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COLLEGE OF HUMANITIES & SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS

THE IMPACT OF INFLATION AND FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH: EVIDENCE FROM GHANA (1975-2013)

By

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DECLARATION

I hereby declare that this submission is my own work towards the degree of Master of Science (Economics) and that, to the best of my knowledge; it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where acknowledgement has been made in the text.

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DEDICATION

I dedicate this project to GOD ALMIGHTY, for favoring me with wisdom to apply the
knowledge and understanding he has bestowed on me. This journey would have been
impossible without his divine and timely assistance.

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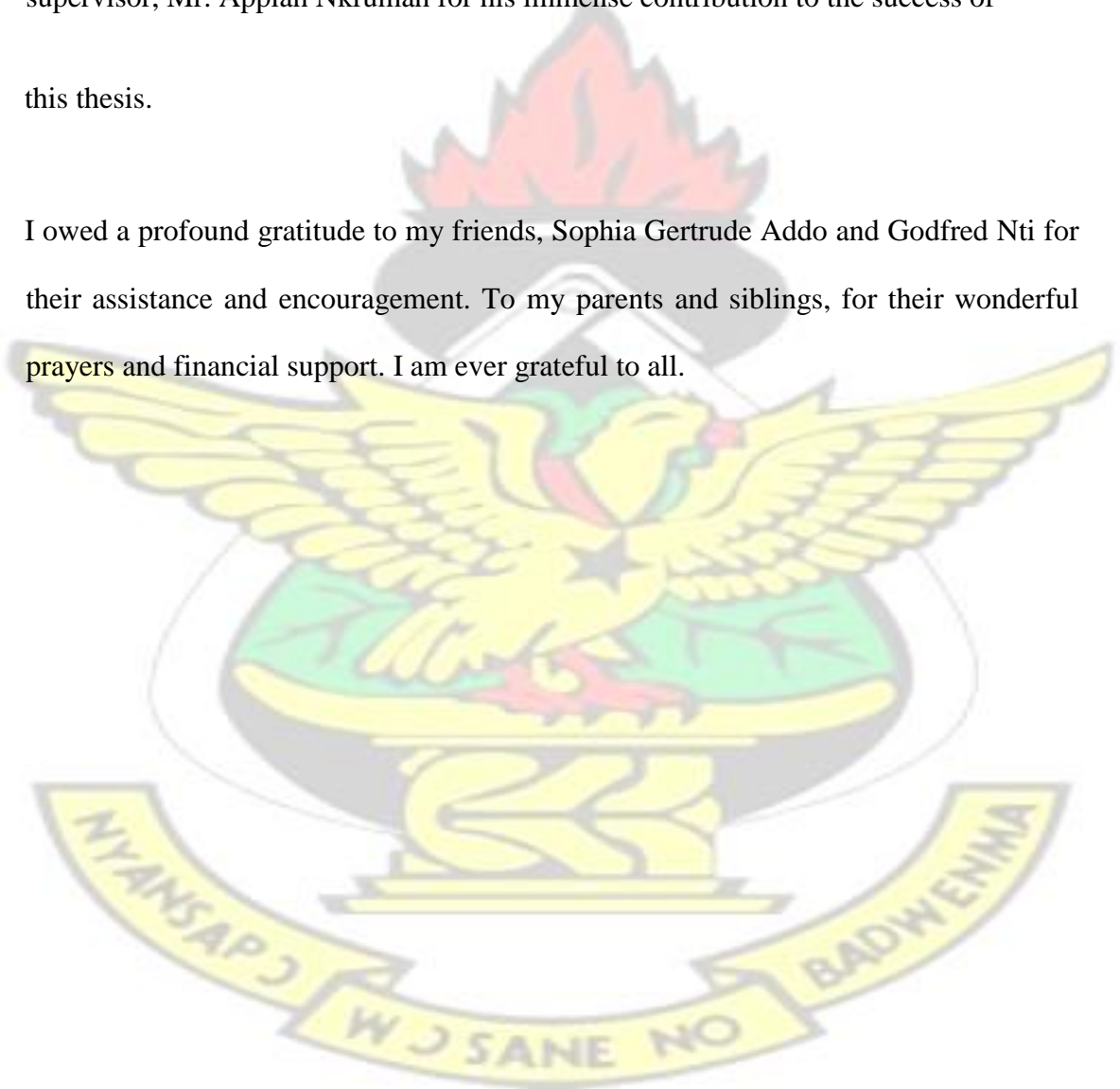
ABSTRACT

The general objective of the study was to find out the impact of inflation and foreign direct investment on economic growth in the Ghanaian economy with evidence from

1975 to 2013. Specifically, the study sought to find the trends of economic growth in Ghana with focus on the pre and post economic recovery phase. Further, the study sought to find long run and short run impact of inflation and FDI on economic growth and controlling for other variables including Direct Investment, trade openness and population growth. The results of the study were based on the outcome of the ARDL econometric model.

The study revealed the insignificance of investment and its contribution to economic growth in the Ghanaian economy either foreign Direct Investment (FDI) or Domestic Investment (DI). This result was associated with the possibility of investment being channeled to the wrong sectors of the economy.

Nevertheless, inflation and population growth were two main factors that affected economic growth in Ghana. Inflation positively influenced it whiles growth in population negatively affected growth. These findings imply stabilizing inflation rates would not necessarily boost economic growth however, putting measures in place to ensure the stability or declining population growth would ensure economic growth. The outcome thus supports the structuralists view of inflation positively impacting on economic growth as well as the works pertaining to the demographic theory postulated by Thomas Malthus.

Lastly, the study underscores the importance the economic recovery program (ERP) in the growth of the Ghanaian economy as it had a vital influence on the growth of the economy.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

A global objective of macroeconomic policies is to promote a steady and sustainable economic growth amidst minimal level of inflation. According to the Bruntland Report (1987), sustainable economic growth is justified by the premise that it makes it impossible for some people to be better off whiles others are made worst off. A low inflation also tends to increase the purchasing ability of the citizens thus achieving the purpose of price stability leading to the improvement of the lives of citizens and thus economic growth.

However, there has been substantial debate on the relationship between inflation and growth. Some studies have estimated a negative impact of inflation on economic growth(see Fischer, 1993; Barro, 2005; Ghosh & Steven, 1998; Khan and Senhadji, 2001) while other scholars also disagree to this assertion of negative nexus, some influential authors also confirmed a positive relationship (Malik & Chawdhury, 2001).

Sidrauski (1967) on another hand further argued from a no relationship point of view. The structuralists are of the view that inflation has a positive effect on economic growth while monetarists moot that inflation is detrimental to economic growth.

On the surface, there is a general consensus that fluctuations in the level of inflation tend to negatively affect the activities of the economy. The harmful effects of inflation call for fervent efforts to manage it. At the same time, the promise of economic growth is so attractive and desirable. The management of these two macroeconomic variables without any spiral effects on the other sectors of the economy is very fundamental and calls for critical analysis. Recently, the fight against inflation and the quest to achieve

faster economic growth have assumed great intensity with the adoption of inflation targeting by the central bank of Ghana in 2007. Irrespective of this, the exact mechanism through which inflation affects economic growth remains unexplored. 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)). This brings to light the prominence of FDI in the inverse nexus between the inflation and economic growth. The FDI encompasses external resources including technological and managerial expertise, marketing expertise and capital either mobile or immobile. Any nation‟s productive capabilities would be boosted in the midst of all these resources. The ability of the government to successfully ensure its policy implementation to enhance the productive sectors of the economy depends on its capacity to control foreign direct investment (Omankhanlen, 2011). The contribution of FDI towards economic growth is widely argued, but most researchers concur that the benefits outweigh its cost on the economy.

The FDI promoted economic growth by increasing the volume of investment and efficiency thus attracting many countries to share in this benefit. Another major advantage of FDI in the economic growth is its ability to crowd in additional domestic investment not just foreign capital which further stimulates economic activities (Jenkins & Thomas, 2002).

In Ghana, one of the most important efforts of controlling inflation in order to attract FDI to spur growth occurred under the Economic Recovery Programme and Structural Adjustment Programme adopted in 1983. This implies the relative importance of these three macroeconomic variables during this adjustment phase which greatly improved economic growth at the time.

Apparently, empirical debates about the exact relation between growth, inflation and FDI remains subjects of concern to the macroeconomists because there has been

inconclusive outcome of varied empirical literatures. Thus, the exact relation between them depends greatly on how the economy in question is structured (Bruno and Easterly, 1995).The study brings to light the impact of inflation and foreign direct Investment on economic growth taking into account the Economic recovery Program implemented in 1983.

1.2 Statement of the Research Problem

Before the Economic recovery Program (ERP) implementation in 1983, economic growth rate witnessed serious fluctuations even reaching negative, but stabilized after the ERP implementation, however after 2007, growth started experiencing downswings and upswings with a recent evidence of declining. The trend raises questions about the prominence in the ERP framework amidst other macroeconomic factors on economic growth in recent years. This can be inferred from the figure below.

Figure 1: Economic Growth trends (1975-2013)

Source: author's own construct, 2015

Currently, stability of prices is one of the policy tools adopted for ensuring sustained economic growth in developed and developing countries. The pursuance of price stability is to ensure low and stable prices which would attract FDI to enhance high

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sustainable growth. A brief look at the developments in the inflation front over the years, it is evident that Ghana has been bedeviled with a plethora of wobbling inflation rates. According to the Ghana Statistical Service (GSS), inflation has seen considerable fluctuations since 2003, average inflation by year was 29.8% in 2003 with a steady reduction to about 10.7 in 2007. Evidently, since the Bank of Ghana has adopted price stability as its major objective, the economy has witnessed inflation following a drastic down trend to about 8.7% in 2011, at the same time economic growth peaked at about 14.4% rate of growth in 2011 whiles net FDI inflows also increased tremendously (US$13.7 million in 2003 to US$3.2 billion in 2011).

Policy makers over the years have attempted to tackle this problem of chronic volatility in economic growth rates using combination of monetary and fiscal measures. Despite the various policies meted out to mitigate the continuous upswings and downswings, the issue still persists. Kait (2008) argue on the relevance of tradeoffs in order to ensure a stable economic environment. Inflation and exchange rate variability are the two main anchors opined to ensure this trade off by influential authors which can also have an impact on the inflow of FDI and further trickle down to economic growth.

According to Ayanwale (2007). The relationship between inflation, FDI and economic growth in Ghana is yet unclear, and that recent evidence shows that the relationship may be country and period specific. Therefore there is the need to carry out more studies on their relationship in the Ghanaian front. Various authors have broadened our understanding about the exact correlation between these three variables. Certain crucial questions pertaining to the relationship between these variables still remain unanswered .The question begging to be asked is what is the importance of inflation and FDI in Ghana‟s economic growth taking into account the ERP framework? Thus what are the magnitudes of impact of inflation and foreign direct investment in the determination of

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economic growth taking into account the importance of the Economic Recovery Program (ERP). The study thus aims to compare the impact of inflation and FDI on economic growth in Ghana taking into account the periods before and after the ERP framework in 1983.

1.3 Objectives of the Study

The main objective of the study is to evaluate the impact of inflation and foreign direct investment on economic growth in Ghana between 1975 and 2013. To achieve this, the study specifically seeks to;

- Analyze the trends of economic growth in Ghana between 1975 and 2013.
- Evaluate the impact of inflation and Foreign Direct Investment on economic growth in the Ghanaian economy from 1975 to 2013
- Compare the impact of inflation and FDI on economic growth taking into account the economic recovery program (ERP) framework.
- Examine the causal linkages between Inflation, Foreign Direct Investment and Economic growth.

1.4 Hypotheses of the Study

With this goal in mind, the study seeks to test the following null hypotheses

- Inflation has no impact on economic growth
- Foreign Direct Investment do not have any significant impact on economic growth in Ghana.

➢ The implementation of the ERP does not significantly impact on economic growth in Ghana.

➢ There is no causal linkages between Inflation, Foreign Direct Investment and Economic growth in Ghana.

1.5 Justification of the Study

Policy makers as well as central banks all over the world are obsessed about inflation and therefore, devote a significant amount of resources at their disposal to fight inflation. The reason is high rates of inflation harm inflow of foreign direct investment which slows sown the growth process of an economy. Thus it becomes prudent to empirically examine the link between these three variables to help in the design process by policy makers.

Most of the studies on these causal relationship amongst the three variables are based on cross country analysis which may be less relevant at the country level. The study thus becomes a worthy course for the Ghanaian inflation- FDI- growth experience.

Last but not least this study would bridge the literature gap by serving as a source of information for future studies by other influential authors interested in the inflation-

FDI- growth nexus.
1.6 Scope of the Study

The study is based on annual dataset spanning the period 1975 to 2013 with evidence from the Ghanaian economy. This time period was chosen with fundamental interest of capturing the structural adjustment program (SAP) period. The study makes use the year on year (YOY) inflation rate, the foreign direct investment and above all the growth rate measure by the Gross Domestic Product (GDP).

1.7 Organization of the Study

The study is organized into five main chapters with each chapter comprising appropriate sections including the general introduction. The rest of the study is organized as follows. Chapter two captures the review of relevant literature including theoretical and empirical reviews with respect to the theories of inflation, FDI and growth models. Chapter three presents the research methodology adopted for the study, touching on issues such as data description and definition, and model specifications. The fourth chapter also entails analysis of the specified models in chapter three to meet the objectives stated. The research concludes in chapter five, with a summary of major findings, policy implications of results and

recommendations, practical limitations of the study, issues for further research and conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The presentation of the chapter incorporates diverse theoretical as well as empirical works on inflation and growth. The theoretical review brings to bare the various theories and arguments about the relationship between inflation and growth as well as investment and growth, whereas the empirical review puts forward the various works by scholars pertaining to the relationship between inflation and other macroeconomic forces whether foreign direct investment or growth.

2.2 Theoretical Review

Volumes of theories have sprung up over the years dating as far back as the eighteenth century all in attempt to uncover the relationship between inflation and other macroeconomic variables. Notwithstanding this the nexus of growth and inflation is underpinned by Keynes" theory and the Neo-classical theories.

2.2.1 The Solow Growth Model

The Solow growth model gained the most prominence amongst the growth theories of the neo-classical economists. The Solow growth model was propounded by Robert Solow and Trevor Swan in 1956. The theory gives insight into the steady state level of capital and how savings (investment) affects output and economic growth. This theory attempts to explain dynamics in long run economic growth by neglecting long run impacts of FDI inflows and it assumes the diminishing returns to physical capital. They opine that these inflows have just short run effect on the level of income thus output. In the long run therefore growth remains constant. The Solow growth model is mathematically presented as;

$y_t \square sf(k) \square (n \square \square \square d)k$ (2.1)

Equation (1) can be graphically presented in fig 2.1 below

Figure 2.1 The Steady State Solow Growth Model
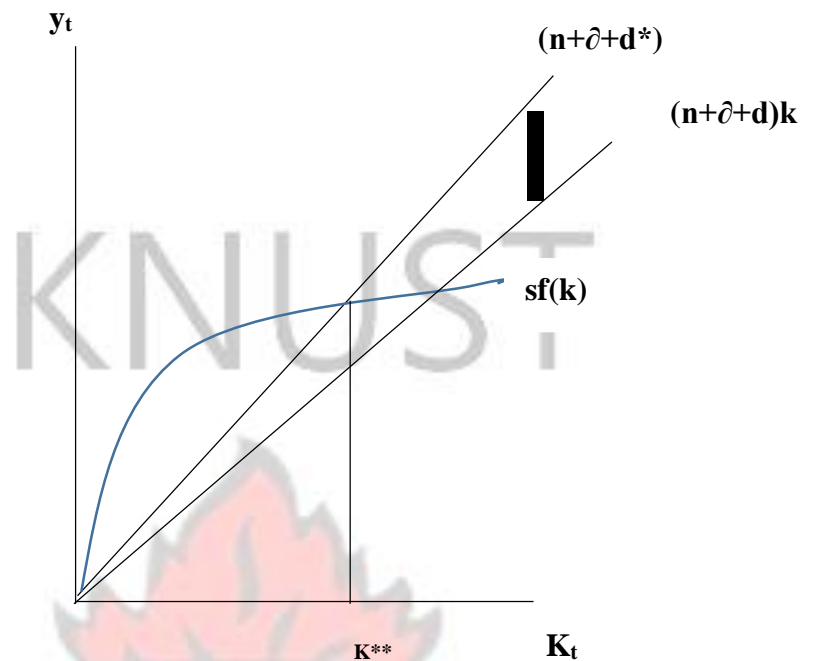
Where y_t represents output a measure of growth, s is the level of savings in the economy, n, ∂ and d are the population, depreciation of capital and technology respectively.

From equation (1), an increase in technology which is captured in the foreign direct investment would lead to an increase in output thus economic growth. Solow,,s model exhibits diminishing returns to scale and labor and constant returns to both factors jointly. Solow (1956) assumed that changes in technology which mainly explain longterm growth is determined exogenously (Todaro, 2000).This theory emphasizes that technology change has a major influence on economic growth, and that technological advances happen by chance. The theory argues that economic growth will not continue unless there continues to be advances in technology.

Furthermore, from equation (1) above, an increase in the rate of population growth would shift the investment line downwards, though labor per capital would increase, it corresponds to a decline in economic growth.

2.2.2 The Neoclassical Theory of inflation and Growth

The Early neo-classical economist believed that growth was exogenously determined thus inflation and growth has no relationship (Sarbapria, 2012). A typical example is the Sidrauski‟s Superneutral of money model. Money is said to exhibit superneutrality when the growth in money has no impact on the real variables of the economy of which output is inclusive. In other words, real variables such as output are independent of the growth rate in money supply. The question is whether a one-time shift in the money growth ratewould change consumption, output, or investment permanently. According toSidrauski therefore, the superneutrality result implies that an increasing monetary growth would not have any impact on economic growth leading to inflation not being related to growth in any way.

However, Stockman (1981) proved otherwise by establishing a relationship that underscores and inverse relationship between growth of the economy and the rates of inflation. According to his model, inflation is inversely related to growth such that an increasing inflation would cause growth rates to decline. In Stockman„s model, money is assumed as a complement to capital. So when the general prices of goods and services increase, it‟s obviously erode the purchasing ability which leads to low capital accumulation and consequently, there is a decline in output growth. In this way Stockman provided a strong justification for a negative linkage between inflation and economic growth. Thus, within the neoclassical framework, the models yield varied results with regard to the relationship between inflation and growth. Thus inflation can have positive or negative or no effect on growth.

2.2.3 The Keynesian theory of Inflation and Growth

The theory of inflation and growth according to the Keynesians stems from the aggregate demand and aggregate supply analysis. This theory is precisely based on the total spending of the economy that is the aggregate demand and its effects on output (Aggregate Supply) and Inflation. The unique feature of this theory is that, the Aggregate supply curve is assumed to be upward sloping in the short run in contrast to its usual vertical nature. The upward sloping state is justified by the fact that, when the AS is vertical, shocks to demand affects only prices (Andinuur, 2013).

However, with the upward sloping AS curve, shocks or any changes in the demand would tend to affect both the prices of goods and services as well as output

(Dornbusch et al, 1996). As a result of the short-run dynamic equilibria of the AD and AS curves, there is the formation of an adjustment path which initially exhibits a movement in the same direction by growth and inflation but later moves in opposite directions. On the average time inconsistency is the main reason for the positive interaction between inflation and growth. In contrast to Blanchard and Kiyotaki (1987), they are of the view that the positive relationship between inflation and growth is traceable to the agreements which firms make to produce goods at higher price in the future. Soon after that, the link becomes negative which describes the occurrence of stagflation when output falls or remains constant against rising prices.

2.2.4 The Irving Fischer Equation

Irving Fisher propounded the Fisher equation in an attempt to explain the relationship between nominal and real inflation rates. It is a useful tool for the calculation of the internal rates of return (IRR) on investments and the yield to maturity (YTM) on bonds. It is expressed in the form;

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$$i = r + \pi^e \qquad (2.2)$$

Stated differently;

$$r = i - \pi^e \qquad (2.3)$$

Where i is the nominal interest rates, r is the real interest rate and π^e 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 the nominal interest rate is the basis upon which other rates of return are built thus deemed as the real purchasing power of loan

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 tend 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 their 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 in return of investment.

2.2.5 The Endogenous Growth Model

As the name implies, the endogenous growth theory primarily results from internal rather than external forces. According to this theory, economic growth is as result of major contribution of the investment in human capital, innovation and knowledge. The theory also focuses on the premise that economic development is as a result of both spillover effects of the knowledge based in any economy and positive externalities. Furthermore, the endogenous growth theory propounds that long run rate of growth is highly dependent on policy measures put in place by the economy. A typical instance includes research subsidies for development or education can increase growth through innovation. To buttress this point, Romer (1990) and Grossman and Helpman (1991) came out with models on economic growth within the endogenous growth theory to explain the exact relation between growth and FDI. Under this model, technological progress is assumed to be the principal driving force behind growth of any economy. These theories focus on the creation and transfer of technological knowledge and also view innovation as major engines for growth. Therefore, human capital accumulation and externalities are vital for growth. They argue that the main channel for the advancement in technologies by most countries developing is through the inflows of FDI. Developing countries generally are unable to generate new technologies which lead to the adoption of technologies invented by the more advanced nations via FDI.

2.3 Empirical Review

Volumes of works have sprung up by influential authors in an attempt to enquire the relationship between inflation, foreign direct investment and economic growth. Nevertheless the outcome of the relationship still remains varied. On the one hand, the relationship of these variables are positive, on the other it is deemed negative, bidirectional or even no relationship at all. The outcome from the various theories makes the relationship amongst them an empirical question.

Prior to the modern and emerging literature, earlier writers such as Singer (1950), Prebisch (1968), Griffin (1970) and Weisskopf (1972) succinctly supported the view that the FDI purposed for a targeted country end up being transferred to other multinational country or countries, consequently very few benefits were realized which negatively affects growth. Furthermore the likes of Bacha (1974) uncovered an inverse relation between economic growth and FDI in the US. Saltz (1992) also emphasized this inverse relation between the two variables when it was considered amongst 68 developing countries. This proved that whether individual countries or cross-country the relationship examined remained inverse.

However, using a cross-section data for 64 different developing nations via the application of the OLS method, Balasubramanyam *et al.* (1996)found a movement in the same direction of FDI and economic growth as FDI impacts positively on growth through the encouragement of export rather than importation into the host nations.

Borensztein et al (1998) further in a cross-country analysis of 69 developing countries, the study sought to find the impact of FDI on economic growth. The study found FDI to be a major driving force behind economic growth which transpires through a minimum absorptive capacity of technology required by the country in question.

In some selected Arabian countries, Omran & Bolbol (2003) researched on FDI, development of respective financial sector and economic growth. FDI was found to be more favorable on growth in Arab with the incorporation and interaction of financial variables

In comparing the three macroeconomic variables that is inflation, foreign direct investment and economic growth, in Pakistan, Faiza et al (2012) explored the impact of inflation and economic growth on investment. Applying a multiple regression analysis,

the study found FDI to relate positively with inflation and economic growth based on annual dataset between 1990 and 2011. Taiwo (2011) assessed the magnitude of impact from inflation and foreign direct investment on economic growth in Nigeria between 1981 and 2006. By the application of the ordinary least squares (OLS), the study found a negative relationship between inflation and economic growth contrary the positive relationship between investment and economic growth. The response of economic growth to inflation was inelastic of about 0.09 decreases in growth when inflation increases by 1 percent. Also with a 1 percent change in investment, economic growth increases by 0.3 percent. Given the negative impact of inflation, the study mooted for supply side and demand side factors to ensure reduction in inflation in both the long and short run respectively.

Omankhanlen (2011) also examined the nexus in Nigeria between economic growth, inflation, exchange rate and FDI spanning 1980-2009 on annual frequencies. With the use of the OLS econometric approach, the study found FDI to positively impact on economic growth but inflation had no effect on foreign direct investment. Also Mehmet (2011) revealed a positive relation between FDI and growth in Turkey based on the Johansen Co-integration methodology on annual time series between 1970 and 2008.

The above studies failed to test the direction of causality between these three macroeconomic variables whether they are bi-directional, uin-directional or neutral.

In respect of the causal relationship, Kragulj & Parezanin (2015) in an attempt to uncover the linear correlation between investment and economic growth, they analyzed separately the period before and after economic crises in some selected eastern European countries. Using the rate of unemployment, import, export and GDP per capita as measures of growth. Using a panel data analysis of annual frequencies from 2000 to 2013, the study uncovered a strong correlation between FDI and economic growth

before the economic crises whiles a weak correlation was found after the economic crises. Economic crises was thus found to disrupt the flow of investment in the countries and thus reduce economic growth.

Gunaydin & Tatoglu (2005) with evidence form Turkey, assessed whether foreign direct investment contributed to economic growth. Employing annual dataset form 1968 to 2002 and the application of the vector autoregressive model, the study found a strong bi-directional causality between FDI and economic growth.

Nevertheless Roy & Mandal (2012) with a similar study in some Asian countries found varied causal relationship between FDI and economic growth. Economic growth impacted on FDI not the other way round except Malaysia. Similarly, Chowdhury & Mavrotas (2006) in a study from three different countries- Chile, Malaysia and Thailand, found GDP to cause movement in the FDI and not the vice versa in Chile. However, there was a bi-directional relationship between the two variables in Malaysia and Thailand. This outcome was based on the time period between 1969 and 2000 on annual frequencies.

Pournarakis & Axarloglou (2007) further uncovered varied outcome of the impact of FDI on economic growth using annual time series from 1974 to 1994 they found FDI to varied affect economic growth from sector to sector. However, industries characteristics become a prominent factor in assessing the inflow of FDI.

2.3.1 Literature in Ghana

On the Ghanaian front, limited works have emerged pertaining to the subject matter. Frimpong & Oteng_Abayie (2011)found in Ghana a negative impact of FDI on economic growth. Frimpong et al., (2011) further emphasized this negative impact based on the outcome using the annual frequencies from 1970 to 2002 by Toda and Yamamoto

(1995). With this, they explored the link between FDI and growth and established between FDI and growth a neutral directional causality for the pre SAP period. However, a unidirectional causality was discovered during the post SAP period from FDI to growth.

On the contrary, Asafu-Adjaye (2009) using annual time series data covering 1970 to 2007. Adjaye found a significant positive relationship between FDI and economic growth in Ghana using the Johansen and Juselius (1990) multivariate maximum likelihood procedure. A bi-directional causality was found using the granger causality test form foreign direct investment to growth which contradicts that of Frimpong et al (2011).

The positive relationship and impact of FDI on economic growth was further buttressed by Sackey et al (2012). They employed various econometric and estimation strategies right including the ADF test, the Vector auto regressive model and the Johansen Co-integration from the period 2001 to 2010. Not just a positive and significant impact was established between growth and FDI, but also a uni-direction causality from FDI to economic growth was unraveled in the Ghanaian economy.

Antwi et al. (2013) furthermore using annual time series data for the period 1980 to 2010 in Ghana, although failing to test the causality between these variables, the study confirmed a positive relationship between FDI and economic growth with the application of the ordinary least Square (OLS) methodology.

Adinuur (2013) found between FDI and economic growth in the long and short run to move in the same direction whiles inflation and growth moved in opposite direstions. This outcome was based on the use of time period between 1980 and 2011 on annual

frequencies. The study established a bi-directional causality between FDI and GDP whiles a unidirectional relationship was found from GDP and FDI to inflation.

The conflicting results from these influential writers with evidence from Ghana could be attributed to the estimation and methodology adopted. From the Johansen and Juselius co-integration procedure adopted by Adjaye whiles Frimpong et al. (2011), employed the Toda and Yamamoto (1995).

The current study makes use of the Auto-regressive Distributed Lag (ARDL) Model, taking into account the significance of the Economic Recovery Program (ERP) framework to spell out the exact quantitative short run and long run impact of FDI and inflation on economic growth.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

In this chapter, the econometric techniques and sources of data for the analysis are described. The chapter is sub-divided into three sections. Section 3.2 presents a discussion on model specification, the reason for the inclusion of regressors, the a priori expectations on the magnitudes and signs of the coefficients to be estimated.

Section 3.3 describes the data, variable measurements and sources of data. Finally, Section 3.4 presents the details of the estimation strategy adopted to ensure the robustness of results. In particular, discussions on the need to test for the presence of (or otherwise) unit roots in the data series as well as joint stationarity (co-integrating relationship) among the variables in a given equation are presented.

3.2 Model Specification

The determination of the impact of independent variables on a dependent variable is given by;

$$y \, \Box \, f(x_1, x_2) \quad (3.1)$$

Where y is the dependent variable whiles x_1, x_2 is a representation of our independent variables under observation.

In the study, determinants of economic growth are seen to be influenced by inflation and the foreign direct investment. The decision to focus on this variables as our regressants which affect economic growth is that, according to Solow (1956), the difference between the developed and developing country is the is technological advancement. FDI is a means which would aid the ease of technological and business know-how to poorer countries. Following the Solow growth model, where technology, savings and population determines output growth we specify our

regressor and regressants as;

$$GDP_t \, \Box \, f(INF_t, FDI_t) \quad (3.2)$$

And making room to include other variables which can impact growth according to Robert Solow, we specify the second regression as

$$GDPR_t \, \Box \, f(INF_t, FDI_t, DI_t, POP_t, TO_t) \quad (3.3)$$

Where,

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GDP_t = Gross Domestic Product at constant prices, INF_t = Inflation at time t, FDI_t = Foreign Direct Investment at time t, DI_t ,POP_t ,TO_t indicates domestic investment, population growth and trade openness at time t respectively.

The nexus between the Gross domestic product, Inflation and Foreign direct Investment in model 1 can be rewritten as;

$$GDPR_t = \beta_o + \beta_1 \ln INF_t + \beta_2 FDI_t + \varepsilon_t \quad (3.4)$$

Where β_o is the intercept whiles β_1 and β_2 are the coefficients of INF and FDI respectively.

Model 2 is also presented as

$$GDPR_t = \beta_o + \beta_1 \ln INF_t + \beta_2 FDI_t + \beta_3 \ln DI + \beta_4 POP + \beta_5 \ln TO + \varepsilon_t \quad (3.5)$$

The model is specified in the log form to ensure the elimination of possible large coefficient and the interpretation of the coefficients as elasticities. Elasticities are of significance as it would bring to bare the actual response of economic growth to changes in the rate of inflation and the foreign direct investment. Growth rate, FDI and population are not specified in log forms since there are negative rates amongst the variables which would lead to the elimination of these negative values when their natural log is taken.

3.2.1 A Priori Expectation of inflation and economic growth

The researcher moot for a negative relationship between inflation and economic growth. Thus an increase in inflation should lead to a decrease in economic growth whiles a decrease in inflation should ensure increase in economic growth. The general increase in the prices of goods and services in a given economy would erode the purchasing

power of individuals, this would cause expenditure on goods to fall leading to a decline in the production of goods and services and thus economic growth.

3.2.2 A Priori Expectation of Foreign Direct Investment and economic growth

Foreign direct investment is expected to have a positive relation with economic growth. An increase in the inflow of FDI (percentage of gdp) would lead to an increasing economic growth whiles a reduction in the inflow would cause economic growth to be retarded. The increasing inflow of FDI is an indication of more technological and business know-how being transferred from developed countries into the developing countries (Romer, 1993). This would lead to a boost in all sectors of the economy thus lead to economic growth.

3.3 Data Sources and Type

The study employs annual time series ranging from the period 1975 -2013. These were obtained mainly from secondary sources, including Bank of Ghana and the

World Development Indicators (WDI). The choice of the sample period was based on the interest in capturing the Economic Recovery Program (ERP) framework in 1983. Since the study attempt to empirically evaluate the long run and short run dynamics in economic growth, the key variables for the study are GDP, inflation and FDI.

3.4 Definition of Variables

To achieve the desired results based on our stated objective and hypothesis, the following variables are thus relevant for the study.

The Gross Domestic Product (GDP) measures the value of total amount of goods and services produced by the economy within a particular year. In this study, GDP is used as a measure of the business cycle. Real GDP served as the proxy in the analysis.

Inflation (INF). Inflation is the persistent increase in the general price level of goods and services. The proxy for the measure of inflation per the study is the year on year inflation rate (YOY) which is the percentage change in the consumer price index (CPI).

Foreign Direct Investment (FDI) is the amount of inflows from abroad in the form of technological and its know-how, human capital, liquid cash amongst a host of others.

It is measured by the log of FDI in Ghana.

3.5 Estimation Strategy

(i) Stationarity and Co-integration Test

In order to consistently estimate the parameters in equation 3.4, First, to avoid the reporting of spurious results, the study examines the stationarity status of the individual series in our regressions model. Secondly, the study test for the existence of long-run equilibrium relationship using the ARDL/ bounds test to co-integration technique.

(ii) Stationarity Test

The use of time series data for analysis requires stationarity tests of the variables to determine the level of stationarity whether at level of first difference before variables are used in the regression. The order of integration test is necessary for econometric model specification in co-integration process. This study applied the Augmented Dickey-Fuller Test (ADF) to check for stationarity. Since the Phillips-Perron (PP) test attempt finding a way of handling deviations in order not to achieve white noise in the estimated model, it was applied to confirm the results of the ADF test. Following Philips and Perron (1988), the PP tests are based on the Augmented Dickey Fuller regression, and the critical values are the same as those used for the DF tests since Augmented

Dickey -Fuller (DF) is an extension of Dickey -Fuller test. The ADF regression is specified as;

$$\Delta y = a_1 + a_2 t + a_3 y_{t-1} + \sum_{n=1}^{n} (A_i \Delta y_{t-1}) + u_t \quad (3.6)$$

Where Δ represents the difference operator, y is the natural logarithm of the series, t is a trend variable. a_1, a_2 and a_3 are the coefficients to be estimated.

A is the vector of the estimated parameters of the lagged values of the differenced value of time series, Δy_{t-i} stands for the vector of the lagged value of the differenced value of the series and u is the error term.

The null hypothesis of the presence of unit root is rejected if the coefficient is significantly different from one. Thus implying stationarity in the data set, however the absence of stationarity is accepted when the null hypothesis is not rejected thus confirming the presence of unit root. So the ADF and the PP tests are run at level and first difference with trend and intercept.

(iii) Co-Integration and Bounds Test

The bounds test is an estimation procedure which is used to test the long run relationship given the fact that the time series is strictly I(0) or I(1) or a combination of both. It makes use of the F- and t - statistics to test for the significance of the lagged variables when there is uncertainty if the time series exhibits a trend or its stationary at first difference.

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta X_{t-i} + \sum_{j=1}^{q} \gamma_i \Delta Z_{t-j} + \varepsilon_t \quad (3.7)$$

From the above mentioned equation, we perform an overall F-test of the null hypothesis that there is no co-integration between the variables X and Z as against the alternative

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that it is not true. The rejection of the null hypothesis implies that there exist long run relationships between the variables. The ARDL bounds test gives an upper and lower boundary with which the overall F-statistic is to be compared. If the F-test is greater than the upper boundary, we reject the null hypothesis whiles an Ftest lower than the lower boundary moot for the acceptance of the null hypothesis.

The outcome is inconclusive is the F-test falls in between these two boundaries.

3.6 The ARDL Model

This study employs the ARDL technique to estimate the relationship between GDP, inflation and FDI. This econometric technique has numerous advantages which makes it suitable for analysis. Firstly, it is significant approach to test for co-integration within a small sample size. Also, according to Pesaran et al (2001), this method can be applied to time series data with combinations of I(1) and I(0) but most prominently when they are stationary at the first difference [I(1)]. This means that the ARDL technique makes it more flexible so as to avoid problems associated with pre-testing in co-integration, which requires that the variables be already classified into I(1) or I(0). The ARDL model specifies both the long run and short run impact of the independent variables on the dependent variables.

The researcher considers the model of the form $ARDL(p,q,k)$. The long run outcome form the ARDL regression process is specified as;

$$GDP_t = \alpha_0 + \sum_{i=o}^{p} \beta_i GDP_{t-i} + \sum_{i=1}^{q} \delta_i INF_{t-i} + \sum_{i=1}^{k} \phi_i FDI_{t-i} + \epsilon_t \quad (3.8)$$

The short run dynamics of the coefficient from the regression process is expressed by finding the error correction model associated with the long run estimates.

$$\Delta GDP_t = \Delta_0 + \sum_{i=o}^{p} \Delta_i \Delta GDP_{t-i} + \sum_{i=1}^{q} \Delta_i \Delta INF_{t-i} + \sum_{i=1}^{k} \Delta_i \Delta FDI_{t-i} + \Delta \Delta_{t-1} + \Delta_t \quad (3.9)$$

Where; Δ_{t-1} represents the error correction factor whereas Δ is the speed of adjustment. The error correction tells the speed of adjustment of the variables to the long run should there be any deviation. The error correction factor should be negative and significant. The negative state spells out the fact that with any deviation from the long run, the variables would turn back to equilibrium. However, a positive error correction term tells the explosive state of the variables an indication of no return back to its equilibrium.

3.7 Optimal Lag Structure

Streams of criteria are available to aid in the optimal selection of lags for various analysis using different methodologies. The most commonly used criterion are the

Akaike Information Criterion (AIC), the Schwartz-Bayesian Information Criterion (SBCI) and the Hannan-Ouinn Information Criterion (HIC). It should be noted that the introduction and optimal selection of lags in time series is very crucial since an incorrect lag selection can cause autocorrelation. In the selection of the optimal lag length (p) to be employed in the ARDL model, we combine both the AIC and the SBIC to choose the appropriate optimal lag lengths of the variables that produce errors that approach a white noise process.

CHAPTER FOUR

RESULTS AND ANALYSIS

4.1 Introduction

This chapter would uncover the empirical results based on the stated objectives and hypothesis to be achieved in chapter one. It begins with the general description of the variables under study, followed by the examination of their degree of correlation and further to analyze the trends of the dependent variable of focus. Test of stationarity and co-integration as well as the long and short run regression outcome is presented.

4.2 Descriptive Analysis

Descriptive analysis gives a general understanding of the actual state of the variables under consideration, it brings to view the number of observation, the minimum and maximum values as well as the mean and standard deviation of our dependent and independent variables.

Table 1: Summary of Descriptive Analysis

Variable	GDPR	CPI	FDI	DI	TO	POP
Mean	3.794121	27.04432	1.862538	16.79432	0.580776	2.54408
Standard dev	4.851326	38.47253	2.797546	7.972791	0.3158394	0.4201763
Minimum	-12.43163	0.0045	-0.5129989	3.53148	0.0632034	1.602882
Maximum	15.00707	132.4647	11.15181	31.12915	1.160484	2.481806

| observation | 39 | 39 | 39 | 39 | 39 | 39 |

From table 1 above, it is visible that over the time period under observation between 1975 and 2013, there were 39 observations in all since they are yearly frequencies. GDP growth rate which is the dependent variable and a measurement of economic growth ranged between -12.43 and 15.00 and has a mean and standard deviation of about 3.7941 and 4.851 respectively. Consumer Price Index on the other hand ranged from 0.0045 to about 132.46. It recorded the highest standard deviation of almost 38.5 and a mean of 27.044 indicating the idea of its high tendency of fluctuations compared to the other macroeconomic variables per the study. Next to CPI with regard to fluctuations is the domestic investment followed by the economic growth. Trade openness and the growth rate in population has mean of 0.058 and 2.554 respectively and standard deviation of 0.315 and 0.42 respectively. These two variables are the least prone to fluctuations with trade openness dominating.

4.3 Trend Analysis Real GDP and Macroeconomic Variables

The prominence of analyzing the trends in the dependent variables of interest is due to the fact that it gives a pictorial presentation of the variable. This helps in the visualization of the peaks and troughs as well as period of stability.
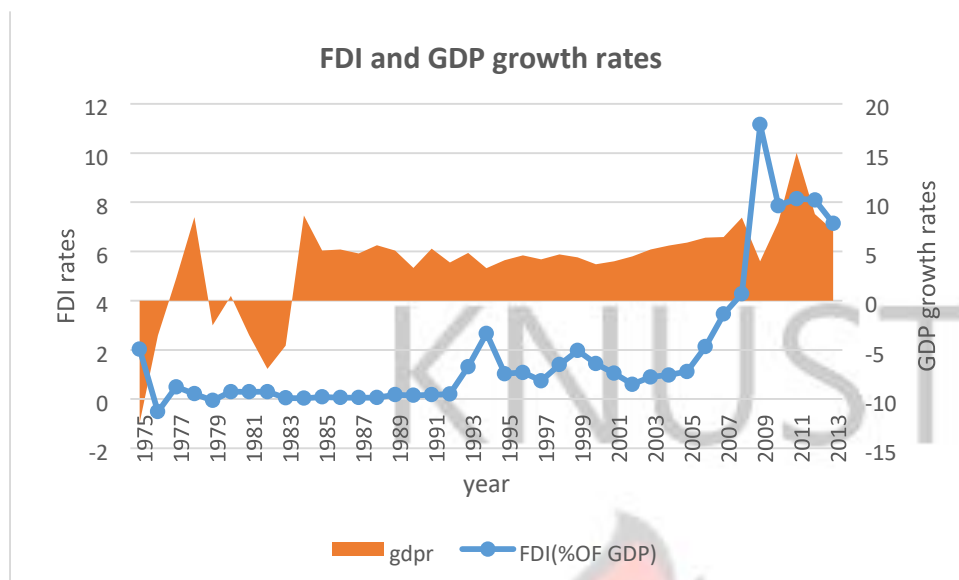
Figure 2: Trends of FDI and economic growth (1975-2013)

Source: Author"s own construct from, 2015

From figure 4.1 above, four distinct peaks in growth rate of the real GDP is visible, 1978, 1984, 2008 and 2011 with 2011 amounting to the highest peak.Also three major troughs in 1975, 1979 and 1982 is also evident. The decline in growth in 1975 was accompanied by a corresponding declining FDI. Growth started increasing sharply from 1975 from a negative growth rate of about 12% to a positive growth of about 8.4% by 1978. Thissharp and continuous increase between these periods could be linked to macroeconomic stability. However, there was a sharp decline in growth rate into negatives from 1979 till 1983. This decline in the Ghanaian economy was attributed to the economic instability and economic mismanagement which resulted in the shortage of goods and services culminating to the decline in economic growth. At the same time between these periods of fluctuations in economic growth saw FDI to be relatively low declining from 2% to about -0.5% and remained insignificant hovering around the zero margin. Nevertheless the economy started expanding after the implementation of the Economic Recovery Program and the Structural Adjustment Programs where growth peak to about 8.5% in 1984. The economy became very stable after this period amidst

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gradual fluctuations which ranged between 4% and 6% till 2008 where there was an expansion in growth to about 8.5% and a sharp decline in the next year to about 3.9%. This same period saw FDI gradually increasing peaking at 11% in 2009. Growth picked up again in 2011 to almost 15% which was driven by the services sector led by the financial and nonfinancial institutions at the same time FDI declined gradually.

From the general trends in these two series, it become evident that FDI and GDP growth rates tend to move in the same direction on the average thus an increasing FDI would boost the general performance in the economy.
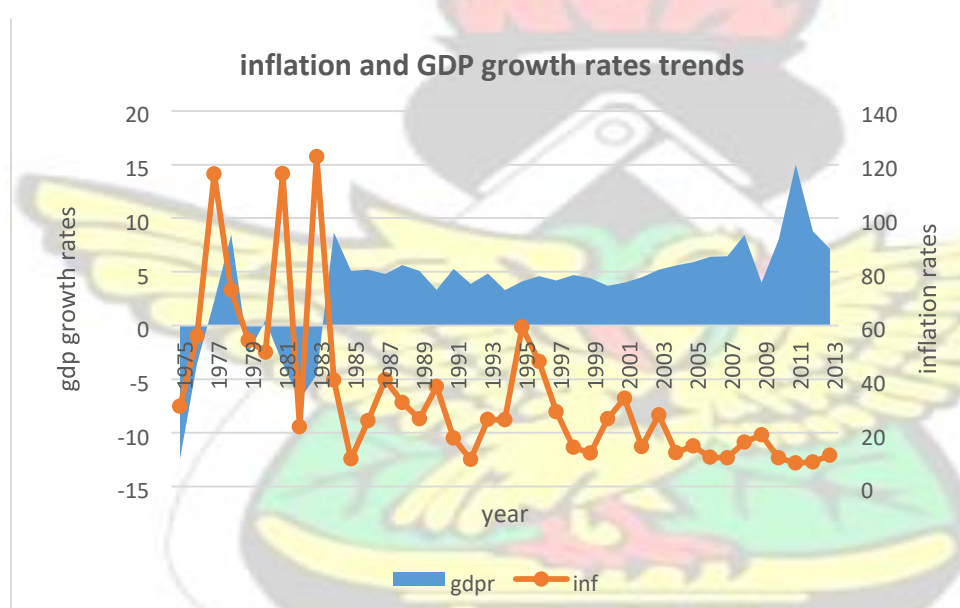
Figure 3: Trends of Inflation and economic growth (1975-2013)

Source: Author's own construct, 2015

From the figure above, it is evident that inflation measured by the consumer price Index (CPI) percentage is characterized by series of fluctuations with two distinct evidence between 1975 and 1985 as well as from 1985 to 2013. The first period between 1975 and 1985 was a highly volatile period with massive troughs and peaks ranging from as low as 29% and 123%, at the same time GDP growth rates had

similar characteristics nevertheless peaked at different years.

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The years after the ERP between 1985 till date saw inflation rates being relatively stable compared to the preceding years. This stability was accompanied by increasing rates of economic growth as opposed to the plummeting economy before the ERP. The period between 2008 and 2013 saw some amount of fluctuations although relatively stable peaking to about 15% in 2011 but with a current trace of gradual decline after 2011 at the same time the general inflation rate started increasing and peaking.

The general relationship between these two series is inverse such that high and volatile rates of inflation becomes detrimental to economic performance.

4.4 Stationarity Test Results

The need for testing for the presence or absence of unit root in time series data has both economic and statistical implication worth noting. Statistically, the presence of unit root in the data has the potential of producing spurious relationships when ordinary least squares methods are applied on the data. It is thus important to know the order of integration of each of the series in the model prior to estimation. Table 2 presents the summary of stationary test results based on both the Augmented Dickey Fuller (ADF) and the Philips Perron (PP) tests.

Table 2: Unit root Test Results

Variables	ADF tau Test		Philips Perron Test		Order of Int
	Constant	Constant +T	Constant	Constant + T	
PANEL A: L EVELS					

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GDPR	0.532	-0.931	0.881	-0.830	?
LnINF	-5.404***	-3.286*	-7.655***	-2.837	I(0)
FDI	-0.816	-3.386*	-0.640	-3.170	?
lnDI	-1.070	-2.360	-1.052	-2.612	?
POP	-1.478	-2.786	-2.018	-1.976	?
lnTO	-1.15	-1.859	-1.115	-1.859	?

	PANEL B: FIRST DIFFERENCE				
GDPR	-3.563**	-3.844**	-4.846***	-4.973***	I(1)
lnINF	?	?	?	?	?
FDI	-4.391***	-4.423***	-5.256***	-5.232***	I(1)
lnDI	-4.598 ***	-4.503 ***	-6.359 ***	-6.222 ***	I(1)
POP	-3.010**	-3.701*	-3.075**	-3.203*	I(1)
lnTO	-3.078**	-3.005*	-3.078**	-3.205*	I(1)

*,** and *** are 10%, 5% and 1% level of significance respectively

Source: Authors own Estimation. 2015

From Table 2 above, the null hypothesis of unit root could not be rejected for all the series at the level for both the ADF and the Philips-Perron tests except for the inflation rates. Inflation was rejected at about 1% level of significance indicating inflation is stationary at levels whether there are trends or not. However, the unit root null is flatly rejected at 1% level of statistical significance for both the ADF and the PP tests for economic growth, domestic inflation, trade openness and population growth rates.We therefore conclude that all the underlying series except inflation rates in the present study are integrated of order one [I(1)] with inflation being integrated of order zero I(0). The series are thus a mixture of levels and

first differences stationary data. The economic implications of unit root is that shock to all the variables under study except inflation would have a lasting effect (lack of mean reversion) but shocks to inflation would have only temporary effects.

4.5 Co-integration Test Results

Table 3: Co-Integration Test Results

models	F-stats***	Critical values			
		99% bound		95% bound	
		I(0)	I(1)	I(0)	I(1)
Without structural breaks					
Fy(gdpr, lninf, fdi)	**9.859961**	5.15	6.36	3.79	5.85
Fy(gdpr, lninf, fdi, lndi, pop, lnto)	**6.665608**	3.41	4.68	2.62	3.79
With structural break					
Fy(gdpr, lninf, fdi)	**14.70776**	5.15	6.38	3.79	4.85
Fy(gdpr, lninf, fdi, lndi, pop, lnto)	**9.594766**	3.41	4.68	2.62	3.79

*** indicates 1% level of significance

Source: Authors own Estimation. 2015

Table 3 above, the results of the bounds test approach to co-integration is seen, the overall F- statistic for the variables were all statistically significant at 1%. This is evident in the fact that the F-statistic is greater than the upper bound This confirms the long run relationship amongst inflation, interest rate, money supply, real GDP and the nominal exchange rate. The null hypothesis of no co-integration amongst the variables is not accepted. The implication of the co-integration amongst the variables is that, in the long

run there at least exist some form of economic relationship between the variables whether there is a structural break or not.

4.6 Regression Results

The regression outcome from the application of the ARDL methodology gives both short run and long run results for the analysis. These are presented in tables 4.3 and 4.5 respectively. The researcher further tests for the presence of a structural break and its significance to economic growth dynamics.

4.6.1 Short run Analysis without Structural Break

This section presents statistical results that do not consider any major structural break which involves major policies implementations in the economy. This would bring afore the exact quantitative impact of inflation and FDI on the general performance of the economy without accounting for major recovery programs in Ghana such as the Economic Recovery Program (ERP). This would ensure the comparison to the

inclusion of the structural break.

Table 4: Short run results from ARDL

Dependent variable is the growth rate of GDP (gdpr)		
Variables	Model 1	Model 2
lnINF	0.493763 (1.748264) [0.0894]*	1.464309 (1.917540) [0.0651]*

FDI	0.150965	-0.214719
	(0.620701)	(0.681127)
	[0.5389]	[0.5021]
lnDI		0.039088
		(0.011962)
		[0.9905]
POP		-14.353865
		(-2.873812)
		[0.0075]**
lnTO		-0.869523
		(-0.290540)
		[0.7735]
cointEq(-1)	-0.739285	-0.780035
	(-5.086270)	(-5.869777)
	[0.0000]***	[0.0000]***

*,** and *** are 10%, 5% and 1% level of significance respectively

The t-values and p-values are presented in ( ) and [ ] respectively

Source: Authors own Estimation. 2015

The outcome of the short run results from the ARDL is presented in table 4 above. Two separate regressions were run, the first focused on the two main macroeconomic variables of interest which are inflation and foreign direct investment. The second model includes three other major control variables which are relevant when it comes to economic growth based on the Solow growth model. The variables include domestic investment, trade openness and population growth rate. In model one, the short run

impact of inflation and foreign direct investment on economic growth was evident with coefficients of 0.493 and 0.150 respectively. Inflation had the highest impact on economic growth. A percentage change in inflation would cause economic growth to increase by almost 49%. An increase in inflation thus causes economic growth though this didn"t meet our priori expectation. As it was expected that inflation should inversely affect economic growth. Care should thus be taken in the explanation of the relationship between variable from the short run to the long run, inflation does not lead outright to declining rate of economic growth but gradually cause increasing growth in the short run. FDI however met the study"s expectation by having a positive impact on economic growth, a one percentage increase in FDI would cause an expansion in growth by approximately 15%. Inflation irrespective of the positive impact turned out to statistically explain changes in economic growth in contrast to FDI. Inflation was significant at 10% whiles FDI was insignificant.

Inflation is thus the major cause of economic growth per the first model of the study. We therefore rejected the null hypothesis of inflation not having any significant impact on economic growth in Ghana.

In the second model, with the introduction of the control variables, the magnitude of inflation"s impact increased although still positive and significant at 10%. FDI however assumed a negative relationship an indication of contraction in growth when FDI increases and was still insignificant. This negative relationship and insignificance perhaps stems from the fact that the FDI"s are channeled to specific sectors of the economy whose contribution to growth are not so significant for growth. It is argued that the services sectors including the financial and non-financial institutions contribute more to growth, nevertheless more of the FDI"s are channeled to the mining sectors instead (Frimpong *et al*, 2011).

Domestic investment was positively related to economic growth and the inverse relation between population and economic growth met priori expectation. Trade openness measured by the share of the difference between imports and exports on the other hand had a negative impact, this spells out and confirms the idea of the reliance on more import than exports in the Ghanaian economy per the study. Nevertheless domestic investment and trade openness were statistically insignificant. Population together with inflation were the only significant variables in the explanation of economic growth rates in Ghana. An increase in population growth would lead to significant decline in economic growth, this is because an increasing population put pressures on existing infrastructures which results in the law of diminishing returns to productive aspects of the economy leading to a decline in growth.

In both models, the error correction term which measures the speed of adjustment of the variables should there be any deviation was quite high of -0.73 and -0.78 in model 1 and 2 respectively and highly significant at 1%. The negative signage measure the variables are not explosive and thus they return back to their initial equilibrium. The speed of returning to equilibrium is 73% and 78%, which is how fast equilibrium would be restored.

4.6.2 Long run Analysis without Structural Breaks

Table 5: Long run results from ARDL

Dependent variable is the growth rate of GDP (gdpr)		
Variables	Model 1	Model 2
lnINF	0.667893	1.877233
	(1.99790)	(1.960501)
	[0.0538]*	[0.0596]*

FDI	0.204204	-0.275269
	(0.626659)	(-0.673760)
	[0.5351]	[0.5058]
lnDI		-4.304388
		(-1.027765)
		[0.3126]
POP		-4.235271
		(-1.442262)
		[0.1599]
lnTO		-1.114722
		(-0.289714)
		[0.7741]
Constant	3.135854	23.708657
	(3.564163)	(1.552182)
	[0.0011]***	[0.1315]

*,** and *** are 10%, 5% and 1% level of significance respectively

The t-values and p-values are presented in ( ) and [ ] respectively

Source: Authors own Estimation. 2015

The results presented in table 5 is representation of the long run outcome of the two models discussed under the short run analysis. It is evident that in the long run all variables in both model 1 and 2 retained their respective signs just as in the short run with the exception of the domestic investment. Domestic investment had a negative impact on growth in the long run per the results in contrast to its short run positive impact. This is an indication that increasing domestic investment impact positively on economic growth in the short run but eventually leads to a declining economic growth

in the long run. This would be attributed to the wrong channeling of domestic investment in the long run to less productive aspect of the economy.

It is also evident in the long run that there was a strong and greater magnitude of impact on economic growth compared to the short run period. A one percent increase in inflation would cause economic expansion of about 67% compared to the 50% in the short run. Further, a one percent increase in Foreign Direct Investment, domestic investment, population and trade openness would reduce economic growth to the tune of 27%, 430%, 423% and 111% respectively. The higher magnitudes of the coefficients in the long run confirms the Le Chatelier"s Principle which hypothesize that in the short run, due to fixed-cost constraints the elasticities are less responsive than in the long run therefore the long run magnitude of impact is higher economically. Nevertheless these variables still were found to be insignificant determinants of economic growth. Population in the long run did not determine economic growth in contrast to the short run.

4.7 Structural break Analysis

One of the major structural changes that influenced the Ghanaian economy is traced to the economic recovery and the structural adjustment programs which jeered up the then plummeting economy between 1981 and 1982. The study thus considers the ERP which was implemented in 1983 to ascertain the exact quantitative impact and relevance of this policy on economic growth.

Table 6 and 7 presents the short and long run results respectively.

Table 6: Short run Analysis with Structural break

Variables	Model 1	Model 2
	Dependent variable is the growth rate of GDP (gdpr)	
lnINF	-0.461628	0.432093
	(0.365347)	(0.504430)
	[0.2178]	[0.3985]
FDI	0.131789	0.231941
	(0.365347)	(0.241792)
	[0.7207]	[0.3451]
lnDI		-2.821707
		(2.723750)
		[0.3085]
POP		-7.136565
		(2.360443)
		[0.0051]**
lnTO		-2.984003
		(2.800505)
		[0.2951]
ERP		13.657909
		(3.126782)
		[0.0001]***
cointEq(-1)	-0.855978	-1.079615
	(0.135187)	(0.136860)
	[0.0000]***	[0.0000]***

*,** and *** are 10%, 5% and 1% level of significance respectively

The t-values and p-values are presented in ( ) and [ ] respectively

Table 7: Long run Analysis with Structural break

Variables	Model 1	Model 2
	Dependent variable is the growth rate of GDP (gdpr)	
lnINF	-0.539299	0.400229
	(0.446207)	(0.452078)
	[0.2357]	[0.3830]
FDI	0.699889	0.214837
	(0.286675)	(2.497616)
	[0.0203]*	[0.3037]
lnDI		-22.613623
		(2.497617)
		[0.3469]
POP		-6.610285
		(1.956297)
		[0.0020]*
lnTO		-2.763951
		(2.537685)
		[0.2848]
ERP	8.471178	12.650718
	(2.438619)	(2.476293)
	[0.0015]*	[0.000]***

Constant		
	3.135854	15.059807
	(3.564163)	(8.468493)
	[0.0011]**	[0.085]*

*,** and *** are 10%, 5% and 1% level of significance respectively

The t-values and p-values are presented in ( ) and [ ] respectively

Table 6 and 7 illustrates the short and long run results respectively with the inclusion of the structural break which is the ERP in 1983. In the short run, in comparison to the exclusion of the structural breaks, the differences in outcome was vast since in the first model which comprise the main variables of interest, none of the variables had any significant impact on economic growth. Nonetheless the policy implementation was of significant influence on economic growth. Again with the incorporation of the control variables only population and the ERP were statistically significant compared with the initial estimation where inflation was also significant. Also the variables of focus met the priori expectations such that in the short run, inflation and FDI tend to have negative and positive impact on economic growth respectively.

Furthermore, the speed of adjustment from any deviation to its equilibrium was fairly faster with the introduction of the break at a rate of 85% compared to the initial 73% without the break.

On the average, the magnitude of impacts of the respective variables on economic growth in the short run reduced slightly. Thus without the incorporation of some vital episodes of the economy leads to the exaggeration and overestimation of the level of economic impact these macroeconomic variables has on economic growth.

In the long run however, foreign direct investment (FDI) became a significant determinant of the economic growth with the inclusion of breaks in model 1 whiles the exclusion of the breaks it proved otherwise. In model two however, FDI and the other variables were in significant with the exception of population. The economic implication is that only FDI and population growth were sensitive to the change in policy framework such that in the long run increasing population growth could have negative repercussions on the economy.

The policy implementation represented by ERP was found to have a highly positive significant impact on the general rate of growth in the Ghanaian economy both in the long and short run. The implication this brings to light is that the introduction of ERP has been a major factor for the increasing level of goods and services in the economy. This is also visible from figures 1 and 2 where economic growth after 1983 saw a sharp increment and evident that the plummeting economy prior to the ERP has not been recorded again.

4.8 Granger Causality Test

The granger causality test in model 1 suggests a uni-directional causality between economic growth and inflation. The null hypothesis of no causality between inflation and economic growth is rejected at 10% significance level (see Appendix B). Confirms the fact that inflation becomes a good predictor economic growth but not the other way round where economic growth does not granger causes inflation. This confirms the significance of inflation in determining economic growth per the study and thus supports the findings of this study since inflation was a statistically significant determinant of economic growth in Ghana.

Also there was a bi-directional causality between FDI and economic growth. FDI granger causes economic growth whiles economic growth further granger causes FDI at

10% significance level (see Appendix B). The first implication of this outcome is that, in order to ensure increasing economic growth, FDI inflows becomes a relevant determinant thus policy options should be favorable in order to encourage private investors into the Ghanaian economy to spur up growth.

In the same vein also, it becomes crucial to give importance to the level of overall growth in the economy in order to ensure the attraction of FDI since economic performance is a determinant of FDI, implying the higher the economic growth, the more FDI is attracted into the country.

Furthermore, domestic investment granger causes economic growth but not the other way round confirming a uni-directional relationship between domestic investment and growth. The same can be said about trade openness and growth as growth does not granger causes trade openness but the inverse is true (see Appendix B).

However, per the test there was no causal relationship between population growth and economic growth. This contradicts the results from the short run analysis per the study.

CHAPTER FIVE

SUMMARY, CONCLUSIONS ANDPOLICY RECOMMENDATIONS

5.1 Introduction

This final chapter of the study focus on the findings and conclusions of the regression results. It unravel policy implications per the results as well as further policy implication to ensure the effective measures to boost economic growth.

5.2 Summary of Key Findings

After analyzing the impact of inflation and foreign Direct Investment on economic growth in Ghana using the ARDL econometric model, the following outcome was uncovered;

First, the trends of economic growth in the Ghanaian economy between 1975 and 2013 witnessed severe downward trends before the implementation of the ERP policy frameworks. Growth rates hit negatives due to the economic hardship between 1978 and 1982, however, with the implantation of the ERP and SAP frameworks, growth rates became stabilized over a period of 20 years but started todecline sharply in recent years.

It raises a question as to how these major policy frame works have impacted on economic growth since its implementation.

Secondly, the results and outcome of the regression without structural break which captures when the ERP was implemented showed that inflation and direct investment was positively related to economic growth in the short run whiles FDI, trade openness and population growth were inversely related to economic growth in the short run. However, inflation and population were the only significant variables that impacted on economic growth in the short run. The insignificance of FDI implies the channeling of

this foreign investment into wrong sectors of the economy rather than the productive sector.

Thirdly, in the long run also inflation still maintained its stance of being positive and the only significant variable while population turned insignificant in the long run contrary to its significance in the short run. All the other control variables including domestic investment, trade openness were insignificant to economic growth in Ghana.

Furthermore, with the introduction of structural breaks (the ERP framework in 1983), the study found population and the ERP policy option to be the only determinants of economic growth both in the short and long run. All the other variables remain insignificant. With population negatively affecting growth and the ERP having a greater positive impact on growth, this is evident from the trends in economic growth as after the implementation of the ERP the GDP growth rates has seen a consistent steady increase and stability.

The study recorded a strong equilibrium stabilization of nearly 74% error correction term with the inclusion of structural break compared to without the break, which indicated the speed with which any deviation from the long run equilibrium would be corrected faster if the ERP policy framework is considered.

Lastly, on the causality front, the study found a uni-directional causality between economic growth and inflation while a bi-directional causality was found between

FDI and economic growth.

5.3 Conclusions

The general objective of the study was to find the impact of inflation and foreign direct investment on economic growth in the Ghanaian economy with evidence from

1975 to 2013. Specifically, the study sought to find the trends of economic growth in Ghana with focus on the pre and post economic recovery phase. Further the study sought to find long run and short run impact of inflation and FDI on economic growth and controlling for other variables including Domestic Investment, trade openness and population growth. The results of the study were based on the outcome of the ARDL econometric model.

The study revealed the insignificance of investment and its contribution to economic growth in the Ghanaian economy either foreign Direct Investment (FDI) or Domestic Investment (DI). This result was associated with the possibility of investment being channeled to the wrong sectors of the economy.

Nevertheless, inflation and population growth were two main factors that affected economic growth in Ghana. Inflation positively influenced it whiles growth in population negatively affected growth. These findings imply stabilizing inflation rates would not necessarily boost economic growth however, putting measures in place to ensure the stability or declining population growth would ensure economic growth. The outcome thus supports the structuralists view of inflation positively impacting on economic growth as well as the works pertaining to the demographic theory postulated by Thomas Malthus.

Lastly, the study underscores the importance the economic recovery program (ERP) in the growth of the Ghanaian economy as it had a vital influence on the growth of the economy.

5.4 Policy Recommendations

The distinction between short run and long run analysis is for policy purposes. It thus should be noted that in the short run policy makers should target inflation and the growth

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in population as policy tools to ensure economic expansion. Inflation was positively related to economic growth whiles population growth was inversely related to economic growth. Therefore in the short run, if policy makers target the reduction in inflation rates to boost economic performance and growth, such policies may turn out to be ineffective.

However, policy makers should enact measures that would ensure that the population growth rate is minimized such as education and awareness on the need for family planning and birth control measures to enable a stable population growth which would be more effective in boosting economic growth.

In the long run also inflation should be the main target when it comes to putting structures in place for economic growth. Policy makers should gradually ensure the increasing rates of inflation although it should be emphasized it should be at a minimal rate to ensure economic expansion. Thus this could be linked to the supply side of the economy where producers would tend to supply more when price increase.

With the significance of the ERP in economic growth per the study, polices similar to these frameworks embarked on in the early 1980"s should be encouraged by policy makers.

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APPENDICES APPENDIX

A

DESCRIPTIVE ANALYSIS

```
sum gdpr cpi fdiofgdp gdcfofgdp populationannualgrowth tradeopeness
```

```
     Variable |       Obs       Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
gdpr |        39   3.794121    4.851326  -12.43163   15.00707        cpi
     |        39   27.04432    38.47253      .0045   132.4647      fdiofgdp
     |        39   1.862538    2.797546  -.5129989   11.15181     gdcfofgdp
     |        39   16.79432    7.972791    3.53148   31.12915  population~h
     |        39    2.54408    .4201763   1.602882   3.481806  -------------
-------------+--------------------------------------------------------  tradeopeness
     |        39   .5807769    .3158394   .0632034   1.160484
```

APPENDIX B

COINTEGRATION TEST

MODEL 1

ARDL Bounds Test
Date: 12/16/15   Time: 12:29
Sample: 1975 2013
Included observations: 38
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	
		k
F-statistic	9.859961	
		2

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

MODEL 2

ARDL Bounds Test
Date: 12/17/15   Time: 00:23
Sample: 1975 2013
Included observations: 38
Null Hypothesis: No longrun relationships exist

Test Statistic	Value	
		k
F-statistic	6.665608	
		5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

REGRESSION WITHOUT STRUCTURAL BREAKS

MODEL 1

ARDL Cointegrating And Long Run Form
Dependent Variable: GDPR
Selected Model: ARDL(1, 0, 0)
Date: 12/16/15   Time: 12:25
Sample: 1975 2013
Included observations: 38

	Cointegrating Form			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNCPI)	0.493763	0.282430	1.748264	0.0894
D(FDI)	0.150965	0.243217	0.620701	0.5389
CointEq(-1)	-0.739285	0.145349	-5.086270	0.0000

Cointeq = GDPR   - (0.6679*LNCPI + 0.2042*FDI + 3.1359   )

	Long Run Coefficients			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNCPI	0.667893	0.334282	1.997990	0.0538
FDI	0.204204	0.325862	0.626659	0.5351
C	3.135854	0.879829	3.564163	0.0011

MODEL 2

ARDL Cointegrating And Long Run Form
Dependent Variable: GDPR
Selected Model: ARDL(1, 0, 0, 0, 1, 1)
Date: 12/16/15 Time: 12:43
Sample: 1975 2013
Included observations: 38

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	1.464309	0.763639	1.917540	
D(LNCPI)				0.0651
D(FDI)	-0.214719	0.315241	-0.681127	0.5012
D(LNTO)	-0.869523	2.992777	-0.290540	0.7735
D(LNDI)	0.039088	3.267834	0.011962	0.9905
D(POP)	14.353865	4.994713	-2.873812	0.0075
CointEq(-1)	-0.780035	0.132890	-5.869777	0.0000

Cointeq = GDPR - (1.8772*LNCPI -0.2753*FDI -
1.1147*LNTO -4.3044
*LNDI -4.2353*POP + 23.7087)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNCPI	1.877233	0.957528	1.960501	0.0596
FDI	-0.275269	0.408556	-0.673760	0.5058
LNTO	-1.114722	3.847667	-0.289714	0.7741
LNDI	-4.304388	4.188106	-1.027765	0.3126
POP	-4.235271	2.936548	-1.442262	0.1599
C	23.708657	15.274401	1.552182	0.1315

COINTEGRATION TEST WITH STRUCTURAL BREAK

MODEL1

ARDL Bounds Test
Date: 03/01/16 Time: 16:24
Sample: 1975 2013
Included observations: 38

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	9.594766	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

MODEL 2

ARDL Bounds Test
Date: 03/01/16   Time: 16:28
Sample: 1975 2013
Included observations: 38
Null Hypothesis: No lo ngrun relations hips exist

Test Statistic	Value	k
F-statistic	14.70778	2

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

REGRESSION RESULTS WITH STRUCTURAL BREAK

ARDL Cointegrating And Long Run Form
Dependent Variable: GDPR

Selected Model: ARDL(1, 0, 0, 0, 0, 0)
Date: 03/01/16   Time: 15:53
Sample: 1975 2013
Included observations: 38

	Cointegrating	Form		

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNCPI)	0.432093	0.504430	0.856596	0.3985
D(LNDI)	-2.821707	2.723750	-1.035964	0.3085
D(FDI)	0.231941	0.241792	0.959256	0.3451
D(POP)	-7.136565	2.360443	-3.023400	0.0051
D(LNTO)	-2.984003	2.800505	-1.065523	0.2951
D(D1981)	13.657909	3.126782	4.368041	0.0001
CointEq(-1)	-1.079615	0.136860	-7.888440	0.0000

Cointeq = GDPR   - (0.4002 *LNCPI   -2.6136 *LNDI +
0.2148   *FDI   -6.6103
   *POP -2.7640 *LNTO + 12.6507*D1981 + 15.0598)

	Long Run Coefficients			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNCPI	0.400229	0.452078	0.885309	0.3830
LNDI	-2.613623	2.497616	-1.046447	0.3037
FDI	0.214837	0.224831	0.955546	0.3469
POP	-6.610285	1.956297	-3.378979	0.0020
LNTO	-2.763951	2.537685	-1.089162	0.2848
D1981	12.650718	2.476293	5.108732	0.0000
C	15.059807	8.468493	1.778334	0.0855

GRANGER CAUSALITY TEST

Pairwise Granger Causality Tests

Pairwise Granger Causality Tests
Date: 12/16/15   Time: 14:32
Sample: 1975 2013
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.

		5.66137	
LNCPI does not Granger Cause GDPR	38		0.0229
GDPR does not Granger Cause LNCPI		2.11762	0.1545

		4.01711	
FDI does not Granger Cause GDPR	38		0.0528
GDPR does not Granger Cause FDI		5.65437	0.0230

FDI does not Granger Cause LNCPI   38   0.17199   0.6809   LNCPI does not Granger Cause FDI 4.82301 0.0348

Pairwise Granger Causality Tests
Date: 12/16/15   Time: 14:33
Sample: 1975 2013
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
		5.66137	
LNCPI does not Granger Cause GDPR	38		0.0229
GDPR does not Granger Cause LNCPI		2.11762	0.1545
		4.01711	
FDI does not Granger Cause GDPR	38		0.0528
GDPR does not Granger Cause FDI		5.65437	0.0230
		4.75459	
LNDI does not Granger Cause GDPR	38		0.0360
GDPR does not Granger Cause LNDI		2.77760	0.1045
		4.70160	
LNTO does not Granger Cause GDPR	38		0.0370
GDPR does not Granger Cause LNTO		2.69382	0.1097
		0.35111	
POP does not Granger Cause GDPR	38		0.5573
GDPR does not Granger Cause POP		0.56305	0.4581
		0.17199	
FDI does not Granger Cause LNCPI	38		0.6809
LNCPI does not Granger Cause FDI		4.82301	0.0348
		0.00578	
LNDI does not Granger Cause LNCPI	38		0.9398
LNCPI does not Granger Cause LNDI		9.27112	0.0044
		0.08467	
LNTO does not Granger Cause LNCPI	38		0.7728
LNCPI does not Granger Cause LNTO		8.69329	0.0057

		0.83116	
POP does not Granger Cause LNCPI	38		0.3682
LNCPI does not Granger Cause POP		0.55407	0.4616
		1.48490	
LNDI does not Granger Cause FDI	38		0.2312
FDI does not Granger Cause LNDI		0.25814	0.6146
		0.90143	
LNTO does not Granger Cause FDI	38		0.3489
FDI does not Granger Cause LNTO		0.41704	0.5226
		0.01143	
POP does not Granger Cause FDI	38		0.9155
FDI does not Granger Cause POP		2.78295	0.1042
		9.58819	
LNTO does not Granger Cause LNDI	38		0.0038
LNDI does not Granger Cause LNTO		0.00649	0.9363
		5.32359	
POP does not Granger Cause LNDI	38		0.0271
LNDI does not Granger Cause POP		7.94191	0.0079
		9.08785	
POP does not Granger Cause LNTO	38		0.0048
LNTO does not Granger Cause POP		7.03005	0.0120

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