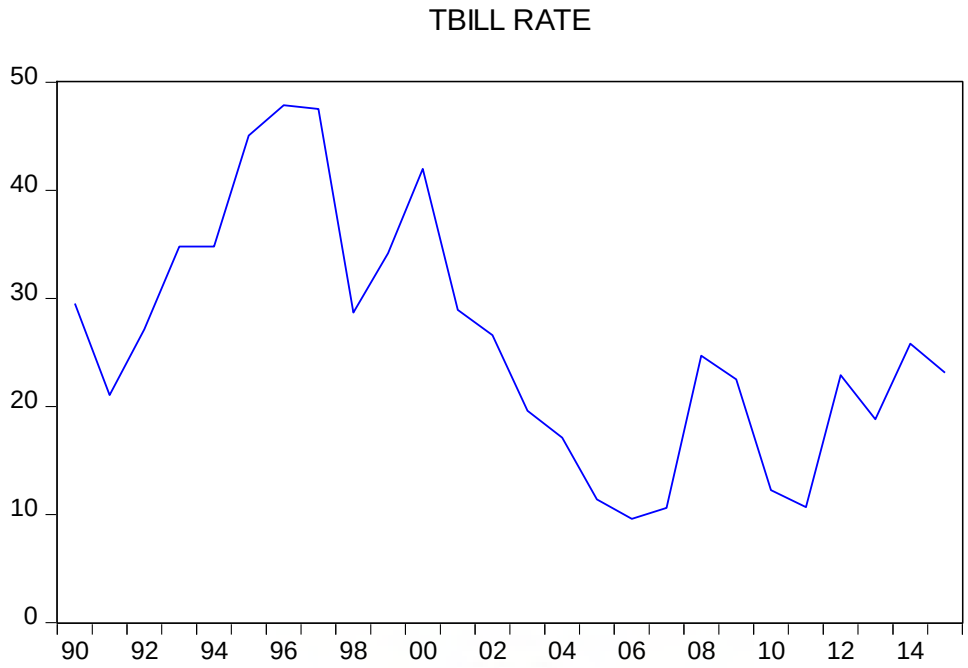


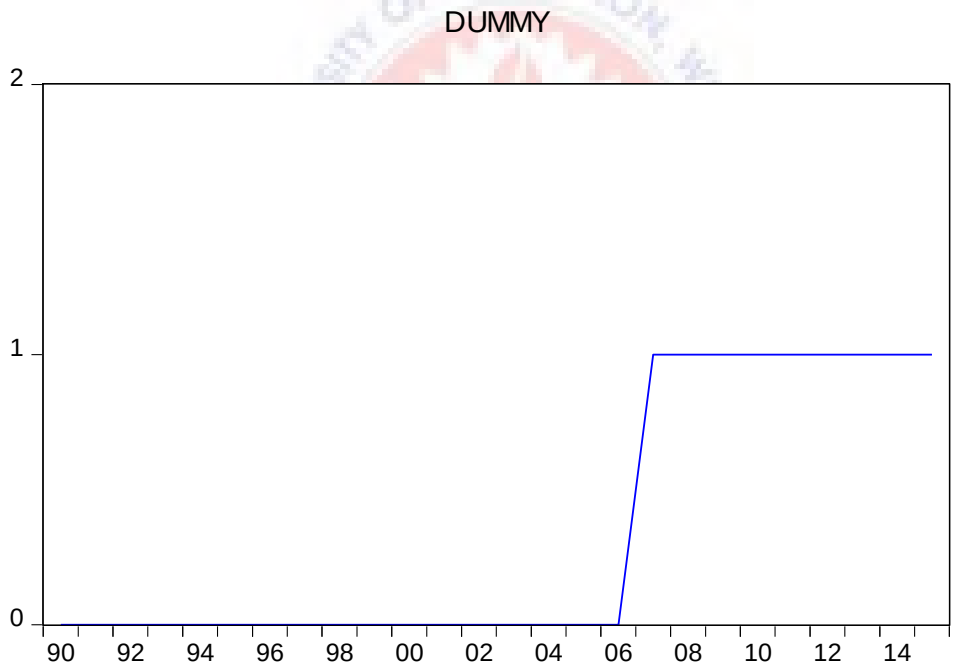
GDP RATE

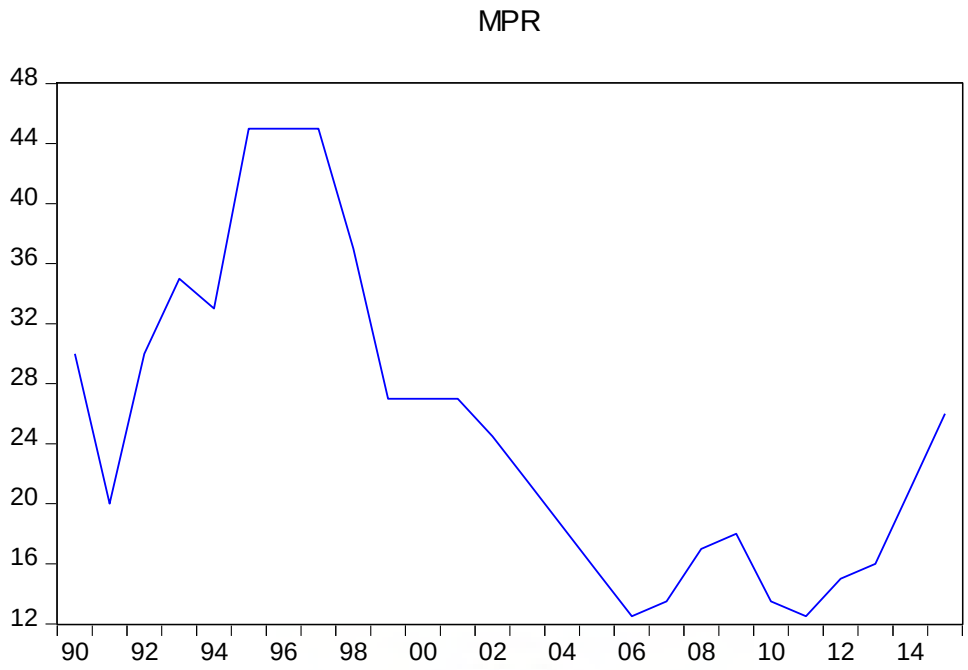


RER



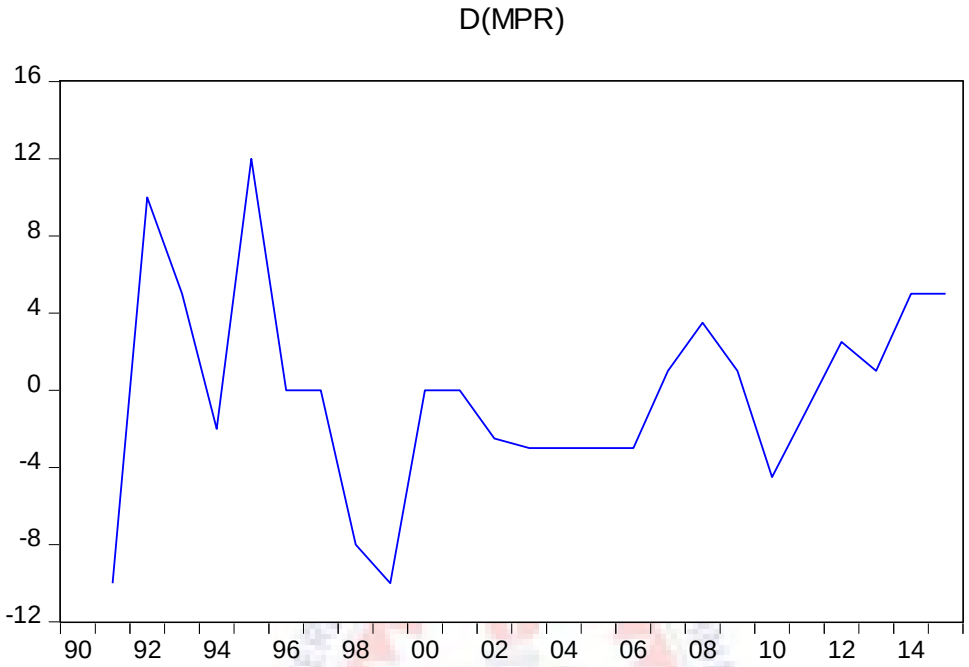


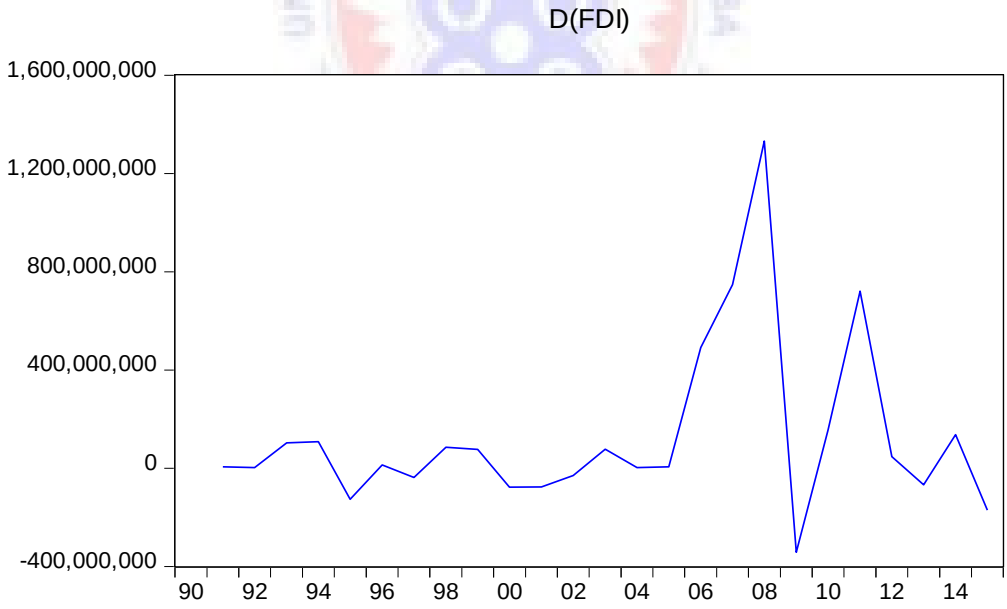


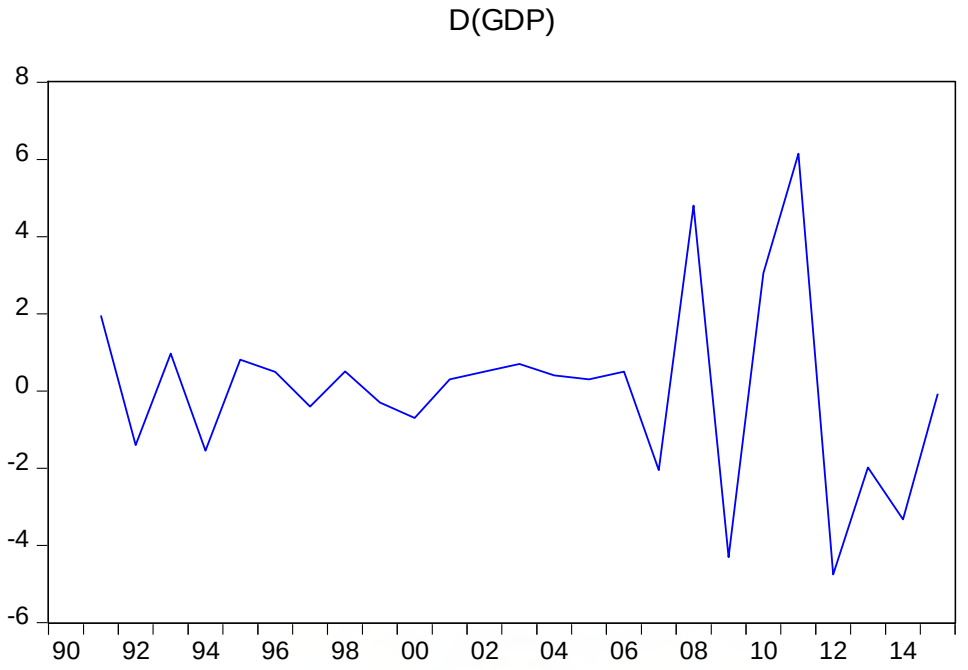


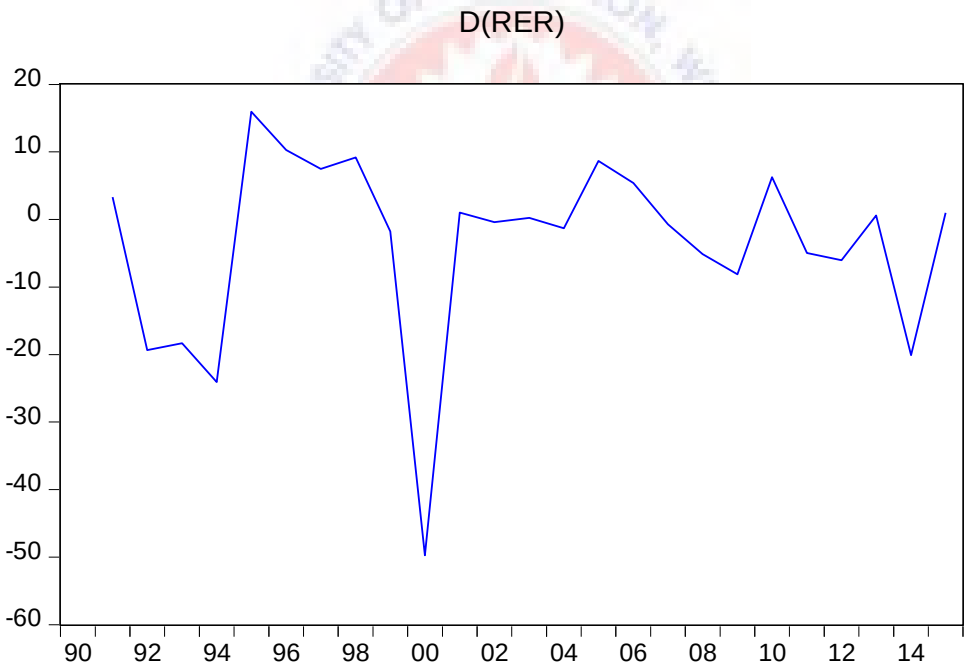
APPENDIX B

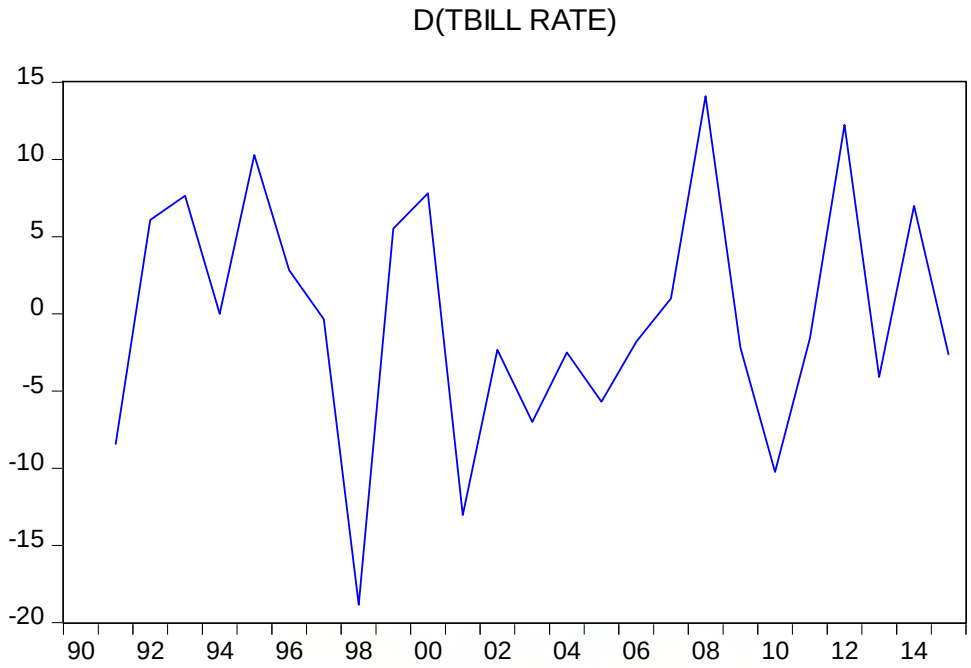
Plots of first differenced variables from 1990-2015











APPENDIX C

Lag Selection Criteria

VAR	Lag	LogL	LR	FPE	AIC	SBIC	HQ
FDI	1	-506.2147	59.08888*	1.45e+17*	42.35123*	42.44940*	42.37727*
INFL	0	1.498156	NA*	0.056172*	-0.041513*	0.007573*	-0.028491*
GDP	1	-51.72474	6.067951*	5.152964*	4.477062*	4.575233*	4.503107*
RER	1	-94.81059	22.92577*	186.8039*	8.067549*	8.165720*	8.093594*
TBILLRATE	1	-81.82713	19.69021*	63.31387*	6.985594*	7.083765*	7.011639*
DUMMY	1	4.856583	39.41871*	0.046165*	-0.238049*	-0.139877*	-0.212004*

APPENDIX D

Diagnostic and Stability test

Table 1. Ramsey RESET Test for Model Specification

	Value	df	Probability
t-statistic	1.577848	12	0.1406
F-statistic	2.489605	(1, 12)	0.1406

Table 2. Serial correlation Test using Breuch- Godfrey Serial Correlation LM test

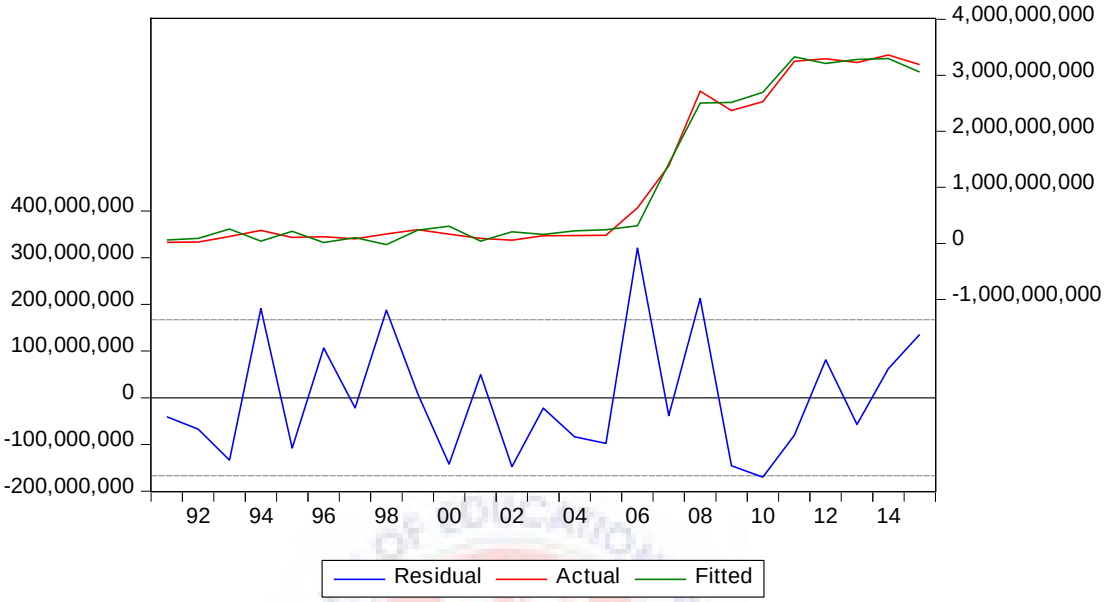
F-statistic	0.109585	Prob. F(2,11)	0.8972
Obs*R-squared	0.488383	Prob. Chi-Square(2)	0.7833

Table 3. Heteroscedasticity Test using Breusch –Pagan Godfrey

F-statistic	1.263211	Prob. F(11,13)	0.3401
Obs*R-squared	12.91611	Prob. Chi-Square(11)	0.2988
Scaled explained SS	3.419963	Prob. Chi-Square(11)	0.9839

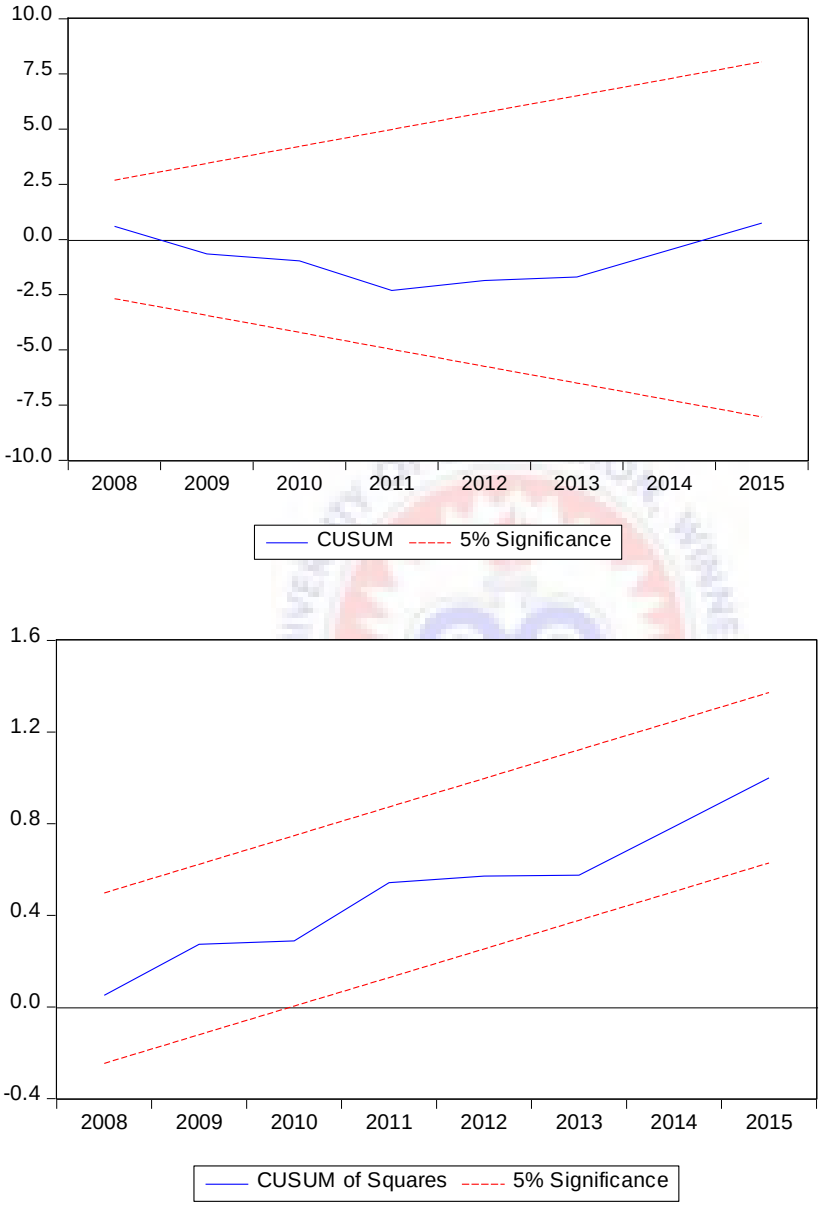
APPENDIX E

Actual versus Fitted Residuals



APPENDIX F

Plots of Cumulative Sum of Recursive residuals (CUSUM) and plot of Cumulative Sum of Squares of Recursive residuals (CUSUMQ)



NB: The upper and lower red lines represent critical bounds at 5% significance level

Source: Authors' estimation.