

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS**

**MACROECONOMIC DETERMINANTS OF ECONOMIC GROWTH IN GHANA
(1970-2007)**

BY

**ENU PATRICK
(PG1168607)**

**A THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS, KWAME
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DEDICATION

This thesis is dedicated to God, whose Grace has seen me through to completion. It is also dedicated to my dear Parents Nana Osereboa Enu I and Mrs. Felicia Enu Koomson, to my mentor Mr. D.E. Adenutsi (a lecturer at the Department of Economics, Central University College, Accra, Ghana) to my Siblings: Priscilla Enu, Richard Enu, Bright Enu, and Alex Enu and lastly to Madam Prudence Attah-Obeng (a student at the Department of Economics, Methodist University College, Accra, Ghana).

DECLARATION

I **ENU PATRICK**, hereby declare that with the exception of references to other people's work which have been duly acknowledged, this thesis is entirely my own work and no part of this publication or the whole has been presented for another degree elsewhere.

.....

**ENU PATRICK
(STUDENT)**

.....

DATE

I declare that I have personally supervised the student to undertake the study herein submitted and I confirm that the student has my permission to present it for assessment.

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**Mr. A.K. OSEI-FOSU
(SUPERVISOR)**

.....

DATE

The problem of the study is ascertaining the major macroeconomic determinants of economic growth that would drive Ghana's real per capita GDP growth (economic growth) towards the attainment of the targeted middle income status by the year 2015 and also determine which ways these determinants influence economic policy formulation and implementation.

As a result, this study examines the long-run macroeconomic determinants of economic growth in Ghana using Johansen approach to cointegration which is more appropriate and efficient for determining the number of cointegrating vectors without relying on an arbitrary normalization. The study period spanned from 1970 to 2007. The time series properties of the data were, first, analyzed using the Augmented Dickey Fuller (ADF) test.

The empirical results derived indicate that all the variables of interest were stationary after their first differencing. The study found cointegration relationship between real GDP per capita (economic growth) and its macroeconomic determinants. The results indicated that the major macroeconomic determinants of economic growth in Ghana are physical capital (+), foreign direct investment (-), foreign aid (-), inflation (+) and government expenditure (-).

In order to achieve the desired rate of economic growth and hence, the attainment of the millennium development goals by 2015, the following policies are suggested.

Physical Capital was found to have a positive impact on economic growth. The policy recommendation is that there should be continuous investment in physical capital including plants, machinery, raw materials, industrial buildings, road network, technology (research and development) and other capital stock that are central to production and other economic activities in the economy.

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More resources should be devoted to expanding technical and vocational education. The reform of the pre-university educational system is in the right direction. The government needs to devote

more resources to enhance non-formal education with strong emphasis on basic literacy and skills training.

Labour force was found to have a positive impact on economic growth. The policy recommendation is that the government should come out with an attractive policy that will attract more foreign direct investment into the manufacturing sector as well as the agricultural sector which is the back bone of the Ghanaian economy.

Foreign aid had a negative effect on economic growth. The policy recommendation is that the government should be able to generate more revenue domestically than relying on foreign aid. The government can do this by widening its tax net to include a greater proportion of the informal sectors of the Ghanaian economy and then spend the revenue generated on developmental projects that will crowd in the private sector which is considered as the engine of growth and hence accelerate Ghana's economic growth.

Inflation had a positive impact on economic growth in Ghana. The policy recommendation is that the monetary policy authorities should continue to pursue the objective of maintaining inflation rate to single digit. This will force commercial banks to reduce its lending rate. This will cause investors to go borrow and invest in the private sector, increase output and hence increase economic growth, all things being equal.

Finally, government expenditure was found to have a negative impact on growth. The policy recommendation is that the government should spend on the productive sectors of the economy such as provision of safe water, primary health care, education, roads, electricity, waste management, telecommunication, security etc which will crowd in the private sector.

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Mr. Kweku Brew (a postgraduate student at the Department of Economics, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana), and Mr. William Akuffo (Underwriter/Marketing Officer, State Insurance Company, Accra, Ghana). Also, my sincere gratitude goes to all my other course mates for being there for me anytime I needed their help. However, all the errors in this thesis remain the author's sole responsibility.

ENU PATRICK
Department of Economics
KNUST, Kumasi
Ghana

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter consists of the background of the study, statement of the problem, objectives of the study, hypothesis of the study, significance of the study, scope of the study, limitations of the study and organization of the study.

1.1 Background of the Study

Economic growth has become a global necessity for alleviating poverty. From 1970 to 2007, every region experienced economic growth, but some grew faster while others grew at a slower rate. In general, Asia's rate of growth was high; North America had moderate growth while Western Europe recorded low growth. Specifically, Asia's growth rate was 19% of the world economic growth rate in 1970, but 28% in 2007. That of North America was 33.3% in 1970 and still remained at 33.3% in 2007 while Western Europe had 34% in 1970 but declined to 25% in 2007. However, African countries were below the average of the world. That is, in 1820, Africa's per capita income was 40% less than the world average. The gap widened to 60% in 1950, and almost 80% in 2000. According to the United Nations Economic Commission for Africa, in 2009, economic growth in Africa is expected to fall from 5.1 % in 2008 to 2% as a result of falling exports and the global recession (financial turmoil that originated in the U.S.A.). Although Africa had the lowest growth rate, its performance has improved substantially over the past decade, giving hope for the future and Ghana is not an exception (The Global Social Change Research Project, 2007).

Since independence in 1957, the Ghanaian economy has been through a period of upswings and downswings. A few years after Ghana's independence, the country experienced satisfactory growth rates. Real gross domestic product (GDP) grew at the rate of 4.6% in 1957 but fell to 3.7% in 1958. This was followed by two years of substantial growth rates of 4.1% and 4.4% in 1962 and 1963 respectively (World Bank Report, 2008). Ghana was ahead of many developing

countries in the 1960's. The years 1960 to 1964 saw relatively high growth, induced by favourable export performance and rapid industrialization as a result of import substitution policies (World Bank country brief, 2008). Average incomes were high (per capita income was the highest £70 compared with £29, £56 and £25 for Nigeria, Egypt and India respectively). There was also an absence of balance of payments, a sound budgetary situation and a well-functioning public administration system (www.worldbank.com; Fosu 2003).

Unfortunately, this impressive beginning started to dwindle. The Ghanaian economy began to experience a slowdown in GDP between 1964 and 1983. In the years 1966, 1972, 1975 to 1976 and 1980 to 1983, the growth rates were negative. These trends have been attributed to inappropriate domestic policies coupled with external shocks (drought in 1975- 1977 and 1981-1983) which led to a severe deterioration in the economic growth performance. The internal factors included inappropriate fiscal and monetary policies. These resulted in large fiscal deficits, which was solely financed by borrowing from the domestic banking system and gave rise to high rates of inflation, as well as overvalued exchange rates in a fixed exchange rate regime. Extreme government involvement in the economy as well as expansion of a large number of state enterprises, (which were non-performing) and the imposition of price controls which discouraged production, while giving excessive profits to the unregulated small-scale trading sector, reinforced the degenerating growth trends. As a result, the incentive to produce, save and invest reduced drastically. The external factors involved unfavourable terms of trade and adverse weather conditions (especially the drought of the late 1970s and early 1980s) which further worsened the situation. The instability of commodity prices on the international market exposed the economy to an unreliable and fragile source of earnings; not to mention the political instability and its devastating effects on the economy (Kusi, 1991).

Faced with these severe economic crises, the government of Ghana was convinced of the need to pursue fundamental reforms that would change the structure of the economy. In April 1983, the government launched the Economic Recovery Programme (ERP) and later Structural Adjustment Programme (SAP) as the first in a series of strategies aimed at reversing the economic turmoil with the support of the World Bank (WB) and the International Monetary Fund (IMF). The

Economic Recovery Programme (ERP) focused on the use of macroeconomic policy tools to address the imbalances and the distortions in the economy. For instance, the programme established production targets and investment priorities that rejuvenated the economy and brought about intense economic expansion over the period 1983 to 1991.

However, the performance of the economy slipped in 1992 when large fiscal imbalances resulted in heightened inflation and currency depreciation. Within this context, there was the need to consolidate economic gains, which includes the improvement of the coordination of economic management as well as the addressing of poverty issues in a systematic manner (The State of the Ghanaian Economy, 1992).

The development of Ghana's Vision-2020, presently vision 2015, was in reaction to the need to ensure long-term growth to avoid the drastic drop in living conditions, by addressing the issue of poverty in an integrated manner and improving the management of the economy to place the nation on a path of sustainable growth (Vision 2020 Report, 1995; GPRS II Annual Progress Report, 2007).

In 2000, the stagnating growth was worsened by a downturn in the prices of the country's major exports and crude oil price shocks. As a result, real output growth slowed to 3.7% and macroeconomic risk worsened. A new political administration in 2001 saw the re-emergence of deeper market reforms and the adoption of the enhanced Heavily Indebted Poor Countries (HIPC) initiative which led to significant debt reliefs; while at the same time, the prices of key exports for Ghana began to strengthen. These led to an improvement in real output growth since 2001, with sustained increases from 4.2% in 2001 to 6.4% in 2008.

At present, the economy is characterized by: (a) market-determined and private sector oriented policy framework; (b) divestiture of state enterprises and restructuring of public sector administration; (c) sector deregulation and opening-up to private investment; (d) dependence on

mainly two export commodities (cocoa and gold) and; (e) adoption of social policies aimed at reducing poverty and improving equal opportunities.

Nonetheless, Ghana's current growth levels cannot significantly lower poverty within the context of the Millennium Development Goals (MDGs); and much higher growth is needed if the country is to attain middle income status by 2015. Given the large number of poor countries in the world, including Ghana, which is not currently growing much, knowing what a country can do to grow faster is vital.

1.2. Statement of the Problem

After independence in 1957, the immediate challenge that faced the Ghanaian economy was how to accelerate economic growth in order to help reduce extreme poverty, improve health care, overcome illiteracy, strengthen democratic and political stability, improve the quality of the natural environment, diminish the incidence of crime and violence, and become an investment destination of choice for global capital, all other things being equal (GPRS II Annual Progress Report, 2007). Long-term broad-based economic growth is essential for Ghana to increase incomes and enable Ghana to reach its potential of becoming a significant trade and investment partner in the world (GPRS II Annual Progress Report, 2007). While rapid growth in China, Malaysia and India for instance, have lifted millions beyond subsistence living, Ghana and many other African countries have however experienced the opposite by recording low growth rates and even in some years recorded negative growth rates in the 1970s, 1980s, and the early 1990s (The Global Social Change Research Project, 2007).

In 1991, Ghana launched the vision 2020 programme, with the aim of becoming an upper middle income country by the year 2020 with an average growth rate of 8% for the period (Vision 2020 Report, 1995). Specifically, gross domestic product was expected to grow between 7.1% and 8.3% in the period 1996 to 2000. However, the actual growth rate was only between 4.2% and 5.0%. Ghana presently aims at becoming a middle income earning nation by the year 2015, that

is, only in six years' time to come. This goal can only be a reality if there is a high and a sustainable rate of growth above 8.5% annually (GPRS II Annual Progress Report, 2007).

From the early 1990s, the growth rates in Ghana have been registering positive values. The average growth rate from 1990 to 2008 was approximately 5% (Computed from the State of the Ghanaian Economy, 1990-2008). However, these impressive growth records between the 1990s and 2008 as compared to the earlier growth records of the Ghanaian economy in the 1960s, 1970s and 1980s, are deemed inadequate to move the economy to the targeted middle income (a per capita income of US\$1000 from the low level of US\$380 per capita in 2005, Government of Ghana, 2005) status by the year 2015. This is because, based on the current growth records (1990-2007), Ghana can only double its real GDP growth by the year 2023 approximately. That is, by the rule of 72, Ghana has fourteen years to reach the goal attainment year, all other things being equal (the rule of 72 means dividing the annual growth rate into 72 to approximate the doubling time). This implies that there is an urgent need to boost GDP growth in Ghana for the attainment of the international development goals by the year 2015. This requires policies that can push GDP growth above 8-10% over the medium to long term, which can only be done if policymakers understand the determinants of growth, as well as how policies affect growth.

Unfortunately, there have not been thorough studies on the determinants of economic growth in Ghana, as well as on specific areas that most policies and strategies should be geared towards in order to achieve the desired rate of growth and even if there is, according to Easterly (2001), over the last decades the issue of economic growth has attracted increasing attention and empirical research. Yet the process underlying economic performance and growth is poorly understood. It also seems there is no specific model for Ghana, hence the need to develop one by ourselves. The country has adopted models of growth presented by IMF, World Bank and other institutions which have been heeded, but the country still remains at the stage of underdevelopment.

Consequently, failure in the understanding of the causes of economic growth and prosperity has caused massive political, economic and social upheaval in the Ghanaian economy. As a result, many questions have arisen. For instance, what are the macroeconomic determinants that would drive Ghana's real GDP per capita growth to attain the targeted middle income status by the year 2015? In other words, what factors are important in explaining long-term growth in Ghana? In which ways would these factors influence economic policy formulation and implementation?

In this regard, this study seeks to critically analyze the macroeconomic determinants of economic growth in Ghana using the neoclassical growth model by applying the Johansen approach to cointegration which was developed by Johansen (1988); and thereby determine the extent to which capital stock, labour stock and other determinants of interest based on theoretical and empirical grounds, are contributing to the real GDP per capita growth within the context of the neoclassical school, both in the long-run and the short-run. It is only by studying the sources and causative factors of economic growth that policy makers can be moved to embark on the proper paths to achieve rapid, sustainable, broad-based economic growth, and prosperity in Ghana, hence, the need for this study.

1.3 Objectives of the Study

The main objective of this study is to examine the major macroeconomic determinants of economic growth in Ghana between the periods 1970 and 2007 applying the Johansen method of cointegration developed by Johansen (1988). In order to achieve this broad objective, the thesis is specifically designed:

- I. to examine the major macroeconomic determinants of real GDP per capita growth in Ghana and
- II. to recommend actions that must be taken to speed up the process of economic growth and prosperity in Ghana.

1.4 Hypotheses of the Study

The following hypotheses are being tested:

- I. physical capital does not have a positive relationship with economic growth in Ghana.
- II. labour force does not have a positive relationship with economic growth in Ghana.
- III. foreign direct investment does not have a positive relationship with economic growth in Ghana.
- IV. foreign aid does not have a positive relationship with economic growth in Ghana.
- V. inflation does not have a negative relationship with economic growth in Ghana.
- VI. government expenditure does not have a negative relationship with economic growth in Ghana.

1.5 Significance of the Study

This study is important because:

- I. it augments the relatively scarce empirical literature on the major sources of economic growth in Ghana. Thus, this work is meant to help close the empirical literature gap on this subject matter.
- II. it would help to understand the factors that determine economic growth in Ghana.
- III. it would enable policy makers to come out with appropriate public policies that would improve upon the growth of the whole economy in terms of policy formulation and implementation. In other words, the study's result is highly relevant in the formulation and implementation of effective policies to promote growth with equity. Simply, this study would help policy makers to know the major macroeconomic determinants of economic growth in Ghana and then know the measures to adopt to accelerate economic growth and hence reduce poverty.
- IV. it proves the existing knowledge of economic growth – determinant relationship.

- V. it would be a source of information to potential private investors. For example, if this study identifies foreign direct investment (FDI), as a significant and a major contributory factor to GDP growth, it would signal potential investors, that the political and economic atmosphere in Ghana is good for business. As such, potential investors would come and invest in the economy. This would help boost GDP growth as the investors come in with their technologies, expertise and other resources. The outcome would be increased employment opportunities in Ghana and hence improvement in the living standards of the people.
- VI. the findings would probably provoke further research in relation to this study.

1.6 Scope of the Study

The study uses time series data from the period 1970 to 2007 where the study specifies the growth model incorporating physical capital, labour force, foreign direct investment, foreign aid, inflation and government expenditure. The period of study (1970-2007) was chosen due to these reasons: Economic crisis, initiation of the economic recovery programme, initiation of the structural adjustment programme, adoption of economic liberalization, passage of the investment act, beginning of multiparty democracy, adoption of privatization and globalization of the economy in this period. Other reasons include: liberal economic reforms, good governance, signing of the Millennium Challenge Corporation Compact, the intense economic expansion and socio-economic and political stability of the economy, since the 1990s and the availability of data for each of the variables considered over the study period. The extent of the analysis will only be on the macroeconomic determinants of economic growth in Ghana and an examination of their relative importance to real per capita GDP growth in Ghana.

1.7 Limitations of the Study

The main limitation of the study has to do with the quality of the data set employed. Since the data is secondary, its accuracy cannot be guaranteed. This problem is compounded by the complexities involved in gathering data in Ghana. According to Kholdy (1995), “data compiled

in most developing countries is inaccurate and may therefore bias the empirical results”. The approximations done in the computations of the data set, though painstaking effort was made at minimizing the errors and effects herein, have the likely effect of affecting its validity/consistency with reality. The study also employed the Johansen approach to cointegration to establish long-run and short-run relationship among the variables of interest. The limitation of this method of cointegration analysis is that, it does not have good small sample size properties (Pesaran, et al., 2001). Also, the period of the study has so many structural breaks like different exchange rate regimes, military regimes, etc. Therefore, any analyses and conclusions drawn from this work takes due recognition of these limitations. The time factor as well as financial resources cannot be excluded from the list of constraints to this study.

1.8 Organization of the Study

The study is organized into six chapters. The first chapter takes into consideration the following: background, problem statement, objectives, hypotheses, significance, scope, limitations and the organization of the study. Chapter two undertakes a review of relevant and existing literature on economic growth which includes: the theories/models of economic growth, determinants of economic growth and empirical review on the sources of economic growth. The third Chapter discusses the growth experience and the political situations in Ghana over the study period while chapter four describes how the whole study would be carried out. Thus, it outlines the method of study, the specification of the model, justification of the variables and the estimation procedures. Chapter five treats the analysis of data and the interpretation of results and finally, chapter six summarizes the main results and recommends actions that must be taken to speed up the economic growth process in Ghana.

To conclude, this chapter identified the major problem of the study; that is, ascertaining the macroeconomic determinants that would drive Ghana’s real GDP per capita growth to attain the targeted middle income status by the year 2015. As such, the main objective of the study is to examine the major macroeconomic determinants of real GDP per capita (economic growth) in Ghana for the period 1970 to 2007 using the Johansen approach of cointegration and to

recommend action(s) that must be taken to speed up the process of economic growth and prosperity in Ghana.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The problem of the study is ascertaining the macroeconomic determinants that would drive Ghana's real per capita GDP (economic growth) towards the attainment of the targeted middle income status by the year 2015 and also determine which ways these determinants influence economic policy formulation and implementation. It is only by studying the sources and causative factors of economic growth that can move policy makers to embark on the proper paths to achieve rapid, sustainable, broad-based economic growth and prosperity in Ghana. This chapter consists of relevant and existing literature on economic growth (theoretical and empirical) both in the context of developed and developing countries to date that attempts to focus on the key determinants of economic growth. This section presents a brief review. The review is based on: The concept of economic growth, challenges of the definition of economic growth, origins of the concept of economic growth, models of economic growth, determinants of economic growth and empirical literature review on the sources of economic growth in the developed world, the developing economies and Ghana.

2.1 Theoretical Literature Review

2.1.1 The Concept of Economic Growth

Economic growth has been the concern of many governments globally. This is because it is a phenomenon in human civilization. There have been a number of hot debates and discussions on how economies could grow, among policy makers in advanced countries as well as in developing nations like Ghana. The reason might be due to the fact that without economic growth, economies could stagnate and nations would be unable to provide for the wellbeing of their citizens. One might even ask what economic growth is.

A number of solutions could be sourced from Whitehead (1970), Spencer, et al. (1993), Johnson (2000), Dornbusch, et al. (1994), Samuelson, et al. (2001), McConnell, et al. (2002), Godwin (2007) and the investment dictionary.

Economic growth refers to the increase (or growth) of a specific measure such as real national income, gross domestic product, or per capita income. National income or product is commonly expressed in terms of the aggregate value-added output of the domestic economy called gross domestic product when the GDP of a nation rises, economists refer to it as economic growth (Conteras, 2007).

Whitehead (1970) defines economic growth as an increase in the national income in real terms, not monetary terms; so that there will be more goods and services available.

Spencer, et al. (1993) also define economic growth as the rate of increase in an economy's full – employment real output or income overtime. Stated differently, economic growth is the rise in an economy's full employment output at constant prices.

Johnson (2000) defines economic growth as that part of economic theory that explains the rate at which a country's economy grows over time. It is usually measured as the annual percentage rate of growth of the country's major national income accounting aggregates, such as the gross national product (GNP) or the gross domestic product (GDP) with appropriate statistical adjustment to discount the potentially misleading effects of price inflation.

Dornbusch, et al. (1994) state that, economic growth focuses on the expansion of productive capacity over time. The expansion of productive capacity requires an increase in natural resource, human resource, capital and technology. Thus economic growth is due to growth in inputs, such as labour, capital and technological improvement.

Samuelson et al. (2001) define economic growth as an expansion of a country's potential GDP or national output. This means that economic growth occurs when a nation's production possibility frontier shifts outward.

Economic growth is a dynamic process in which the supply, demand and efficiency factor all interest (McConnell, et al., 2002).

Godwin (2007) defines economic growth as an increase in real gross domestic product (GDP). That is, gross domestic product adjusted for inflation.

The Investment dictionary defines economic growth as an increase in the capacity of an economy to produce goods and services, compared from one period of time to another.

Economic growth generally, can be described as a positive change in the level of production of goods and services by a country over a certain period of time. In other words, economic growth is the increase in the value of goods and services produced by an economy. It can also be referred to as the increase in the gross domestic product. It is a relatively straight forward measure of output and gives an idea of how well off a country is, compared with competitors and past performance. It is a beacon that helps policy makers steer the economy towards key economic objectives. Finally, it is a measure of the wellbeing of a state; usually in real terms, all other things being equal.

2.1.2 Challenges of the Concepts of Economic Growth

The definitions of economic growth have been criticized on a number of grounds. The criticisms could find explanations in the (i) rate of population, (ii) type of goods and services produced, (iii) type of technology used and (iv) income distribution (Fosu, 2003; Elwell, 2006).

Population increases may offset economic growth, thus the output of goods and services may rise but the number of people may also increase. If the economy and the population, both grow at the same rate, the national per capita income will not change. Economists would not consider this as economic growth. It is only when the growth in national output is faster or higher than the growth in population that the national per capita income increases (Fosu, 2003; Elwell, 2006).

Secondly, economic growth is simply an increase in the amount of goods and services in the country. As to whether the increase of goods and services benefit majority of the population or not, is unknown. This depends on the composition of the goods and services. The increase may comprise military hardware, goods and services for refugees outside the economy, or building presidential palaces which may not benefit the masses directly. In this case, most people may not be better off as compared to output made up of basic foodstuff and low-cost housing provision (Fosu, 2003; Elwell, 2006).

Economic growth tells us nothing about the way the increases in productivity come about. It may result from a capital intensive method of production, leaving majority of the population unemployed, hence rendering many people impoverished. This may nullify the effects of economic growth (Fosu, 2003; Elwell, 2006).

Economic growth per capita is only an average figure which simply means that everybody's income has risen at that rate. The income distribution might be skewed with few people highly rich and majority in abject poverty. In this case, larger income may go to the pockets of the few rich, who may be foreigners who usually repatriate their incomes and would not benefit the people and for that matter the economy as a whole. For the economy to grow meaningfully, the increases in output and income must be fairly and widely distributed among the majority of the people. This should be the paramount concern of policy makers (Fosu, 2003; Elwell, 2006).

In conclusion, even though the definitions of economic growth have been criticized on a number of grounds, it is still a good indicator of how well an economy is performing (Kuznets, 1957).

2.1.3 Origins of the Concept of Economic Growth

In the late 1370's, some people in Western European nations began conceiving the idea that economies could "grow", that is, produce a greater economic surplus which could be expanded on something other than religious or governmental projects (such as road construction, railway

construction, building of dams for electric power, building of schools and hospitals) ([http: en.wikipedia.org/wiki/Economic-growth](http://en.wikipedia.org/wiki/Economic-growth)). The previous view was that, only increases, either in population or tax rates could generate more surplus money for the country. During much of the “Mercantilist” period, growth was seen as involving an increase in the total amount of species that is the circulating medium such as silver and gold, under the control of the state. This “Bullionist” theory led to policies to force trade through a particular state, the acquisition of colonies to supply cheaper raw materials which could then be manufactured and sold.

Later, such trade policies were justified instead, simply in terms of promoting domestic trade and industry. The post-Bullionist insight saw the increasing capability of manufacturing which led to policies in the 1700’s to encourage manufacturing in itself and the formula of importing raw materials and exporting finished goods. Under this system high tariffs were erected to allow manufacturers to establish “factories” (The word comes from “factor”, the term for someone who carried goods from one stage of production to the next). Local markets would then pay the fixed costs of capital growth, and then allow them to be exported abroad, undercutting the prices of manufactured goods elsewhere. Once competition from abroad was removed, prices could then be increased to recoup the costs of establishing the business (<http://en.wikipedia.org>).

Under this theory of growth, the road to increased national wealth was to grant monopolies, which would give an incentive to an individual to exploit a market or resource confident that he would make all of the profits when all other extra – national competitors were driven out of business. The “Dutch East India Company” and the “British East India Company” were examples of such state – granted trade monopolies.

It should be stressed that Mercantilism was not simply a matter of restricting trade. Within a country, it often meant breaking down trade barriers, building new roads, and abolishing local toll booth, all of which expanded markets. This corresponded to the centralization of power in the hands of the crown (or “Absolutism”). This process helped produce the modern nation – state in West Europe.

Internationally, Mercantilism led to a contradiction. Growth was gained through trade, but to trade with other nations on equal terms was disadvantageous. This along with the rise of nation-state encouraged several major wars.

The modern concept of economic growth began with the critique of Mercantilism, especially by the physiocrats and with the Scottish Enlightenment thinkers such as David Hume and Adam Smith, and the foundation of the discipline of modern political economy. The theory of the physiocrat was that productive capacity itself, allowed for growth, and the improving and increasing of capital led to “the Wealth of nations”. They stressed the importance of agriculture and saw urban industry as “sterile”. Smith extended the notion that manufacturing was central to the entire economy.

David Ricardo (1772) would then argue that trade was a benefit to a country, because if one could buy a good more cheaply from abroad, then it meant that there was more profitable work to be done. This theory of “comparative advantage” would be the central basis for arguments in favour of free trade as an essential component of growth.

This notion of growth as increased stocks of capital goods (means of production) was codified as the Solow (1956)-Swan (1956) Growth model, which involved a series of equations that showed the relationship between labour-time, capital goods, output, and investment. In this modern view, the role of technological change became crucial, even more important than the accumulation of capital.

The late 20th century, with its global economy of which a few very wealthy nations, and many very poor nations, led to the study of the transition from substance and resource-based economies to production and consumption based economies occurred. This led to the field of Development economics as a subject, including the work of Amartya Sen and Joseph Stiglitz.

From the above discussion, it could be said that economies could grow depending on these factors: (i) increase in population, (ii) increases in tax rates, (iii) international trade (manufacturing output), (iv) technological change, (v) capital accumulation, (vi) labour productivity and (vii) agricultural output, all other things being equal.

2.2 Models of Economic Growth

Following from the origins of the concept of economic growth are the growth models. Economists have been trying to understand why and how poor countries become rich and rich countries become richer since the time of Adam Smith in the eighteen century. Four main models have been proposed. They are: (i) Classical Growth Models, (ii) Keynesian Growth Model, (iii) Neoclassical Growth Model and (iv) Endogenous Growth Model.

2.2.1 Classical (or Pre-Keynesian) Growth Models

The first work in economic theory which deals with the issues of economic growth is the work by Adam Smith titled: *“Inquiry into the Nature and Cause of the Wealth of Nations”* (1776). He explained that the output depends on the amount of input (labour, capital and land) and the output growth is determined by the population growth, increase in investments, land and the total labour productivity growth. The main factor of economic growth was the division of labour, which leads to the output growth, technical progress and accumulation. According to Smith, the division of labour is limited by the market dimension. If the division of labour increases than the output, then it increases the market dimension and induces further division of labour and as a result brings about further economic growth.

Another factor which stimulates economic growth according to Smith is capital accumulation. It is based on saving of mainly capitalists. For that reason Smith considered income division as one of the most important determinants of rapid economic growth.

Smith (1776) promoted free competition which has its own self-regulating mechanism and can lead to optimal resource allocation. He was aware of the fact that an economy can work only if the social, institutional and legal framework exists and works. Smith approved the necessity of state interventions to market economy, for example, tariff protection of immature branches. He also defined the substitutability of state roles in security sphere, justice and public activity.

David Ricardo (1772) and Thomas Robert Malthus (1798) took up Adam Smith's (1776) theory in the first half of the 19th century. They implemented the law of decreasing returns to the theory of economic growth. At the end of the 1920s, the theory of growth was enriched by Ramsey's "*inter temporal optimization of households' behaviour*". The idea was accepted in the 1960s.

2.2.2 Keynesian Growth Model

Keynesian growth theory is mainly connected with Roy. F. Harrod (1939) and Evsey Domar (1946). These neo-keynesian economists tried independently to dynamize Keynesian theory. The theory is based on the active role of money, the principles of effective demand and on the saving function respectively, the transition of saving to investments and multiplication effect. In his scientific work Harrod (1939) started from the accelerator principle and Domar (1946) started from the multiplication effect. Despite the different approaches, they came to the same conclusion that the rate of growth of output is determined jointly by the national savings ratio and national capital output ratio. In economic literature their theory appears as Harrod-Domar Keynesian theory of growth or simply, Harrod-Domar growth model (Harrod, 1939; Domar, 1946).

The Harrod-Domar growth model shows through a mathematical equation, the existence of a direct relationship between savings and the rate of economic growth. The model, which attempts to integrate Keynesian analysis with the element of economic growth, assumes that economic growth is a direct result of capital accumulation in the form of savings. In addition, the Harrod-Domar growth model assumes a fixed coefficient production function and constant returns to scale.

To illustrate the Harrod-Domar growth model, savings (S) is some proportion (s) of national income (Y) such that:

$$S = sY \dots\dots\dots (1)$$

Investment (I) is defined as the change in capital stock (K) and can be represented by ΔK such that:

$$I = \Delta K \dots\dots\dots (2)$$

Total capital stock (K) is directly related to national income (Y) as represented by the capital output ratio (k) such that:

$$K/Y = k \dots\dots\dots (3)$$

The capital output ratio can be written in its marginal value as:

$$\Delta K/\Delta Y = k \dots\dots\dots (4)$$

This is popularly known as the incremental capital-output ratio. Since the equilibrium saving (S) must equal total investment (I), it follows that:

$$sY = k\Delta Y \dots\dots\dots (5)$$

In a more familiar expression,

$$\Delta Y/Y = s/k \dots\dots\dots (6)$$

This equation tells us that that the rate of growth of output is determined jointly by the national savings ratio (s), and the national capital output ratio (k). It also says that the growth rate of national income will be directly related to the saving ratio and inversely related to capital-output ratio (Maier, et al., 2007).

The Harrod-Domar growth model has been used by development economists to estimate the financing gap of a developing economy. Assuming that there is abundant supply of labour, they claim that scarcity of capital is the only constraint to production (Effendi, 2001). The model itself predicts that growth will be proportional to the rate of investment. That is, growth will be

equal to investment divided by the Incremental Capital Output Ratio. If a target growth is set, the required investment to meet this target can be estimated by multiplying the target with the incremental capital output ratio (Maier, et al., 2007). The financing gap is thus, the gap between the available financing for investment and the required investment. By filling this gap with imported foreign debt or aid, developing countries will get the required investment that will yield the target growth rate. Empirical evidence does not, however, support this theory because the massive external debt that has accumulated in developing countries since the 1960s was not accompanied by an increase in per capita income (Maier, et al., 2007; Fosu, 1996).

This model is particularly criticized for not defining the mechanism which is used to establish equilibrium in an economy. It is based on a production function with constant coefficient. It does not consider the substitution of capital and labour. Its general methodological framework does not provide the possibility to analyze the influence of technical progress, money and other important aspects (<http://cepa.newschool.edu/het/essays/growth/keynesgrowth.htm>). These weaknesses have made economists to pay less attention to the Harrod-Domar growth model in favour of growth models that are less rigid and empirically more applicable. Despite these flaws, the Harrod-Domar growth model was very popular after the great depression until the early 1950s and has generated many papers in the field of economic growth (Maier, et al., 2007).

The Post Keynesians (for example, Kaldor, 1955; Pasinetti, 1962; Robinson, 1962) tried to supplement Harrod-Domar model with the mechanism of establishing equilibrium. Their approach was significantly influenced by the rate of savings which is derived from the division theory. Post Keynesian includes supply side and monetarist ideologies.

The Supply side economists (for example, Robert Mundell and Arthur Laffer) argue that growth can be most effectively created using incentives such as adjusting income tax and capital gains, tax rates and by allowing greater flexibility by reducing regulation. This will enable people to produce (supply) goods and services. In effect, consumers will then benefit from a greater supply of goods and services at lower prices. They also argue that the size of the economic growth

would be significant enough if government revenue from a faster growing economy would be sufficient to compensate completely for the short term costs of tax cut and that tax cuts could in fact cause the overall revenue to increase (<http://en.wikipedia.org/wiki/supply-side-economics>).

The Monetarists focused on the macroeconomic effects of a nation's money supply and its central banking institution. They focused on supply and demand for money as the primary means by which economic activity is regulated. Milton Friedman argued that excessive expansion of the money supply will inherently lead to price inflation and that monetary authorities should focus solely on maintaining price stability to enhance general economic health. Monetarism proposes that the growth of the money supply should be regulated to increase parallel to the potential growth of the Gross Domestic Product (GDP), and that this will stabilize prices ensuring healthy economic growth with low inflation (www.newworldencyclopedia.org).

2.2.3 Neo-Classical Growth Model

The classical and the neoclassical growth theories differ from each other in a number of ways. They differ in terms of their themes in analyzing an economy, methodology, and value theory. However, the distinction in this study is based on only their theme in analyzing an economy. The Classical growth model predicts that the economy will stagnate under the pressure of population growth. It implies that the richest nations will be the ones with the fastest growth and therefore they will be the first to stagnate. On the other hand, the neoclassical growth model predicts that the economy will grow and at a rate that is determined by the pace of technological change. All economies have access to the same technologies, and capital is free to roam on the globe seeking the highest available profits. So, neoclassical model predicts that national levels of real GDP and national growth rates will converge (www.newworldencyclopedia.org).

The neo-classical theory of growth was developed during the 1950s and 1960s. The neoclassical growth theory is a build-up of the classical growth theory used before Keynes and his followers. The most known neo-classical model is the Solow-Swan (1956) model. The model tries to explain the output determination using reciprocal interaction of capital, labour and technology. In

case there is no technical change, the model defines conditions which need to be fulfilled to produce constant output per capita. If the population is increasing, the savings should cover new population members by capital per capita in the economy. The product level in steady state is determined by the amount of savings and the population growth. If the technological change is absent, the total output growth rate in steady state is equal to population growth rate. The increase in savings rate leads to a temporary increase in output growth, but the new steady state remains without changes and the output level per capita (living standard) is higher (<http://cepa.newschool.edu/het/essays/growth/neoclass/solowgr.htm>).

In other words, the Solow model implies that if a country's national saving rate rises, growth will temporarily rise above its long-run rate as the economy shifts to its new equilibrium. However, long-run equilibrium growth is independent of the savings rate or the population growth rate. If all countries have access to the same technology, all should have the same steady-state (long-run) growth rate. If a country raises its investment rate, it will experience a period of higher than normal growth as the economy adjusts to its new, higher growth path; but once the adjustment has occurred, growth will revert to steady state level.

If the technical progress exists (which is considered as an exogenous variable in the model), the steady state output per capita grows at a rate responding to technical progress growth. The total output rises at the rate equal to the sum of technical progress growth rate and population growth rate. The output growth is an exogenous variable in the neoclassical theory.

The next conclusion of the model concerns convergence. If two countries indicate the same population growth rate, the same savings rate and work with the same production function, they finally reach the same level of output. These theories prove that small countries are small because they hold less capital.

If the countries hold different savings rate, they reach different output levels in steady state. In case their technological progress rate and population growth rate are identical, their output

growth rates will be the same in steady state (Dornbusch and Fischer, 1994). The above mentioned conclusions of the Solow model were not fully proven by the long-term world economic development. Therefore, for the neoclassical growth theorist, long-term per capita growth is determined by the capital/labour ratio, human capital accumulation and the pace of technological progress (<http://cepa.newschool.edu/het/essays/growth/neoclass/solowgr.htm>). For a formal exposition, the standard production function in neoclassical growth model is:

$$Y = Ae^{\mu t} K^{\alpha} L^{1-\alpha} \dots\dots\dots (7)$$

where,

Y is gross domestic product;

K is the stock of human and physical capital;

L is unskilled labour;

A is a constant reflecting the base level of technology and

e^{μ} represents the constant exogenous rate at which technology grows.

(Maier, et al. (2007)

In this formula, α represents the elasticity of output with respect to capital, which is the percentage increase in gross domestic product from a percent increase in capital. Empirical, α is measured as the share of capital in a country's national income account. This formulation of the neoclassical growth model yields diminishing returns to capital and labour since α is assumed to be less than one and private capital is assumed to be paid its marginal product. Growth in per capita will continue and will be equal μ , which is the annual rate of productivity improvement. The constant, μ can be interpreted in several ways such as the improvement of organizational knowledge, rearrangement of the flow of materials in a factory, or better management in inventory (Maier, et al., 2007).

Another important neoclassical growth model, beside the Solow-Swan model, is the Ramsey model. The Ramsey model is a refinement of the Solow-Swan model. Chronologically, Ramsey's growth theory was developed before Solow-Swan's. In literature, his model is usually put after the Solow-Swan's model. One of the key features in Ramsey's model is the assumption that households optimize their utility over time. This assumption importantly makes the model dynamic. Using Ramsey's model as their starting point, Cass (1965) and Koopmans (1965) recast the saving rate that is exogenous under Solow-Swan model as endogenous. Even though this is considered a refinement of the neoclassical growth model, it does not eliminate the dependence of the long-run growth rate on exogenous technological progress. The works of Cass and Koopmans (1965) mark the end of the basic neoclassical growth model era (Maier, et al., 2007).

Though the neoclassical growth model is intuitively plausible, it has at least two drawbacks. First, it does not explain what determines technological change because it is completely independent of the decision of economic agents. Secondly, the theory fails to explain large difference in residuals across countries with similar technologies, hence the emergence of the endogenous growth model.

(Maier, et al., 2007; <http://cepa.newschool.edu/het/essays/growth/neoclass/solowgr.htm>).

2.2.4 Endogenous Growth Model

Non-convergence of economic growth in a long-term development in the world and a decreasing rate of average labour productivity in advanced market economies in the 1960's and 1970's were the main reasons for a follow-up interest in investigating the issues of long-term economic growth. The interest leads to attempts to endogenise factors of growth in economic theory. The aim was to endogenise technological progress in economic growth models. It means to let it be determined by interaction in the model itself. The same applied to determining the labour force growth.

The endogenous growth model is similar to the neoclassical growth model but they differ considerably in their underlying assumptions and conclusions. Three distinctions between the

two are obvious: (1) first, the neoclassical assumption of diminishing marginal returns to capital is discarded. Second, the model also envisages increasing returns to scale in aggregate production, and third, the model recognizes the role of externalities in determining the rate of return on capital (Maier, et al., 2007).

The first ideas of new endogenous growth theory appeared in Paul M. Romer's work on the "Increasing Returns and Long-Run Growth" in 1986 and Robert E. Lucas' work on the "Mechanics of Economic Development" in 1988. The works and papers by S. Rebelo (1991) followed the work by Arrow, Sheshinski and Uzawa from the 1960s. These economists focused mainly on conception and possibilities of measuring capital, which is defined to include physical as well as human capital. They came to the conclusion, that the revenues from the capital which is defined this way do not necessarily embody the decreasing trend. The factors of economic growth are positive externalities from human capital and knowledge transfer between producers who decelerate the decreasing returns from accumulated capital.

The second trend in the development of new endogenous growth theory is linked with explicitly involved research and development (R and D) and imperfect competition. The conception can be followed in Romer's work in 1987, Grossman and Helpman (1992) and Aghion and Howitt (nd). Technical progress is an effect of a targeted research and development. The gratuity for R and D is derived ex-post from its monopoly position. Technical progress and economic growth are an endogenous effect of imperfect competition and not some forces outside the system.

The theory of endogenous economic growth highlights the governmental policy, particularly the tax system. There should be tax incentives for research and development and the development of new technologies, intellectual property rights and their protection, law eligibility, the infrastructural development, the human capital investment support, foreign trade regulation and so on. R. Barro and X. Sala-i-Martin (1995), M. Obstfeld and K. Rogoff (1996) and others support this approach (<http://en.wikipedia.org/wiki/Economic-growth>).

The endogenous growth theory can be expressed in a simple equation:

$$Y = AK \dots\dots\dots (8)$$

where,

A can be interpreted as any factor that affects technology and;

K represents both human and physical capital.

(Maier, et al., 2007)

Notice here that there are no diminishing returns to capital, a feature that can be achieved by invoking some externality that offsets any propensity to diminishing returns. Investment; whether physical investment by a firm or human investment by an individual, leads to an increase in productivity that exceeds private gain. This model leaves open the possibility that an increase in the investment rate, either in physical or human capital, can lead to sustained growth if strong external economies are generated by investment itself so that α in the neoclassical model becomes unity (that is $\alpha = 1$).

In this case, the equation:

$$Y = Ae^{\mu} K^{\alpha} L^{1-\alpha} \dots\dots\dots (9)$$

reduces to the endogenous equation:

$$Y = Ae^{\mu} K \dots\dots\dots (10)$$

The net result is sustained long-run growth resulting from increasing returns to scale. This model offers an alternative to the diminishing returns and absence of any sustained impact on growth that is characteristic of the basic neoclassical growth model (Maier, et al., 2007)..

Another way of obtaining an equation like $Y = AK$ is to postulate that an increasing variety or quality of machinery or intermediate inputs offsets the propensity to diminishing returns. To summarize, in endogenous growth models diminishing returns does not occur or if it does, it is offset by some other forces (Maier, et al., 2007). In the endogenous growth model, diminishing returns does not occur because of new knowledge, innovation and the quality of institutions (Roger, 2003).

Endogenous growth theory can help explain anomalous international flow of capital that exacerbate wealth disparities between developed and developing countries. Developing countries potentially have high rate of return on investment due to the law of diminishing returns. However, this is eroded by lower levels of complementary investments in human capital, infrastructure, or research and development. As a result, developing countries benefit less from broader social gains associated with each of these alternative forms of capital expenditure. Endogenous growth model also suggests an active role for public policy in promoting economic development through direct and indirect investment in human capital formation and foreign private investment (Maier, et al., 2007).

The endogenous growth model has some drawbacks. The model does not predict convergence either in absolute or conditional. It also remains dependent on a number of neoclassical assumptions that are often inappropriate for LDC economies. Finally, the model has limited empirical support (Maier, et al., 2007).

To sum up, apart from the Classical (or Pre-Keynesian) Models, the Keynesian Model, the Post-Keynesian Models, the Neo-classical Growth Model and the Endogenous Growth Model, other growth models that exist in the growth literature are the Basic Needs Approach (BNA), Structuralism, and Capability Approach (AC).

2. 3 Determinants of Economic Growth

In view of the discussions of the origins of the concept of economic growth, the models of economic growth and other academic literature on economic growth, this section focuses on the variables mentioned below as the main macroeconomic determinants of economic growth in this particular study.

Natural resource (arable land, oil and gas, forests, water, soil and climate, fuel, mineral resource and environmental quality) is one of the major sources of economic growth according to the classical school. Natural resource abundance (measured as the share of exports of primary products in GDP) negatively affects growth through several channels. The reasons are that natural resource abundant countries tend to exhibit the Dutch-disease syndrome in terms of overvalued exchange rates, and hence the difficulty to develop a profitable export-oriented or import-competing manufacturing sector. Resource-rich countries are also associated with wasteful consumption and poor public investment behaviour, and provide incentives for rent seeking and other unproductive activities. In addition, it is widely observed that natural resource availability forestalls reform. Finally, the secular decline of world prices of natural resources and their high volatility translates into high uncertainty, which, in turn, impacts negatively on growth (see Sachs and Warner, 1995, 1997; Leite and Weidman, 1999; Rodriquez and Sachs, 1999).

On the other hand, despite the fact that natural resource could be a curse for the long term growth, natural resource may contribute positively to economic growth (see Barro and Sala-i-Martin, 1995). For example, gold export revenues have contributed to the improvement of welfare and helped finance investment in infrastructure and human capital in most gold producing countries like South Africa and Ghana. Finally, a country's natural resources have only a limited effect on economic growth. Countries that lack many of the raw materials necessary to produce output in a modern economy can nonetheless grow rapidly (for example Japan, Singapore, Taiwan, and Hong Kong) and countries that are well endowed with resources often grow slowly (for example Russia, Brazil, Nigeria, Ghana, Venezuela, Saudi Arabia etc) . The explanation for this surprising finding is simply that many natural resources are easy to transport across country borders (Weil, 2005).

According to the classical growth theorists, population growth is one of the factors that determine economic growth. While an economy's absolute productive capacity is directly related to its population size, the law of diminishing returns states that real per capital output will eventually fall if population increases and the quantity of other economic resources remain constant. Based upon the expectation of rapid population increase, early 19th-century economists predicted that population growth would result in economic stagnation and decline in the long-run. For example, the Malthusian theory of population stressed that population would increase at a rate faster than the economy's ability to grow food and that real income would fall to the subsistence level. Also, Solow (1957) and Swan (1956) who developed the first neo-classical models of growth took the rate of growth of population as one exogenous variables in their model to show that the faster the rate of population growth, the poorer the country.

With regards to population density today, we cannot say that poverty is always associated with high population density as some economists, following Malthus' predictions, initially believed. Switzerland, Germany (and in particular the former West Germany) and newly industrialized Asian countries have a high population density but this was not an obstacle to their development. In contrast, many Latin American countries such as Brazil and Mexico have a low population density but this did not bring development (Tridico, 2007).

On the other hand, according to Kuznets (1959), acceleration in the growth of population, provided the rate of growth of per capita output does not decline, would necessarily produce acceleration in the rate of growth of total output and later there would be further acceleration when growth in per capita output quickens. In addition, when both population and per capita output stabilize at a constant rate of growth, total product will also grow at a constant rate. Finally, when retardation in the rate of population growth begins, the growth of total product will be retarded, unless the rate of growth of per capita product begins at that point to accelerate which is highly unlikely.

Investment (measured as the ratio of investment to GDP) is the most fundamental determinant of economic growth identified by both neoclassical and endogenous growth models. However, in the neoclassical model investment has impact on the transitional period, while the endogenous growth models argue for more permanent effects. The importance attached to investment by these theories has led to an enormous amount of empirical studies examining the relationship between investment and economic growth and have identified investment as a key determinant of economic growth (see De Long and Summers, 1991; Levine and Renelt, 1992; Mankiw, Phelps and Romer, 1995). Nevertheless, findings are not conclusive. On the other hand, high investment ratios do not necessarily lead to rapid economic growth. It depends on the effectiveness of the investment made which might be affected by the quality of investment, its productivity, and existence of appropriate policy, political and social infrastructure (see Romer, 1986; Fafchamps, 2000; Artadi and Sala-i- Martin, 2003). Thus, gigantic investment does not guarantee rapid sustainable growth, because only those factors that encourage high-quality investment (for example, stable prices and proper incentives) can be expected to foster growth.

Human capital is the main source of growth in several endogenous growth models as well as one of the key extensions of the neoclassical growth model (see Lucas, 1988; Romer, 1990; Bils and Klenow, 2000). Since the term ‘human capital’ refers principally to workers’ acquisition of skills and know-how through education and training, the majority of studies have measured the quality of human capital using proxies related to education (for example, primary school enrolment ratio, secondary school enrolment ratio, gross school-enrolment rates, index of educational attainment, tests of mathematics and scientific skills, public expenditure on education relative to national income, expected years of schooling for girls, illiteracy rate, highest level of education attained, population growth, expenditure on education, and IQ test).

A large number of studies have found evidence suggesting that educated population is a key determinant of economic growth (see Barro, 1991, 2001; Mankiw, Romer, and Weil, 1992; Miller and Upadhyay, 2000). The large literature on growth stemming from the work of Barro (1991, 1997) found some measure of human capital significant in determining growth. Gemmell (1996) finds both the levels of human capital and their growth rates to be important. Benhabib

and Spiegel (1994) presents evidence, that education influences rates of technological progress. None of these papers address issues of causation. Bils and Klenow (2000) ask if the observed correlation between school enrolments and growth over the period from 1960 to 1990 can be interpreted as causal. They argue that it cannot. In considering the determination of aggregate incomes, as distinct from growth rates, Hall and Jones (1999) argue that “differences in physical capital and educational attainment explain only a modest amount of the difference in output per worker across countries”. The implication of these papers is that low rates of human capital formation are one of the consequences of, for example, poor social infrastructure, not a cause of poor performance.

In a recent contribution Easterly and Levine (2003) argue, along similar lines, that factor accumulation is not the key to growth, but rather human capital (see Becker, et al., 1990; Barro and Lee, 1993, 2000; Levine and Zervos, 1993; Barro and Sala-i-Martin, 1995). In spite of numerous theoretical developments, attempts at empirical verification give contradictory conclusions (see Benhabib and Spiegel, 1994). However, the quality of human capital in general is generated by public investment in education, culture and health services with non-rival consumption and free supply (Teal, 2001). According to Tridico (2007) human capital contributes to economic growth only when it is associated with appropriate governance, captured by political stability and government effectiveness.

Innovation (measured as the share expenditure on research and development in GDP) combined with increase in technological knowledge constitute a sufficient condition for the modern economic growth. This is due to increasing use of technology that enables introduction of new and superior products and processes. This role has been stressed by various endogenous growth models, and the strong positive relation between innovation/ research and development (R and D) and economic growth has been empirically affirmed by many studies (see Grossman and Helpman, 1992; Coe and Helpman, 1993; Ulku, 2004).

Technological progress is another important factor which determines growth. It holds the key to continual economic growth. According to Romer (1986, 1990) and other studies (see Solow, 1962; Lucas, 1988; Grossman and Helpman, 1991), the world economy grows because of technological progress, through the invention of new ideas. However, it should be noted that a country should be effective at taking advantage of technologies invented elsewhere. Hence, technology transfer and diffusion are both essential contributory elements to the growth of a country (Weil, 2005).

Economic policies and macroeconomic conditions have also attracted much attention as determinants of economic growth (see Barro, 1991, 1997; Fischer, 1993; Easterly and Rebelo, 1993; Loayza, et al., 2004) since they can set the framework within which economic growth takes place. Economic policies can influence several aspects of an economy through investment in human capital and infrastructure, improvement of political and legal institutions and so on (although there is disagreement in terms of which policies are more conducive to growth). Macroeconomic conditions are regarded as necessary but not sufficient conditions for economic growth (Fischer, 1993). In general, a stable macroeconomic environment may favour growth, especially, through reduction of uncertainty, whereas macroeconomic instability may have a negative impact on growth through its effects on productivity. Several macroeconomic factors which affect growth have been identified, but considerable attention has been placed on inflation (measured as consumer price index), fiscal policy (measured as government consumption/GDP), unemployment (total % of total labour force), budget deficits (measured as deficit/GDP or overall budget balance including grant % of GDP) and tax burdens (measured as quota, direct taxes/GDP, indirect taxes/GDP), real interest rate (%), current account balance (% of GDP), and real effective exchange rate (in index) (see Fischer and Modigliani, 1978; Sala-i-Martin, 1991; Levine and Renelt, 1992; Cozier and Selody, 1992; Clark, 1993; Barro, 1996).

What is more, Governmental factors (measured as government consumption/GDP, recurrent expenditure plus capital expenditure) are not left out from the economic growth determinants. Barro (1989, 1990, and 1991) found that the larger the shares of government spending (excluding defense and education) in total GDP, the lower the levels of investment and growth. Barro also

finds that government investment has no statistically significant effect on economic growth (see Grossman, 1988; Barro, 1990; Dowrick, 1996). A government may attempt to increase private productivity through government spending, but the evidence suggests it has no such effect and may even decrease growth. Growth appears to fall with higher government spending because of lower private savings and because of the distortionary effects from taxation and government expenditure programmes (see Landau, 1983; Barro, 1991; Engen and Skinner, 1992). However, growth also appears to increase with lower government spending, all things being equal (see Ram, 1986; Rivera and Toledo, 2004). Some empirical studies have proven conflicting results (see Ramirez, 2000). In addition, government can improve a country's growth through the provision of rule of law, regulation of how firms behave, planning (direction of resources to certain targeted industries), trade policies such as tariff and quota and outright ownership of means of production (Frank, et al., 2003; Weil, 2005).

Financial system (measured as broad money/GDP, credit to the private sector/GDP, currency/GDP, domestic credit provided by banking sector/GDP, stock market capitalization of listed companies/GDP, stock traded/GDP, turnover ratio, amount of clearing house/GDP, currency/ M_2) is also known to affect the level of economic growth in a country. According to Levine and Zervos (1993), new research suggests that economies with more developed and more efficient financial systems will be able to more effectively allocate savings to the best investments, which in turn leads to increased productivity, potentially higher savings rates, and faster growth. The authors use the ratio of liquid liabilities to GDP to examine the relationship between financial policy and growth.

Their results show that countries with larger per capita growth rates tend to have larger financial systems. Several other studies like Bencivenga and Smith (1991), King and Levine (1993) and Levine (1999) have emphasized the role of financial development in the effectiveness of economic growth. However, financial repression is detrimental to growth (see Lagos and Diaz, 1992). According to this hypothesis, a low or negative real interest rate will discourage saving. This will reduce the availability of loanable funds for investment, which in turn lower the rate of economic growth (McKinnon and Shaw, 1993). In addition, many developing countries over

regulate their financial development through controls on interest on deposits and restriction on credit to the private sector, which hampers its ability to intermediate savings efficiently (World Bank, 1989).

Foreign Aid (measured as Aid per capita, Aid/GDP) is another factor that determines a country's economic growth. Foreign aid is an important determinant of economic growth, particularly after peace is reached (Ibrahim, et al., 2008). Some studies find a statistically significant correlation between aid and growth and some do not. Papanek (1973) using data covering the 1955-65 period for a sample of 34 LDCs, obtained a significant positive impact of aid on growth (see Gupta, 1975; Stoneman 1975; Burnside and Dollar, 2000). Griffin and Enos (1970) reported a negative impact of aid on growth for a sample of 32 Latin American countries for the 1957-64 periods (see Voivodas, 1973).

A study of 97 countries from 1971 to 1990 found that “in all countries there was no significant correlation between aid and growth” (Boone, 1994). Another study of 73 countries from 1971 to 1995 found that neither aid per capita nor aid as a percentage of GDP was positively correlated with economic growth (Vásquez, 1998). To date, foreign aid has failed to increase growth in most LDCs. Furthermore, aid has typically focused on two areas believed to be critical to economic development: education and health care. In these areas, too, aid has failed to make a difference (see Hjertholm, et al., 2000; Gomanee, et al., 2005).

Recent theories of economic growth emphasize the importance of knowledge and information as a determinant of economic growth. Empirical measures of knowledge generally focus on skill levels and research and development activity. But since almost all of the R and D activities take place in advanced economies of the OECD, the LDCs cannot catch up with more developed countries, unless LDC's can gain access to the new technology. Three most common channels of technology transfer include foreign direct investment, international licensing agreement and international trade.

Openness to the world economy is good for a country's economic growth (Weil, 2005). Openness to trade (measured as exports/GDP, export duties/ total export, export + import values/GDP, export prices/import prices, index of real exchange rate volatility, average tariff, non-tariff barriers, black market premium on exchange rates and sometimes dummy) has been used extensively in economic growth literature as a major determinant of growth performance.

According to the neoclassical thinking, there are sound theoretical reasons for believing that there is a strong and positive link between openness and growth. Openness affects economic growth through several channels such as exploitation of comparative advantage; technological transfer and diffusion of knowledge through global interaction, increasing economies of scale, exposure to competition which improves efficiency and by increasing the incentives for technological innovation (see Piazzolo, 1995; Harrison, 1996; Frankel and Romer, 1999). However, countries that close their markets experience slow growth. Countries that are less able to participate in world commerce because of their geographic position suffer from lower income as a result of their isolation (Weil, 2005).

There is a substantial and growing empirical literature investigating the relationship between openness and growth. On one hand, a large part of the literature found that economies that are more open to trade and capital flows have higher GDP per capita and grew faster (see Frankel and Romer, 1999; Sukar and Ramakrishna, 2002; Yanikkaya, 2003). There are other studies, however, that question the wisdom of trade openness. Rodriquez and Rodrik (1999), for example, present a critical view of the link between open-trade policy and economic growth. Their analysis shows that the relationship between average tariff rates and economic growth is only slightly negative and nowhere near statistical significance. Also, competition arising from openness to trade may discourage innovation by making investment in research and development less profitable (Harrison, 1996). Finally, openness to trade does not enhance economic growth in poor countries (Harrison, 1996).

Openness and integration in the world economy should be accompanied by institutions and strategies which support internal cohesion and maintain external competitive advantages. However, countries with poor political institutions, weak conflict management institutions and strong social cleavages suffer the external shocks and do not perform well in the world economy (Tridico, 2007).

Foreign direct investment (measured as FDI/GDP, the share of manufacturing in merchandise export) has recently played a crucial role of internationalizing economic activity and it is a primary source of technology transfer and economic growth. This major role is stressed in several models of endogenous growth theory (see Barro, 1991; Barro and Sala-i-Martin, 1995). However, according to the neoclassical models, FDI can only affect growth in the short-run because of diminishing returns of capital in the long-run. The empirical literature examining the impact of FDI on growth has provided more-or-less consistent findings affirming a significant positive link between FDI and economic growth (see Balasubramanyam, et al., 1999; Asheghian, 2004; Vu, et al., 2006).

In contrast, recent literature has also raised concerns about the deleterious effects of flows of capital on the recipient countries. That is, some theories predict that foreign direct investment in the presence of pre-existing trade, price, financial and other distortions will hurt resource allocation and slow down economic growth in any economy (Papanek, 1973; Cohen, 1993). Specifically, the negative effect of FDI on growth might be due to; repatriation of profit, enclave investment, sweatshop employment, income inequality and high external dependency (Ramirez, 2000). Some empirical studies have found a negative relation of FDI on economic growth in the receiving economies (see Aitken and Harrison, 1999; Carkovic and Levine, 2002; Akinlo, 2004).

Another important source of growth highlighted is the institutional framework. Although the important role institutions play in shaping economic performance has been acknowledged a long time ago (see Lewis, 1955; Ayres, 1962), it is not until recently that such factors have been examined empirically in a more consistent way (see Knack and Keefer, 1995; Hall and Jones, 1999; Acemoglu, et al., 2002). Rodrik (2000) highlights five key institutions (property rights,

regulatory institutions, institutions for macroeconomic stabilization, institutions for social insurance and institutions of conflict management), which not only exert direct influence on economic growth, but also affect other determinants of growth such as the physical and human capital, investment, technical changes and the economic growth processes. It is on these grounds that Easterly (2001) argued that none of the traditional factors would have any impact on economic performance if they had not developed a stable and trustworthy institutional environment. The most frequently used measures of the quality of institutions in some empirical literature include government repudiation of contracts, risk of expropriation, prevalence of corruption, property rights, the rule of law and bureaucratic quality and economic freedom (Knack and Keefer, 1995).

The relation between political factors and economic growth has come to the fore by the work of Lipset, (1959) examined how economic development affects the political regime. Since then, research on the issues has proliferated, making clear that the political environment plays an important role in economic growth (see Grier and Tullock, 1989; Lensink, et al., 1999, 2001). At the most basic form, political instability would increase uncertainty, discouraging investment and eventually hindering economic growth (see Levine and Zervos, 1993; Barro and Sala-i-Martin, 1995).

The measure of political instability could be based on the number of assassination per million people per year and the number of coups per year. The degree of democracy is also associated with economic growth, though the relation is much more complex, since democracy may both retard and enhance economic growth, depending on the various channels that it passes through (Alesina, et al., 1995).

According to Barro (1996) at low levels of political rights, an expansion of rights stimulates growth; however, once a moderate level of democracy has been obtained, a further expansion of right reduces growth. In recent years, a number of researchers have made an effort to measure the quality of the political environment using variables such as political instability, political and civil freedom, and political regimes. Brunetti (1997) distinguishes five categories of relevant

political variables: democracy, government stability, political violence, political volatility and subjective perception of politics.

Recently there has been a growing interest in how various socio-cultural factors may affect growth (see Landes, 2000; Zak and Knack, 2001; Barro and McCleary, 2003). Trust is an important variable that belongs to this category. Trusting economies are expected to have stronger incentives to innovate, to accumulate physical capital and to exhibit richer human resources, all of which are conducive to economic growth (Knack and Keefer, 1997). Other aspects of culture that may affect income include openness to new ideas which affects the ability to assimilate technology from abroad, inclination to work hard, to save for the future which leads to accumulation of physical capital and human capital and the level of social capital. Ethnic diversity, in turn, may have a negative impact on growth by reducing trust, increasing polarization and promoting the adoption of policies that have neutral or even negative effects in terms of growth (Easterly and Levine, 1997). Several other socio-cultural factors have been examined in some literature, which include ethnic composition and fragmentation, language, religion, beliefs, attitudes and social/ethnic conflicts, but their relation to economic growth seems to be indirect and unclear. For instance cultural diversity may have a negative impact on growth due to emergence of social uncertainty or even of social conflicts, or a positive effect since it may give rise to a pluralistic environment where cooperation can flourish (Weil, 2005).

The important role of geography on economic growth has long been recognized. Though, over the last years there has been an increased interest on these factors since they have been properly formalized and entered into models (Gallup, et al., 1998, 1999). Researchers have used numerous variables as proxies for geography including absolute values of latitude, distances from the equator, proportion of land within 100km of the coast, average temperatures and average rainfall, soil quality, disease ecology, landlocked and natural resource export/GDP (see Hall and Jones, 1999; Rodrik, et al., 2002; Easterly and Levine, 2003). There have been a number of recent empirical studies (see Sachs and Warner, 1997; Bloom and Sachs, 1998; Armstrong and Read, 2004) affirming that natural resources, climate, topography and 'landlockedness' have a direct impact on economic growth affecting (agricultural) productivity, economic structure, transport

costs and competitiveness. However, others found no effect of geography on growth after controlling for institutions (see Easterly and Levine, 2003).

Also, the relationship between demographic trends and economic growth has attracted a lot of interest particularly over the last years, yet many demographic aspects remain today unexplored. Of those examined, population growth, population density, migration and age distribution, seem to play the major role in economic growth (see Kelley and Schmidt, 1995; Bloom and Williamson, 1998). High population growth, for example, could have a negative impact on economic growth influencing the dependency ratio, investment and saving behaviour and quality of human capital. The composition of the population has also important implications for growth. A large working-age population is deemed to be conducive to growth, whereas population with many young and elderly dependents is seen as impediment. Population density, in turn, may be positively linked with economic growth as a result of increased specialization, knowledge diffusion and so on. Migration would affect growth potential of both the sending and receiving countries. Findings again are not conclusive since there have been studies reporting no (strong) correlation between economic growth and demographic trends (see Grierand and Tullock, 1989; Pritchett, 2001).

In addition to this, a final growth agent that is not very frequently used in the recent empirical growth literature is the role of output volatility in explaining output growth. Volatility to the extent that it properly reflects uncertainty, should be negatively linked to growth (Fata's, 2003). Uncertainty could affect growth through many channels. For instance, under irreversibility and large sunk cost, uncertainty delays investment decisions and affects output growth. Ramey and Ramey (1995) have found empirical evidence on the negative link between output growth and its volatility. Binder and Pesaran (1999) have provided a theoretical rationale for this link based on the statistical properties of stochastic versions of conventional growth models. For empirical analysis, volatility is measured as the standard deviation of per capita growth rate (Binder and Pesaran, 1999).

Recently, several authors have considered the role of religious diversity in the explanation of democracy and economic development. According to the authors, Religious Polarization is a significant explanatory variable for the long run growth while religious fragmentation is not statistically significant. Hence, Religious fragmentation does not have a significant effect on growth while religious polarization does (Barro, 1997; Sala-i-Martin, 1997; Tavares and Wacziarg, 2001).

Not forgetting debt overhang of an economy, huge debt has been found to have a negative relationship with economic growth. The reason is that potential increases in debt payment depresses the return to productive investment and discourages capital formation. This makes it difficult for a country to continue large infrastructure, new projects and old investment (Cholifihani, 2008). Krugman (1988) argues that a very high debt burden is seen as a future tax on the return to capital. The heavy debt burden means that the government will have to increase taxes in the future to finance the high debt service payment. However, increase in taxes means a lower after tax return on capital and reduced incentive to investment. Therefore, lower investment leads to slower growth (Pattillo, et al., 2004).

From the above literature review, this study concludes that the main determinants of economic growth are namely, investment, human capital, innovation, technology, economic policies and macro-economic conditions, financial system, foreign aid, trade openness, foreign direct investment, governmental factors (for example, property rights), political factors (for example, political rights), socio-cultural factors, geographical, demographic factors and volatility, all other things being equal. While most of this literature finds a significant correlation between the above mentioned determinants and growth, some do not. For instance, the relationship between investment and growth is not certain because political factors, if favourable or not, could interfere with the trend of investment in an economy and thus influence growth negatively or positively. Nevertheless the determinants reviewed above have been shown to affect growth in one way or the other and hence are worth taking note of. All that being said, the policy variables that seem most robustly related to growth are sound macroeconomic policies (mainly stable and

reasonable low inflation), openness to trade, institutional quality (little government corruption) and financial development (Weil, 2005).

2.4 Empirical Literature Review

In connection with the above discussions numerous researchers have examined sources of growth for cross country difference, developed countries and developing economies using a wide variety of explanatory variables, however, there are few widely agreed on results. In this section, a selected number of the empirical studies are reviewed. The empirical studies reviewed are classified into four groups: (i) Cross Country Evidence (ii) the case of Advanced Countries, (iii) the case of Developing Countries, and (iv) the case of Ghana.

2.4.1 Cross Country Evidence

One of the most interesting recent approaches to understanding what causes sustained increase in economic growth is the work by Ricardo Hausman, Lant Pritchett, and Dani Rodrik (2004), who studied eighty-three cases in which a country rapidly increased its growth rate and sustained the increase for at least eight years. Their most statistically significant results are that a financial liberalization raises the probability of growth by around 7 percent, and that a political regime change toward autocracy (from democracy or less-strict autocracy) raises the probability of increased growth by almost 11 percent. They concluded that the vast majority of growth accelerations are unrelated to standard determinants such as political change and economic reform, and most instances of economic reform do not produce growth acceleration.

Sala-i-Martin (1997) estimates cross-sectional regressions on a wide range of disparate countries and makes no allowance for the possibility of reverse causality; a few variables seem to have a significant effect on growth. He considers sixty-three variables that might potentially explain growth. He finds higher growth in countries that have been open to trade and that abide by rule of law and that are more capitalistic. On the other hand, he finds growth to be negatively associated with revolutions, coups, and wars.

Nicolae (2008) did a cross country study on the determinants of economic growth on a panel data for more than 150 countries with observations computed 5 years, 10 years, 20 years, 40 years period, and annually during 1961 – 2000. Using the general framework developed by Barro (1991, 1997, 2003), the study found out that economic growth is positively correlated with a higher level of human capital through health, accounted by life expectancy at birth, and education in the form of secondary and tertiary school enrollment, and an increase in savings, in openness of the economy, an improvement in the development of the financial and banking system, a raise of gross capital formation, and foreign direct investments, an increase of the real interest rate. On the other hand, the study found that economic growth is negatively correlated with higher level of physical capital accounted by the level of GDP per capita, with government consumption, inflation rate, budget deficit, fertility and population growth, unemployment, and current account deficit.

Benito (2009) also analysed the determinants of economic growth in recent cross countries. The method of analyses employed by Benito (2009) was the Bayesian Model Averaging. The study used panel data. The empirical results show that the most robust growth determinants of the cross-country growth were the price of investment, distance to major world cities, and political rights. The study concluded that growth-promoting policy strategies should aim to reduce taxes and distortions that raise the prices of investment goods, improve access to international markets and promote democracy enhancing institutional reforms.

Glaeser, et al. (1995), Cribfield and Panggabean (1995) and Rauch (1993) examined the determinants of growth for metropolitan areas and cities and found out that human capital has a powerful impact on economic performance measured by population, employment and income growth as well as productivity.

Barro (1996) examined the determinants of economic growth for 100 countries during the period 1960 to 1990. Barro (1996) found out that with a starting level of real per capita gross domestic product (GDP), the growth rate was enhanced by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation and improvements in the terms of trade. He also found out that for given values of these

and other variables, growth was negatively related to the initial level of real per capita gross domestic product (GDP), but political freedom had only a weak effect on growth. He finally concluded that at low levels of political rights, an expansion of these rights will stimulate economic growth.

Mwebaze (2002) investigated the determinants of economic growth of 60 countries over the period 1960 to 1996. A panel of annual data for 60 countries was used instead of a cross section data. Mwebaze (2002) found out that the most important factors that determined the process of economic growth for the 60 countries were tax revenue, government consumption and human capital. The result thus predicted conditional convergence.

Dewan, et al. (2001) examined the determinants of economic growth in developing countries. They used a sample of 41 middle income developing countries to develop an empirical model for growth. Both cross country and time variation specifics were used in an attempt to explain the determinants for sustained economic growth in developing countries. They found out that, apart from the natural rate of growth of labour force, investment in both physical and human capital, as well as low inflation and open trade policies (to encourage efficiency through assessing better foreign technologies) were necessary for economic growth. They again found out that, since many of the developing countries have large agricultural sector, adverse supply shocks were found to have a negative impact on growth.

Savvides (1998) studied the factors behind differences in per capita growth rates across Africa. He adopted the endogenous growth methodology for his analysis. He found out that the various economic factors including initial conditions, investment, population growth, trade orientation, inflation, financial development and the growth of the government sector contributed significantly to economic growth. In addition to the other economic variables, he finally found political freedom to be a significant contributor to economic growth in Africa.

2.4.2 The Case of Advance Countries

According to Bade, et al. (2007) Britain became the world economic leader in the 1800s by pioneering the industrial revolution inventing steam engines and rail road and emphasizing free trade. Later the Asian tigers came to the economic growth race. Their success resulted from rapid accumulation of capital (through high investment), labour force (through population growth and increased labour force participation), government policies of encouraging education, opening economy to foreign technologies, promoting trade, keeping taxes low and encouraging savings (30% of GDP in “tiger” economies) and government spending around 20% of GDP compared to over 50% in Europe. For example, Japan made its mark by first imitating foreign technologies, protecting domestic industries from imports and then developing tremendous expertise in manufacturing and electronics. South Korea had high productivity growth because of high savings and investment rates, a good education system and sustained technological progress while Africa suffered from major political instability, poor education, deficient infrastructure and disease.

Similarly, Solow (1956) estimated the U.S economic growth rate during the period 1909 to 1949. Solow found out that 0.32 percent was attributable to capital accumulation, 1.09 percent was due to increases in the input of labour, and the remaining 1.49 percent was due to technical progress. Therefore, Solow concluded that the important determinants of GDP growth in U.S were technical progress, increased labour supply and capital accumulation.

Denison (1974) also accounted for the sources of growth of U.S real output during the period 1929 to 1969. Within that time span, the American economy grew at an average rate of 3.3 percent during 1929 to 1969. In the second half of the period, 1948 to 1969, the rate of growth was 3.85 percent per year. He concluded that the U.S real GDP grew partly as a result of advances in knowledge, more work done, capital accumulation, increased education, efficient use of available factors of production, a major shift of surplus labour from agriculture to industry and a small reduction in the unemployment rate.

Rupasingha, et al. (2002) examined economic growth for the United States, using per capita personal income data for the period 1990-1997. Their interest was the impact of social and institutional characteristic on growth. They examined these factors by including measures of inequality, ethnic inequality, and measures of the two types of social groups: social groups (religious group) and rent-seeking groups (like labour and business associations). They included a wide range of control variables, including fiscal measures and educational attainment. They found out that social and institutional characteristics matter for country income growth, as well as important role for human capital (measured by college level educational attainment) in raising a country's income growth.

Coe and Reza (1993) presented an estimate of aggregate production function for France that focused on the role of trade and the importance of capital accumulation by government, households, and businesses, including expenditure on research and development. They found out that trade and capital (business-sector capital, government infrastructure capital and residential capital) accounted for all of the growth performance in France over the previous two decades.

Hsing and Hesieh (1996) examined the determinants of the growth rate of real output for China with an emphasis on institutional, social and political changes and development. They found out that growth rate of real output was positively correlated with employment to real output ratio, investment/output ratio, human capital, but negatively associated with the great leap forward, and cultural revolution. In addition, they found out that the coefficient of deficit financing, the openness of the economy and dummy variables for economic and agricultural reforms were insignificant.

Woo (1997) examined the growth experience of China during the period 1979-1993. Woo (1997) found out that China's impressive growth record was due to high accumulation of capital as a result of high rate of households saving, lower rate of inflation, factor mobility from low productivity agriculture into high-productivity industry, modern technology some of which were previously denied to China, foreign direct investment (which increased the capital stock,

transferred new technology, made available global distribution networks, and introduced domestic firms to more efficient management techniques), and competition from international trade which forced Chinese enterprises to be more efficient and innovative.

Chen and Feng (2000) used a statistical analysis of data on twenty-nine (29) provinces, municipalities and autonomous regions for the period 1978-1989. They found out that private and semi-private enterprise, higher education and international trade all led to an increase in economic growth in China. They also found out that high fertility, high inflation and the presence of state-owned enterprises reduced growth rates among the provinces. In the final analysis, their evidence indicated that the convergence hypothesis holds in China.

Baily (2003) of the Institute of International Economics conducted a research on “sources of economic growth in the Organization for Economic Cooperation and Development (OECD) countries”. The methodology employed was aggregate regression analysis with particular emphasis on the ways in which policies affect outcomes. Baily (2003) found out that investment in physical and human capital, sound macroeconomic policies, government spending, research and development by the business sector, financial market, and international trade were all important factors to economic growth in OECDs. On the other hand, Baily (2003) found out that a larger sized government spending, direct taxes and research and development by the public sector all contributed negatively to economic growth.

Teixeira and Fortuna (2003) examined the interaction between human capital, innovation capability and economic growth in the Portuguese economy during the period 1960 to 2001. In their study, the Vector Autoregressive (VAR) and cointegration analyses were employed to estimate the equation specified. They obtained 0.42 long run estimates for human capital elasticity, 0.30 long run estimates for internal knowledge elasticity related with the composite variable that measures the interaction between human capital and innovation capacity. The results of the estimate confirmed that human capital and indigenous innovation efforts were

enormously important to the process of Portuguese economic growth during the period 1960 to 2001.

Prados and Rose's (2005) empirically analysed the sources of economic growth in Spain for the period 1850 to 2000. They used the method of Domar and Jorgenson that allows measuring capital and labour inputs in terms of quality. This method was used to disentangle the contribution of embodied and disembodied technological change to economic growth. They found out that innovation appeared to be the leading force in Spanish growth as its main spurts corresponded to the impact of the railways (1860s-1883), the electrification (1920s), and adopting US technology during the Golden Age (1951-1974). Quite the contrary, their results seemed to correlate well with some predictions of the new growth theory, mainly with the Grossman Helpman model (1991) that predicts that growth in output is proportional to the rate of innovation, to which the rate of capital formation adjusts.

Hammond and Thompson (2006) empirically investigated the determinants of income growth in U.S metropolitan and non-metropolitan regions during the period 1969 to 1999. The study used a production function approach based on four inputs; labour, manufacturing investment, human capital investment and public capital investment. They found out that public capital investment played a little role in either metropolitan or non-metropolitan regions, but manufacturing investment tended to spur growth in non-metropolitan regions, in contrast to the results from metropolitan regions. They also found out that human capital matters for both metropolitan and non-metropolitan regions and an increase in human capital investment in metropolitan regions might have a larger impact on growth than in non-metropolitan regions. They finalized that the presence of more colleges and universities, more households amenities, and lower tax rate were all to encourage human capital accumulation in United States labour market areas.

Harvie, et al. (2006) examined the sources of economic growth in South Korea. They used quarterly time series data from the period 1980Q₁ to 2005Q₃. They employed an Autoregressive Distributed Lag (ARDL) analysis to specify the short-and long term determinants of economic

growth in the presence of structural breaks in South Korea. They found out that the growth of real Gross Fixed Capital Formation (GFCF), educational spending and export exerted a significant impact on GDP growth in South Korea. They also found out that only imports were not significant to growth. The reason they gave was that there were compositional changes away from the importation of capital goods to consumer goods as Korean standard of living improved. In addition, based on the preliminary empirical findings obtained, they finally concluded that, in the long-term, policies aimed at promoting various types of physical and human capital, and trade openness should improve Korea's economic growth.

Khan (2006) utilized the conventional growth accounting framework to estimate the total factor productivity in Pakistan during the period 1960 to 2003. Khan (2006) confirmed that macroeconomic stability, foreign direct investment, and financial sector development played an important role in the increase of total factor productivity in Pakistan. Interestingly, expenditure on education turned out to be insignificant.

Papyrakis, et al. (2007) examined the determinants of economic growth in the United States using cross-country data on forty nine (49) states. Their dependent variable was growth rate of Gross State Product (GRP). The regressors were initial income, natural resource, investment, schooling, openness and corruption. They found out that initial income, investment and schooling impacted positively and significantly on gross state product while natural resource abundance and corruption impacted negatively on gross state product. They concluded that policies and strategies should be geared toward investment and schooling in order to boost future economic growth.

Ledyaeva (2008) examined the determinants of economic growth in Russia. A modification of Barro and Sala-i- Martin's empirical framework of growth model was specified. Seventy-four (74) Russian regions were considered for the period 1996 to 2005. The study used both panel and cross country data. Ledyaeva (2008) found out that the financial crisis of 1998 decreased gross state product (GRP) per capita growth in Russia by 0.56 percent. He also found out that a one

percent increase in the level of domestic investment would lead to 0.34 percent in GDP per capita growth. He again found out that foreign direct investment (FDI) was not important for Russian economic development. He further found out that, the other specified control variables, natural resource availability surprisingly did not contribute significantly to economic growth in Russian regions. The same results were achieved when he replaced the natural resources variable with oil variable. He finally concluded that in order to enhance economic growth in poor Russian regions the authorities must stimulate domestic investment in these regions.

2.4.3 The Case of Developing Countries

Dobronogov and Iqbah (2005) investigated the key determinants of economic growth in Egypt by combining the growth diagnostics framework with econometric time series analysis. They argued that trends in government consumption, private sector credit and Organization of Economic Cooperation and Development (OECD) GDP were among the major growth determinants in Egypt since 1986. They also found out that the inefficiency of the financial intermediation was an important constraint on growth. They concluded that an improvement in the quality of financial intermediation may bring a sustained growth dividend to Egypt in the long-run.

2.4.4 The Case of Sub-Saharan Africa excluding Ghana

Sen and Te Velde (2009) examined the effect of effective state-business relations on economic growth for a panel of 19 sub-Saharan African countries for the period 1970-2004. They proposed a measure that captures the various dimensions of effective state-business relations in sub-Saharan Africa. They then estimated the standard growth regressions using dynamic panel data methods. With that measure, along with the more conventionally used measures of institutional quality such as the degree of executive constraints, the rule of law, the degree of corruption and the quality of the bureaucracy. Their results showed that effective state-business relations contribute significantly to economic growth. Countries which have shown improvements in state-business relations have witnessed higher economic growth, when they controlled for other determinants of economic growth and independent of other measures of institutional quality.

Gyimah-Brempong (1989) examined the effect of military spending on the economic growth of Sub-Saharan African countries using a simultaneous-equations model. He concluded that military expenditure had a negative impact on economic growth. However, the revision of his analysis showed that his reported results were weak and do not support his policy conclusions, because the calculated value of the defense burden/growth rate multiplier is not statistically significant.

Njikam (2003) tried to find answers to the following questions; Are exports and economic growth correlated in Sub-Saharan Africa? If yes, what is the direction of this causation? Is this direction reversed with the change of these countries from import-substitution (IS) to export promotion (EP) strategies? Based on a sample of 21 SSA countries these questions were addressed using Hsiao's Granger-causality. The results were that: (1) during the IS period, economic growth unidirectionally caused total exports in five countries, (2) manufactured exports unidirectionally caused economic growth in one country, (3) bidirectional causality existed between economic growth and total exports in three countries, (4) bidirectional causality existed between economic growth and agricultural exports in one country and (5) bidirectional causality existed between economic growth and manufactured exports in three countries. However during the EP period, agricultural exports unidirectionally caused economic growth in nine countries, manufactured exports unidirectionally caused economic growth in three countries, economic growth unidirectionally caused agricultural exports in five countries, economic growth unidirectionally caused manufactured exports in six countries and a bidirectional causality existed between economic growth and agricultural exports in three countries.

Basu, Calamitsis, and Ghura (2000) studied on the topic "Promoting Growth in Sub-Saharan Africa: Learning What Works". Their evidence for sub-Saharan Africa suggested that the recent economic recovery was underpinned by a positive economic environment influenced—either directly or indirectly—by improvements in macroeconomic policies and structural reforms. The estimated growth equation indicated that per capita real GDP growth is positively influenced by economic policies that raise the ratio of private investment to GDP, promote human capital development, lower the ratio of the budget deficit to GDP, avoid overvalued exchange rates, and

stimulate export volume growth. Their key results were: the effect of an increase in the private investment-GDP ratio on economic growth is large and statistically significant; also that effect was larger than that of an increase in the government investment-GDP ratio; the policy environment matters for growth. Per capita real GDP growth was positively influenced by reductions in the budget deficit-GDP ratio, enhancements in external competitiveness, and expansions of export volume; the results supported the view that countries that implemented IMF-supported programs on a sustained basis were able to achieve faster rates of growth than others. The fact that that effect is significant after controlling for the effects of the macroeconomic policy-related variables suggested that it was most likely capturing the independent effects of structural reforms; the effect of an increase in human capital was positive, but not robust, when other factors affecting growth were taken into account. They concluded that these results suggested that macroeconomic stability, the implementation of structural reforms, and increases in private investment were necessary for boosting growth in sub-Saharan Africa.

Salisu and Ogwumike (2010) contributed to the growing debate on aid-growth nexus. They examined the role of macroeconomic policy environment in aid-growth nexus; an area which had received less attention in Sub-Saharan Africa (SSA). In a panel regression model covering 20 Sub-Saharan African countries, estimated with the use of OLS and TSLS over the period 1970-2001 (in 9-4 years sub-periods), the study found that a sound macroeconomic environment was a sine qua non for the effective contribution of aid to sustainable growth. The results also showed that macroeconomic policy environment was an important determinant of growth. Overall, the study concluded that the incessant socio-political crisis, policy inconsistencies, bad governance and macroeconomic instability evident in many SSA countries had crippled the effectiveness of aid in these countries.

Sentsho did a study on Export Revenues as Determinants of Economic Growth: Evidence from Botswana. The main objective of the paper was to assess whether export revenues derived from an 'enclave sector' like the case of mining in Botswana, can lead to significant and positive economic growth in a country. The paper used both statistical data and time series econometric analysis to test the causal relationship between exports and economic growth. The results indicated that primary export revenues have led to positive and significant economic growth in

Botswana. He concluded that his results should be seen as a transition strategy towards long term economic growth based on manufactures and services as the main engines of growth.

Adams (2003) looked at the impact of Intellectual Property Rights (IPRs) on economic growth for a cross – section of 34 Sub-Saharan (SSA) countries from 1985 to 2003. Using three different estimation techniques (Ordinary Least Squares, seemingly unrelated regressions, and Fixed effects), the results of the study indicated that: (1) strengthening IPRs had a negative effect on economic growth; (2) domestic investment is positively correlated with economic growth; and (3) human capital was an important determinant of economic growth. The findings of the study suggested that a “one size fits all” approach to harmonizing IPRs in developing countries might not produce the expected benefits for Sub-Saharan African countries.

Ojo and Oshiokoya (1995) studied the determinants of long term growth in a cross section of African countries over the period 1970 – 1991. As is usual in much of the growth regressions literature, the authors included variables such as initial per capita income, investment, population growth, macroeconomic policy (inflation and exchange rates), external factors (export growth, external debt, and terms of trade), political environment, and human capital development. The paper found that, on average the most significant variables influencing long-term growth in the sample of African countries over the study period were-investment, external debt, population growth, and the macroeconomic environment.

Ghura and Hadjimicheal (1996) investigated long run growth in sub-Saharan Africa over the period 1981 – 1992. Using feasible generalized least squares techniques on a panel of 29 sub-Saharan African countries; the authors found support for conditional convergence, even though the absolute convergence was rejected on the control variables, the authors found that both private and public investment had a positive and significant growth.

Easterly and Levine (1997) contributed some valuable empirical perspective on the growth tragedy in sub-Saharan African in particular. The paper investigated both the direct and indirect effect of ethnic diversity on growth. The paper made some interesting observations first, it was reported that ethnicity had a significant negative direct effect on growth; second, it was found

that high levels of ethnic diversity were strongly linked to high black market premiums, political instability, poor financial development, low provision of infrastructure and low levels of education.

Sachs and Warner (1997) analyzed the sources of slow growth in developing countries with a particular emphasis on sub-Saharan Africa over the period 1965 – 1990. The authors included a wide range of explanatory variables such as openness, geography, climate, natural resources, institutional quality, inflation, life expectancy, neighborhood effects, ethnic fractionalization and population growth. They found that natural resource dependence, tropical climate, and limited access to the sea were the key sources of economic growth in sub-Saharan Africa.

Hassan and Ahmed (2008) studied education's contribution to economic growth of Sub-Saharan Africa. They tested the hypothesis that education has a positive impact on economic growth but with significant country variation. They used cross section panel data regression. They found positive correlations between growth and various definitions of human capital.

Macias and Massa (2009) used a panel cointegration analysis to examine the long-run relationship between economic growth and four different types of private capital inflows (cross-border bank lending, foreign direct investment (FDI), bonds flows and portfolio equity flows) on a sample of selected sub-Saharan African countries over the period 1980-2007. Their results showed that FDI and cross-border bank lending exert a significant and positive impact on sub-Saharan Africa's growth, whereas portfolio equity flows and bonds flows had no growth impact. Their estimates suggested that a drop by 10% in FDI inflows may lead to a 0.5% decrease of income per capita in sub-Saharan Africa, and a 10% decrease in cross-border bank lending may reduce growth by up to 0.7%. Therefore, the global financial crisis was likely to have an important effect on sub-Saharan Africa's growth through the private capital inflows channel (half a percent of growth is worth around \$5 billion in lost output).

Ndambendia and Njoupouognigni (2010) investigated the long-run relationship between foreign aid, foreign direct investment and economic growth in 36 Sub-Saharan Africa countries over the period 1980-2007. Following the recent dynamic panel data of mean group (MG), pooled mean

group estimator (PMG), and dynamic fixed effect (DFE) proposed by Pesaran et al. (1999), they found strong evidence of positive impact of foreign aid and foreign direct investment on economic growth. However, the effect of foreign aid on growth in SSA was low. For example, an increase by 1% of foreign aid induced only 0.05% point of economic growth for PMG and 0.13% point for DFE, while it was ten times greater for employment in PMG and approximately six times greater in DFE. As economic policy implication, they concluded that it was much better to focus on internal factors than external factors to boost economic growth in SSA.

Agbory, Fedderkez, and Viegix February (2010) investigated the channels through which colonial origin affects economic growth in sub-Saharan Africa (SSA). Their finding suggested that colonial origin matters for growth in SSA and its likely transmission mechanism was human capital. In particular, their results suggested that British former colonies had acquired their superior economic performance over their French counterparts mainly because the negative effects of human capital growth on per capita GDP growth had been comparatively less severe in British former colonies. They do not find statistical evidence in support of the market distortion, trade openness, geography and natural resources channels. However, some channels were statistically insignificant, notably, geography and natural resources seem to be economically as important as the one that is statistically significant.

Feng (1996) conducted a cross-national analysis of forty sub-Saharan African countries during the years 1960–1992. His study examined the long run relationship between political democracy and economic growth, taking advantage of the availability of large economic and political data sets. The conclusion he drew from his study was that an economy grows faster under a regime that enjoys a higher level of institutionalized democracy. He also found that a positive feedback relationship exists between democracy and growth; while democracy promotes growth, growth leads to a higher level of democratization. In addition, Feng (1996) found that the duration of authoritarian rule decreases economic growth, while growth shortens the tenure of an autocratic government. Other factors that accounted for growth in sub-Saharan African countries included the initial size of the economy, human capital stocks, domestic investment share, and international trade.

Salish (2008) examined the role of macroeconomic policy environment in aid-growth nexus the area of which had received no serious attention in Sub-Saharan Africa (SSA). In a panel regression model covering twenty Sub-Saharan African countries, estimated with the use of OLS and TSLS over a period of 1970 to 2001 (in nine- four year sub-periods), the paper found that a sound macroeconomic environment was sine qua non for the effective contribution of aid to sustainable growth. The paper also found that macroeconomic policy environment was an important determinant of growth. Overall, the paper concluded that the incessant socio-political crisis, policy inconsistencies, bad governance, and macroeconomic instability evident in many SSAs had crippled the effectiveness of aid in these countries.

Stephanié (2003) studied the East-Asian economic growth miracle: lessons for sub-Sahara Africa. According to Stephanié (2003) the economic performance of eight East Asian countries - Japan, South Korea, Taiwan, Hong Kong, Singapore, Thailand, Malaysia and Indonesia - had been described as the "East Asian Miracle" because of their economies' significant growth since the 1960s. In these eight countries real per capita Gross Domestic Product (GDP) rose twice as fast as in any other region between 1965 and 1990. In contrast, much of Sub-Sahara African (SSA) remained in poverty with slow growth in many SSA economies over the same period of time. In this light, it was the purpose of this study to identify the determinants of economic growth in East Asia over the period 1960 to 1990, and to determine whether these determinants are also relevant to explain economic growth in SSA.

The hypothesis tested was that the determinants of economic growth in East Asia are similar to the determinants of economic growth in SSA. The experiences of East Asia - Malaysia, Thailand and Indonesia - can probably be most meaningfully compared to SSA economies. In the 1960s, the average levels of GDP in East Asia (Indonesia, Malaysia and Thailand) and SSA were similar. Also, economic structures and the social contexts of countries in East Asia in the 1960s were not apparently so different from those of some SSA countries. East Asia could be characterized as being relatively rich in natural resources but weaker in human resources. That was similar to the situation in many countries in SSA both in the 1960s and today. East Asia also had problems of ethnic conflict and periods of political instability. At the time (Circa early

1960s), many expected rapid growth in SSA and stagnation in Asia. The study showed that SSA's exports had a small and declining share in the world trade and that its exports were largely confined to primary products and the importation of non-primary products. The study then showed that the causes for SSA's failure to grow were either because of proximate causes, i.e. exogenous factors such as bad weather, deteriorating terms of trade, fluctuating international interest rates and reduced inflows of foreign aid, or because of ultimate causes i.e. endogenous factors such as, inappropriate domestic policies, including incentive structures, and the mismanagement of public resources.

The study found the determinants of East Asia's economic growth to be an outward oriented strategy, which built strong linkages with world markets and technology through an export promotion policy. East Asian countries also pursued conservative macroeconomic policies, which created a stable, predictable environment for investment and trade. Inflation was kept low, exchange rates competitive and debt affordable. Human capital was vigorously invested to develop an educated and technically competent labour force. And finally, competitive markets were maintained for factors to facilitate the structural transformation from primary production to manufacturing and eventually to knowledge-intensive industries. After running a regression analysis, which combined SSA and East Asian growth determinants, Stephanié (2003) found out that institutions and geographical factors determined SSA's growth performance. In particular factors such as initial GDP, exports as a percentage of GDP, government effectiveness, political stability, landlockness and tropics, external debt, population growth rate and literacy rate. Stephanié (2003) concluded that if SSA could some way improve their policies and focus on becoming more open to international trade and thus promoting their exports, it may improve their economic growth rate. Although many of the same determinants, which caused East Asia's economic growth were found to be significant in the SSA experience, it was also found that the African dummy were extremely significant.

This meant that not all the determinants, which caused East Asia's economic growth, could be identified, and thus creates an avenue for further research.

Sanyal, Rajib; Samanta, Subarna (2010) studied the “Relationship between Bribery and Economic Growth: an Empirical Analysis in Sub-Saharan Africa”. The major findings of the paper were that bribery and economic growth impact each other both unidirectional and simultaneously. However, the impact of lower levels of bribery on economic growth was stronger than the impact of higher economic growth rate on reducing bribery. It was also found that there may not exist any relationship among these two variables in some countries. These varied findings suggested that unique country specific factors explained the prevalence of bribery and pace of economic growth; universal explanations need to be hedged. The findings again suggested that concerted efforts to reduce bribery must remain a desirable policy for national governments, international agencies, and non-governmental organizations. Reducing the prevalence of bribery would contribute to a higher rate of economic growth and that in turn could further accelerate the decline in bribe taking a virtuous cycle that can contribute to the economic well-being of more of the world's people. Concurrently, policies that enhance economic growth need to be put in place and implemented to arrest bribery.

Sang, Leventis, and Gutierrez (2009) examined the effect on economic growth of mobile cellular phones in sub-Saharan Africa where a marked asymmetry was present between land-line penetration and mobile telecommunications expansion. Their study extended previous ones along two important dimensions. First, they allowed for the potential endogeneity between economic growth and telecommunications expansion by employing a special linear generalized method of moments (GMM) estimator. Second, they explicitly modeled for varying degrees of substitutability between mobile cellular and land-line telephony, so that greater expansion of mobile telecommunications can have a different impact whenever the level of land-line penetration differs. They found that mobile cellular phone expansion was an important determinant of the rate of economic growth in Sub-Saharan Africa. Moreover, they found that the contribution of mobile cellular phones to economic growth has been growing in importance in the region, and that the marginal impact of mobile telecommunication services was even greater wherever land-line phones were rare. Given the low cost of mobile telecommunications technology relative to other broad infrastructure projects, especially land-line infrastructure, they advocated that mobile telecommunication services be encouraged in the area.

Klasen and Lawson (2007) examined the link between population and per capita economic growth, and poverty, using the interesting case study of Uganda. Although Uganda has recently experienced excellent economic growth and poverty reduction, it currently has one of the highest population growth rates in the world which, due to the inherent demographic momentum, will persist for some time to come. By combining both a macro and micro econometric approach, using panel data, they were able to consider the impact of population growth on per capita economic growth and poverty. They found both theoretical considerations and strong empirical evidence suggested that the currently high population growth puts a considerable break on per capita growth prospects in Uganda. Moreover, it contributed significantly to low achievement in poverty reduction and is associated with households being persistently poor and moving into poverty. They concluded that this is therefore likely to make substantial improvements in poverty reduction, and per capita growth, very difficult.

M'Amanja and Morrissey (2006) conducted a study on Foreign Aid, Investment, and Economic Growth in Kenya: A Time Series Approach. The aim of the paper was to identify aspects of the determinants of growth in Kenya, in particular if aid played a role. According to them the empirical specifications used in cross-country work do not translate easily into country studies: many of the variables were not available annually or tend to change very slowly over time, and it was not feasible to include all potential determinants. Thus, they focused on one element of growth and used a multivariate approach on time series data for Kenya over the period 1964 – 2002 to investigate the growth effects of foreign aid, investment and a measure of international trade. Their econometric results revealed two long run relations representing the reduced form growth equation and the behavioral function of private investment. They found that shares of private and public investment, and imports in GDP had strong beneficial effects on per capita income in Kenya. However, aid in the form of net external loans was found to have a significant negative impact on long run growth. Private investment relates to government investment and imports negatively, but positively to foreign aid. The implication for policy was that in order for Kenya to foster and sustain growth, closer attention should be given to factors that promote private investment.

Musila and Walid (2004) investigated whether education promote economic growth due to the fact that empirical evidence is not conclusive on this question. Their paper used time-series technique to investigate the relationship between government education expenditure per worker and economic growth in Uganda during the period 1965-1999. The empirical results showed that education expenditure per worker had a positive and significant impact on economic growth both in the long run and short run. The estimates of error correction model suggested that a 1% increase in average education expenditure per worker will lead to about 0.04% increase in output in the short run. The cointegration estimates show that a 1% increase in average education expenditure per worker will increase output by about 0.6% in the long run.

Akinlo (2006) studied the effects of macroeconomic factors on total factor productivity in 34 sub-Saharan African countries for the period 1980-2002. The econometric analysis showed that external debt was negatively and significantly related to total factor productivity. Other factors that had significant negative effect included inflation rate, agricultural value-added as percentage of GDP, lending rate and local price deviation from purchasing power parity. However, Akinlo (2006) result showed that human capital, export-GDP ratio, credit to private sector as percentage of GDP, foreign direct investment as percentage of GDP, manufacturing value added as a share of GDP and liquid liabilities as percentage of GDP had significant positive effect on total factor productivity. Taken together, the result showed that policies that reduce population growth rate and debt; facilitate greater openness, sound macroeconomic fundamentals, price stability, financial deepening and greater private participation; would lead to higher total factor productivity in sub-Saharan region.

Dhura, et al. (1993) in their working paper 95/136.P21 on Growth in sub-Saharan Africa investigated the determinants of economic growth for the period 1981 to 1992. Their results indicated that private investment, public policies and a lower budget deficit impacted positively on per capita growth. They finally identified that convergence of per capita income occurred after controlling for capital development and public policies.

Basu, et al. (2000) analysed the determinants of growth in sub-Saharan Africa. They reported that the recent economic recovery was underpinned by a positive economic environment influenced either directly or indirectly by improvements in macroeconomic policies and structural reforms. The estimated growth equation indicated that per capita real GDP growth was positively influenced by economic policies that raise the ratio of private investment to GDP, promote human capital development, lower the ratio of the budget deficit to GDP, avoid overvalued exchange rates and stimulate export volume growth.

Tahari, A., et al. (2004) examined the sources of growth in Sub-Saharan Africa during the period 1960 to 2003. Their study employed the Growth Accounting Method of Analysis. They found out that average real GDP growth in Sub-Sahara was low and decelerated continuously before starting to recover in the second part of the 1990s. Growth was driven primarily by factor accumulation with little role for total factor productivity growth.

Khungwa (2007) analysed the determinants of economic growth in Malawi. Her research work employed a growth framework that emanated from Cobb-Douglas production function. She used time series data from the period 1970 to 2003. She found out that terms of trade, openness, and human capital all had a significant effect on economic growth in Malawi. She suggested that in order to boost future economic growth in Malawi, policies and strategies that are to be implemented should aim at increasing human capital and creating a conducive macroeconomic environment. Above all, the government should continue to pursue stable macroeconomic policy.

Naude, et al. (2003) estimated the determinants of economic growth on a local level, using a data set on 353 areas in South Africa between 1990 and 2000. They found out that the most significant determinants of growth in the local areas were the stocks of human capital and distance from harbours and markets.

Ahortor et al., (2009) studied the “Impact of Remittance on Economic Growth in Small-Open Developing Economies”. The essence of their paper was to verify the macroeconomic

implications of cross-border remittances for economic growth prospects of Small-Open Developing Economies for the period 1996-2006. A set of dynamic panel models specified within the framework of Blundell-Bond Generalized Method of Moments (GMM) was empirically analyzed. Using annual data from 31 Small-Open Developing countries from Sub-Saharan Africa, Latin America and the Caribbean, their study argued that, contemporaneously, remittances contributed significantly to growth in Small-Open Developing Economies. Remittances, however, contributed more to long-run economic growth in Latin America and the Caribbean than to Sub-Saharan Africa. In dynamic terms, remittances retarded growth, but with overall positive long-run growth impact across the developing economies.

2.4.5 The Case of Ghana

Aryeetey and Tarp (2000) reported in their study of “Structural Adjustment & After: Which Way Forward? in Economic Reforms in Ghana”. The miracle and the mirage, that the growth of the 1980s came about as a result of the expansion of capital application, largely as a consequence of increased aid inflows, which was similar to the expansion that occurred in the 1960s financed largely through accumulated reserves from the 1950s. Similarly, Booth, et al. (2004) identified economic liberalization in the 1980s and political liberalization in the 1990s as the key factors behind the fairly decent growth performance in Ghana.

Aryeetey, et al. (2005) analysed Ghana’s GDP growth for the period 1961-1996. The method of analysis used by the study was the growth accounting method by Solow. They found out that the only significant variable among others was the economic liberalization dummy variable, which had a positive impact of GDP growth. They also found out that growth in labour and capital did not contribute significantly to GDP growth. They finally suggested that total factor productivity played a more important role in the observed pattern of GDP, and that TFP was affected by economic regimes. This meant that liberal regimes positively contributed to TFP and growth. Research at ISSER (2002) has also sought to explain the source of economic growth in Ghana and found similar results.

Mawutor, Agyire, Akoena, and Twerefou, (2007) studied the causal relationship between economic growth and energy consumption in Ghana. Their aim was to investigate the possibility of energy demand – led growth and growth driven energy demand hypothesis in Ghana. Using annual data for the period 1975 – 2006 and the Vector Autoregressive. With the VAR methodology, the study established that for Ghana, causality runs from economic growth to energy (electricity and petroleum) consumption. Possible explanation for this occurrence could be that in Ghana the major driver of economic growth is the agricultural sector whose energy consumption is very low. The household sector consumed majority of electricity generated while most of the oil products are consumed by the transport sector. The implication is that, the industrial and service sectors that are supposed to be energy intensive through the use of advanced technologies and the major drivers of economic growth are not energy intensive and rarely drive growth. Rather, the agricultural sector drives growth although its energy consumption is quite minimal. Impulse response analysis revealed that it takes a longer shock in economic growth on energy consumption to return to their long run equilibrium than it is for a shock in energy consumption on economic growth.

Lloyd, Morrissey and Osei (2001) did a study on aid, export and growth in Ghana. They modeled growth in private consumption. At the end of their analysis, they found out that export, aid and public investment all were positively related to long-run economic growth in Ghana.

Anaman (2006) examined the determinants of economic growth in Ghana. The study used neoclassical growth model based on available data from 1966 to 2000. The dependent variable of the long-run growth model was the annual growth of real gross domestic product (GDP). The independent variables were an annual growth of total exports, annual growth of total labour, total investment-GDP ratio, government size. The other independent variables were a dummy variable for world oil market price shock of the mid 1970s and early 1980s and a military coup or extreme political upheaval related to major droughts. The short run error correction model, based on the long-run cointegrating function, was also estimated. The results showed that the long run economic growth was positively influenced by political stability. The world oil price shocks of the mid 1970s and early 1980s led to reduced economic growth. Government size influenced economic growth in quadratic equation fashion with increasing government size resulting in

increasing growth until a point was reached beyond which growth would actually fall with increasing government size. Growth of exports strongly affected economic growth. However increase in total investment-GDP ratio did not significantly affect long-run economic growth though the expected positive relationship between the two variables was captured by the analysis. Growth of labour did not influence economic growth suggesting insignificant marginal labour productivity at the aggregate level. Short-run economic growth was mainly influenced by political stability. Overall, the results indicated that political stability was a major catalyst for achieving long-run economic growth in Ghana.

Danquah (2006) investigated the sources of growth in Ghana during the 1960-2004 periods. He employed the growth accounting method for his analysis. He found out that during 1960-2004 average real GDP was driven by factor accumulation with no role for total factor productivity (TFP). That is, the contribution of physical capital was 2.11 percent share for the entire period. The contribution of the labour force during the period was 0.70 percent while TFP growth was negative (-0.60%) during the period. He also observed that TFP emerged as one strong driving force of Ghana's growth during the growth recovery period in 1983. He reported that investment should be directed towards physical capital, human capital and technological development to accelerate and sustain economic growth in Ghana.

Oteng-Abayie, et al. (2006) examined the impact of FDI inflows and trade on economic growth in Ghana for the period 1970 – 2002. The method of analysis that was used is the bound testing procedure. They found out that labour, capital investment and trade are important in explaining Ghana's economic growth in the long run.

In Easterly, et al. (2008) research paper "Factors Affecting Economic Growth in Ghana: Bases for a New USAID Approach to Economic Growth", it was reported that the World Bank estimated the growth of total factor productivity in Ghana, a measure of how fast productivity is growth in the economic, apart from increased inputs of capital and labour for the period 1990-2005. Their model shows TFP growth during 1990-2001 was essentially zero. That is all the

growth came from increased use of land, labour and capital. For 2001-2005, on the other hand, TFP growth was 1.6% per year overall and 3.4% per year in the agricultural sector.

Adenutsi (2011) studied on the topic “Financial Development, International Migrant Remittances and Endogenous Growth in Ghana”. The purpose of the paper was to provide further insights into understanding the finance-growth nexus by verifying the hypothesis that financial development promotes economic growth through its capacity to attract increased international migrant remittances to Ghana. A dynamic equilibrium-correction mechanism model for the period 1987(3)-2007(4) was estimated following the Johansen cointegration procedure. The approach produced maximum likelihood estimators of the unconstrained cointegrating vector, and suggested the number of cointegrating vectors without relying on an arbitrary normalization. The findings revealed two stylized facts with reference to Ghana. First, although financial development Granger-causes international migrant remittance inflows, it is in itself directly detrimental to endogenous growth. Second, international migrant remittance inflows were statistically significant in explaining variations in endogenous growth in the short run as well as in the long run. According to him, since directly, financial development hampers endogenous growth, but Granger-causes increased inflows of migrant remittances, and these remittances impact positively but marginally on endogenous growth, it follows that the sequencing of implementing Ghana’s financial reform programmes should be re-examined, whilst an enabling environment is created to induce Ghanaians living abroad to remit home through official channels. International migrant remittances were found to be statistically significant in promoting endogenous growth, albeit marginally. In addition, he found out that financial development did not directly engender growth, unless it succeeds in attracting non-debt foreign capital in the form of remittances through the formal sector. He finally found out that financial development caused migrant remittance inflows which impacted positively on growth.

To sum up, the empirical evidence in the growth literature suggests that economic growth is positively related to: technological progress and technological diffusion, labour and capital productivity, higher initial schooling and life expectancy, better maintenance of rule of law, saving rate, trade openness, investment rates, investment in physical and human capital, foreign direct investment, tax revenue, terms of trade rates, population growth, political freedom, sound

macroeconomic policies, innovation, financial intermediation, research and development, economic and political liberalization. On the other hand, aid is negatively related to the initial level of real per capita GDP, taxation level, government consumption, high inflation, fertility rate, budget deficit, Cultural Revolution, Research and Development by public sector, all other things being equal.

In conclusion, several works have examined the sources of economic growth in both the developed and the developing countries including Ghana, most of these works concentrated on the interrelationship between real GDP growth and its determinants without necessarily paying much attention to particular areas where most policies and strategies should be geared towards in order to achieve the desired rate of growth. This in effect has left some gaps in the economic growth-determinants literature. In the light of this and many others, this study attempts to examine the major determinants of GDP growth in Ghana during the period 1970-2007. Consequently, it attempts to contribute to the limited existing literature by focusing mainly on which particular areas that most policy issues should be geared towards in the Ghanaian economy as far as economic growth is concerned. The researcher also wants to analyze the sources of economic growth in Ghana over the period 1970-2007, applying the Johansen Maximum Likelihood method of cointegration developed by Johansen (1988). The study period was chosen due to the adoption of economic liberalization, political liberalization, privatization and globalization of the economy. The dependent variable is real per GDP capita (Economic Growth) and the independent variables include physical capital, labour force, foreign direct investment, foreign aid, inflation and government expenditure. These variables were chosen because of their authenticity in empirical literature on economic growth and they are the variables that most policy makers debate on frequently in Ghana.

CHAPTER THREE

AN OVERVIEW OF THE GHANAIAN ECONOMY

3.0 Introduction

This chapter reviews Ghana's growth experience and her political situation since independence.

3.1 Ghana's Growth Experience since Independence

Ghana is the first African country in sub-Sahara Africa to gain independence. After independence, there have been a multitude of national development plans aimed at ensuring sustainable and accelerated economic growth and development. However, it is difficult to conclude that Ghana has made a remarkable success in that direction. At independence, Ghana was regarded as one of the better-placed developing countries and its level of economic development was comparable to the "Asian tigers" such as Thailand and South Korea. Average incomes were high (per capita income was the highest £70 compared with £29, £56, and £25 for Nigeria, Egypt and India respectively); there was an absence of balance of payments deficits, a sound budgetary situation and a well-functioning public administrative system (the state of the Ghanaian economy, 1990; Aryeetey, et al. 2000; Fosu, 2003 and Akoena, et al. 2007).

However the distinct political instability gave way to poor economic conditions. Throughout the 1960s and 1970s, political instability which reflected in high levels of corruption, policy reversals and a general lack of direction, made Ghana find itself far behind Thailand and South Korea (Aryeetey and Trap, 2000). Specifically, the economic decline was to a greater extent caused internally by excessive public spending on unproductive sectors of the economy such unnecessary spending of tax payers' money at the time of elections etc, which led to large fiscal deficits financed by monetary expansion, heavy government intervention through administrative control of prices, distribution and import controls and massive expansion of the public sector. External factors which led to the economic decline included the severe drought in the early 1980s, decline in international commodity prices of traditional exports, repatriation of about one million Ghanaians from Nigeria, high interest rates on international financial markets, price hikes

in the late 1970s and early 1980s and political instability (the state of the Ghanaian economy, 1990; Aryeetey, et al. 2000; Fosu, 2003 and Akoena, et al. 2007).

In 1983, the Government of Ghana initiated the Economic Recovery Programme (ERP) and later Structural Adjustment Programme (SAP) as the first in a series of strategies, aimed at reversing the economic turmoil, with the support of the World Bank and International Monetary Fund (IMF). The reform efforts in Ghana aimed at the introduction of market based policies and the promotion of the private sector as the “engine” of sustained economic growth. Among the most significant measures that were adopted included exchange rate liberalization, fiscal discipline, tightening of monetary policy, foreign trade reforms, financial sector reforms, privatization of state-owned enterprises, investment expansion, price deregulation and labour market reforms (the state of the Ghanaian economy, 1990; Aryeetey, et al. 2000; Fosu, 2003 and Akoena, et al. 2007) .

Although the Economic Recovery Programme (ERP) was primarily geared towards restoring the country's international economic standing, it came under popular criticism in Ghana for ignoring the plight of those not involved in the export sector. The overwhelming shift in resources was toward cocoa rehabilitation and other export sectors, neglecting food production relatively. Government employees, especially those in state enterprises, were actively targeted, and many lost their jobs. Farmers suffered as the percentage of the total budget devoted to agriculture fell from 10% in 1983 to 4.2% in 1986 and to 3.5% in 1988, excluding foreign aid projects. Although cocoa contributed less to Ghana's GDP than food crops, cocoa nonetheless received 9% of capital expenditures in the late 1980s; at the same time it received roughly 67% of recurrent agricultural expenditures because of its export value (the state of the Ghanaian economy, 1990; Aryeetey, et al. 2000; Fosu, 2003 and Akoena, et al. 2007).

In response to criticism of such policies, the government initiated the US\$85 million Programme of Action to Mitigate the Social Costs of Adjustment (PAMSCAD). Beginning in 1988, the programme sought to create 40,000 jobs over a two-year period. It was aimed at the poorest individuals, small-scale miners and artisans in particular. Selected communities were to be

assisted to implement labor intensive self-help projects (Sowa, 2002). As part of PAMSCAD, ₵10 billion was slated in the 1993 budget for the rehabilitation and development of rural and urban social infrastructure. The new programme, organized through PAMSCAD and the new district assemblies, was designed to focus on improving water supply, sanitation, primary education, and health care. An additional ₵51 billion was set aside for redeployment and end-of-service benefits, for those who had lost their jobs in civil service and parastatal reorganizations (Sowa, 2002).

In the early 1990s, the government was committed to continuing the policies of the ERP. New agreements were concluded with the World Bank to continue credit arrangements on condition, that Ghana reviews and revises its various economic laws and regulations, and support private sector development. In particular, the government agreed to revise or to repeal existing laws and regulations, affecting private investment that undermines the spirit of deregulation, economic liberalization, and exchange rate reforms. The government also agreed to develop and to strengthen the institutional framework that would facilitate private investment. Key priorities for the year 1992 and afterward included giving new impetus to state enterprise reform, broadening the scope of the banking-sector reforms, liberalizing the administrative framework, and strengthening public-sector management. Basic education and primary health-care services were to receive attention over the long term as well (Sowa, 2002).

However, in 1992, 1993, 1996 and latter half of 1999, there was lackluster performance of the Ghanaian economy and occasional fiscal slippages. The crises in these years resulted from poor macroeconomic management, particularly through interruption by political unrest in connection with national elections, fiscal indiscipline (high government spending in pre-election period) and adverse external economic conditions (low cocoa and gold prices and high oil prices). Inflation accelerated, interest rates became unbearably high and the exchange rate depreciated rapidly. Large fiscal imbalances persisted, causing government to borrow more from the domestic economy, thus crowding out the private sector. The fiscal excesses have led to the rapid build-up of domestic debt, but large inflows of external aid continued. This helped to lubricate the economic machinery at a time when many facets of the Ghanaian economy had stopped.

However, by the beginning of 2000, Ghana's domestic debt had swelled to almost 20 percent of national output, with interest payments more than the national expenditure on health and education combined. The total government domestic debt was attributed to inefficient operation of some state agencies like Tema oil Refinery (TOR), Ghana National Petroleum Corporation (GNPC) as well as the local government units. An interest payment on the debt alone is more than a third of the national recurrent expenditure and certainly more than the development expenditure (IMF and World Bank, 2001). In addition Ghana had the statutory obligation of servicing its external debt. In that same year (2000), the stagnating growth was worsened by a downturn in the price of the country's major exports and crude oil price shocks. As a result real output growth declined to 3.7% and macroeconomic risk worsened (Databank Economic Analyst monthly Report, March 24, 2009).

The current account-induced balance of payments difficulties intensified in 2001, leaving the country's foreign exchange market badly distorted. The cedi underwent huge depreciation with variable impact on different economic groups. The impact was most severe on firms producing for domestic markets and those engaged in pure commerce. Export-oriented firms, on the other hand, perhaps on account of their foreign exchange retention entitlements and privileges, seemed to have fared better. In the final analysis, the inflationary situation in the country got worse (Sowa, 2002).

The large and persistent fiscal and external gaps created heavy debt burden that could not be sustained in the early 2000s. Consequently, Ghana had no recourse but to seek debt relief under the HIPC initiative in 2001 which led to significant debt reliefs. By 2006, Ghana's public debt as a percentage of GDP declined to 41% from an estimated 198% of GDP in 2000. However, financing of energy infrastructure and the 50th Anniversary Celebration in 2007, as well as hosting of the African Cup of Nations among others, pushed public debt up to 56% of GDP by the end of 2008. By 2004, Ghana had received a total debt relief of approximately \$3.5 billion. This led to improvement in real output growth since 2001, with sustained increases from 4.2% in 2001 to 6.4% in 2008 (Databank Economic Analyst monthly Report, March 24, 2009).

More precisely, available records have shown that after over two decades of implementation of the reforms (Especially ERP/SAP), macroeconomic performance has improved. See Table 1 below.

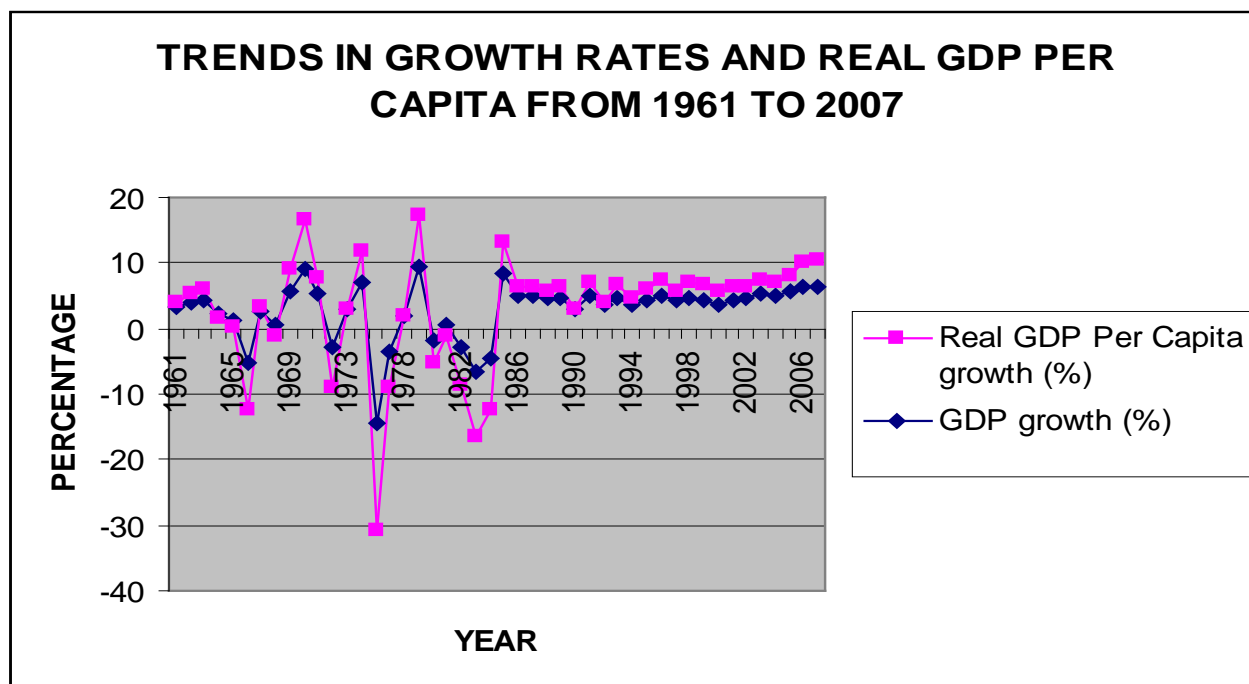
Table 3.1: Key Macroeconomic Indicators, 1970-2007 (Annual period Averages)

Year	1970-1979	1980-1989	1990-1999	2000-2007
Real GDP growth (%)	1.7	1.2	4.3	5.2
Real GDP Per Capita (%)	-0.46	-1.8	1.6	2.7
Agriculture, Value Added (% of GDP)	51.4	52	39.7	36.4
Industry, Value Added (% of GDP)	17.1	12.9	22.5	25.1
Services, etc., Value Added (% of GDP)	31.6	35.2	38	30.5
Exports of Goods and Services as % GDP	14.8	12.2	25	41.1
Imports of Goods and Services % of GDP	16.3	14.2	37.7	61.3
Merchandise trade (% of GDP)	49.5	41.5	53.2	80.9
Balance of payments (US\$)				
Trade Accounts	100.9	-141.8	-6646.1	na
Current Account	-21.2	-198.5	-512.4	na
Overall Balance	19.1	14.9	162.0	
Government Expenditure (% of GDP)	18.7	11.9	21.2	31.9
Government Revenue as % GDP	10.9	9.6	19.5	22.5
Budget Deficit (% of GDP)	-7.8	-2.3	-1.8	-9.2
Narrow Fiscal Deficit (% of GDP)	-6.2	-2.0	-1.8	Na
Money Supply Growth Rate (Broad Money) (%)	29.4	47.7	36	35.2
Inflation CPI (%)	38.9	48.3	29.8	19.6
Exchange Rate (Cedis/US\$)	1.5	88.4	1261.8	5234.5
Real Interest Rate (%)	-30.4	-39.0	3.3	Na
Gross Fixed Capital Formation % of GDP	9.7	7.9	18.6	20.7
Gross Capital Formation (% of GDP)	10.2	7.8	19.9	27.1
Foreign Aid (% of GDP)	2.8	6.2	10	11.4
Foreign Direct Investment (% of GDP)	0.9	0.2	0.9	2.1

Source: Computed from: IMF Balance of Payments Yearbook; World Bank, 1988; World Bank 1995 Statistical Appendices; World Development Indicators 2004, 2008, 2009; the State of the Ghanaian Economy (1995-2007).

Specifically, the Ghanaian economy recorded an annual growth of 2.2% between 1975 and 1982 with an average annual inflation of 64.9% and balance of payments deficit of \$6.8 million over the same period. She also experienced an average GDP growth of about 4.4% and per capita GDP growth of about 1.6% from 1984 to 2007 although the real per capita GDP of \$420 in 2001 fell short of the \$450 earned in 1960. Figure 3.1 below provides the details of real GDP and Per Capita GDP growth rates in Ghana (Akoena, et al. 2007: WDI 2009).

Figure 3.1: Real GDP and Real GDP Per Capita Growth Rates, 1961-2007 (%)

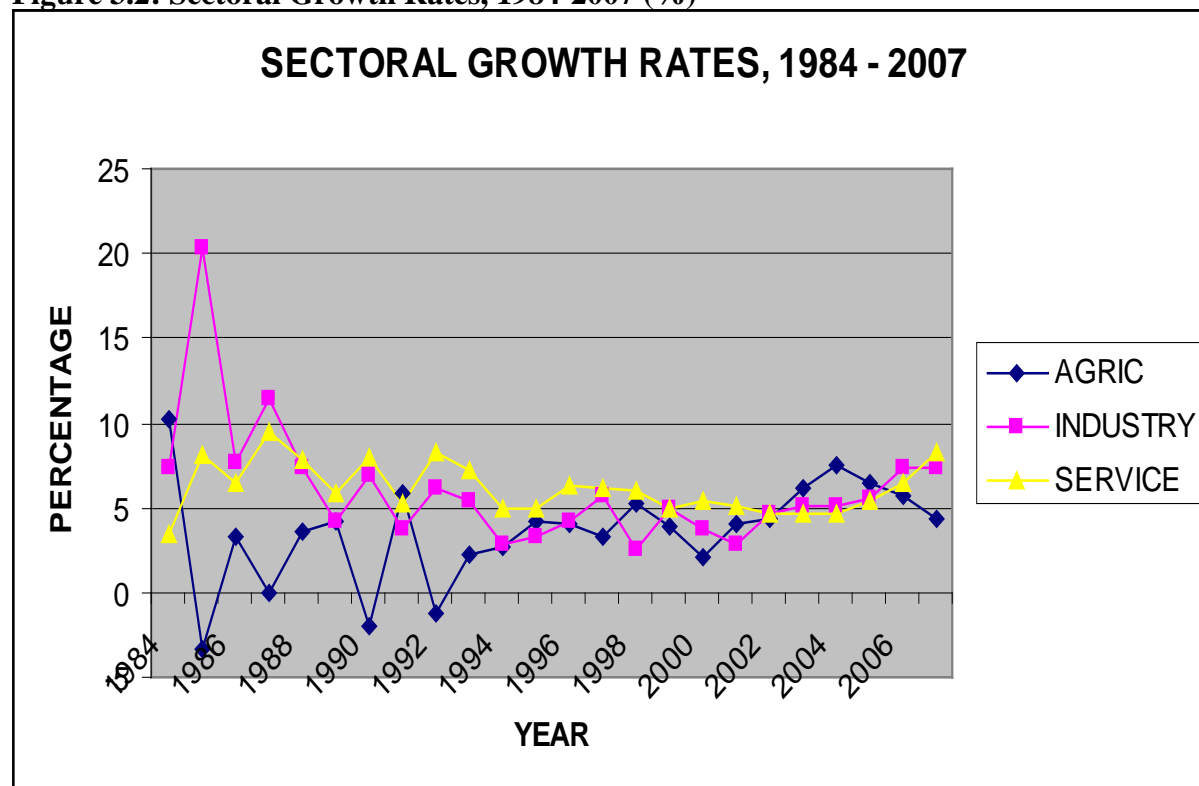


Source: Ministry of Finance and Economic Planning (MOFEP); WDI (2009)

From figure 3.1, the growth in real GDP and Real GDP per capita recorded some negative values between the periods 1961 to 1983. However, there has been a positive growth rate in real GDP and Real per capita GDP since 1984 with an irregular pattern. The growth was as a result of better economic management and the removal of distortions (which had discouraged production) under the adjustment programme.

Mainly, the agricultural sector has been the highest contributor to Ghana's GDP though its contribution has been decreasing (see figure 2 below). For example, between the periods 1998-2007 agriculture contributed 36%, industry 25.2% and services 29.7% on the average to GDP. The decline in the contribution of the agricultural sector to GDP could find explanation in inefficient farming practices, outdated technology and cultural practices, over dependence on rain-fed agriculture and poor transportation and distribution channels. The other sectors that contributed to GDP growth were the services sector (average contribution from 1998-2007 to GDP growth was 29.7%) and the industrial sector (average contribution from 1998-2007 to GDP growth was 25.1%). Figure 3.2 presents the growth rates in the various sectors of the Ghanaian economy (the state of the Ghanaian economy, 1990-2007; Fosu, 2003).

Figure 3.2: Sectoral Growth Rates, 1984-2007 (%)



Source: African Development Indicators (2006); the State of the Ghanaian Economy (2007); Ghana Statistical Service, Newsletter Revised Gross Domestic Product Estimates for 2008

From figure 3.2, the growth in the various sectors of the economy has followed an irregular pattern over the period 1984 to 2007. Between the years 2005-2007, the agricultural sector experienced declining growth rates. It however increased to 5.1% in 2008, driven by crops and livestock subsector which grew by 5.82%, good rainfall pattern, coupled with increase in area under cultivation and use of improved seeds. While both the service and the industrial sectors have been experiencing increasing growth rates, much of the increase in the services was drawn from the relatively lower-order service sectors; notably, wholesale and retail trade, and also restaurants and hotels. Also, much of the increase in the industrial sector was drawn from the growth in mining and quarrying subsector especially gold, electricity subsector, manufacturing subsector and the construction subsector. The industrial and services sectors could have performed better, but the energy crises experienced in 2006 and 2007 had significant effects on these vital sectors, hence the failure to achieve targeted growth rates especially in 2006 and 2007.

The macroeconomic stability that characterized the Ghanaian economy between 2004 and 2006 was weakened in 2008 with the economy exhibiting signs of fiscal stress, higher inflation and interest rates, as well as, widening trade deficit by the end of 2008. Domestic inflation reached a 4-year high percentage of 18.4% in June, 2008 due to external pressures from global food and crude oil prices, as well as, disruptions of domestic food supply. Money supply policy responded to the inflation shocks in 2008 with significant interest rate mark-up; but monetary expansion remained high, with broad money supply (M2+) closing 2008 at 36.3% compared to 33.2% in 2007 (Databank Group Research Economic Analysis Monthly Report, 2009).

Furthermore, according to the Databank Economic Analyst Report (2009), the Ghanaian economy will face severe growth threats in 2009 due to the global economic recession. Mainly from global commodity price declines, as well as, weak foreign direct and portfolio investment, lower donor inflow and remittances. Though the short term economic stability for Ghana is threatened by the global economic crisis, prudent sectoral reforms could facilitate broader gains within the short to medium term. Strong domestic demand, fiscal expansion, and banking sector credit expansion could stimulate domestic growth if the economy's marginal propensity to import is reduced through activist policy tools.

Also, the discovery of crude oil in commercial quantities for Ghana is likely to alter the structure of the economy when production starts in 2010. Currently, domestic tax revenue accounts for 55.8% of total planned expenditure, while an estimated 52% of tax revenue is used to finance the public sector wage bill. Projected annual oil revenue inflows for Ghana is estimated between US\$500 million and US\$860 million, and is expected to further increase to US\$3.0 billion by the end of 2015 according to the Databank Economic Analyst Report (2009).

Currently, Ghana's quest to become a middle income country (eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases; ensure environmental sustainability and develop a global partnership for development) by the

year 2015 remains on course and policy makers are trying hard to maintain the macroeconomic conditions required for growth and poverty reduction (reducing domestic debt stock-measured as ratio to GDP, achieving inflation target of single digit, achieving falling interest rate, significantly building up the Gross Internal Reserve and minimizing the volatility in the exchange rate et ce tera), but more needs to be done. More importantly, sustained progress towards the MDGs will depend to a large extent on boosting economic growth rates to at least 8-10% per annum consecutively according to the World Bank Report (2008). Hence, the pivotal tool for the attainment of MDGs is a very high, sustainable and equitable economic growth of more than 8% per annum which Ghana is still struggling to attain (Vision 2020 Report).

3.2 Political Environment in Ghana

The role of political factors in the economic growth process has now been well established. Until the 1980s, Ghana was one of the most politically unstable nations in Sub-Saharan Africa (SSA) in terms of the incidence of Coup d'états by the military. During 1960-85, Ghana had 5 "successful" coups, 6 attempted but unsuccessful coups, and 13 coup plots (see table 3.2 below). In comparison, Nigeria had 5, 1, and 4, respectively, over the same period. Such political instabilities have promoted adverse economic performance in Sub-Saharan Africa (Fosu, 1992). In this regard, the last decade and a half has been one of political tranquility, within which the present economic liberal regime has operated in Ghana. The liberal political regimes in Ghana have been associated with substantially better economic performance than control regimes (see table 3.1 above). Hence, if the present relatively good economic performance is to continue, a stable political environment will be an important contributory factor. Tables 3.2 and 3.3 present Political Data on Ghana and Democratic Presidential Elections in Ghana between the periods 1990-2008 (African Elections Database Country Report, nd; Boafo-Arthur, 1998).

Table 3.2: Political Data on Ghana

Country	Year of Independence	Year/No of Military Coups	Current Political System
Ghana	1957	1966, 1972, 1978, 1979, and 1981	Democracy

Source: African Elections Database Country Report; Boafo-Arthur (1998)

Table 3.3: Democratic Presidential Elections in Ghana, 1990-2008

Country	Year of Election	Government Turn Over
Ghana	1992, 1996, 2000, 2004, and 2008	2000 and 2008

Source: African Elections Database Country Report

3.3 Trends in all the Variables of the Study

This sub section shows the trends in all the variables of the study which include real GDP per capita, physical capital, labour force, foreign direct investment, foreign aid, inflation and government expenditure. All the data for each of the variable of interest is obtained from World Development Indicators 2009.

3.3.1: Trends in Real GDP per capita

Figure 3.3: Trend in Real GDP per capita



Figure 3.3 shows the trend of the real per capita GDP of Ghana from 1970 - 2007. It can be seen that real per capita GDP rates decreased continually from 1970 – 1981 with minimum level of US\$186.075 after 1981, there was continuous increase of real GDP per capita to 2007 with the maximum of US\$314.129. Reasons for the fall between 1970 – 1981 are high population rate – dividing GDP (when small) by a huge number of population led to the reduction in the real per capita GDP during 1970 – 1981 which resulted in low national income, recessionary – when

there was downturn in Ghana's economic activities-fall in real GDP. Another reason for the rise of real GDP per capita is recovery – expansion of activities in the economy, privatization, adequate savings, low population as a result of low mortality, maternal rate and adequate family planning.

3.3.2: Trends in Physical Capital (Gross Fixed Capital Formation % GDP)

Figure 3.4: Trend in Physical Capital

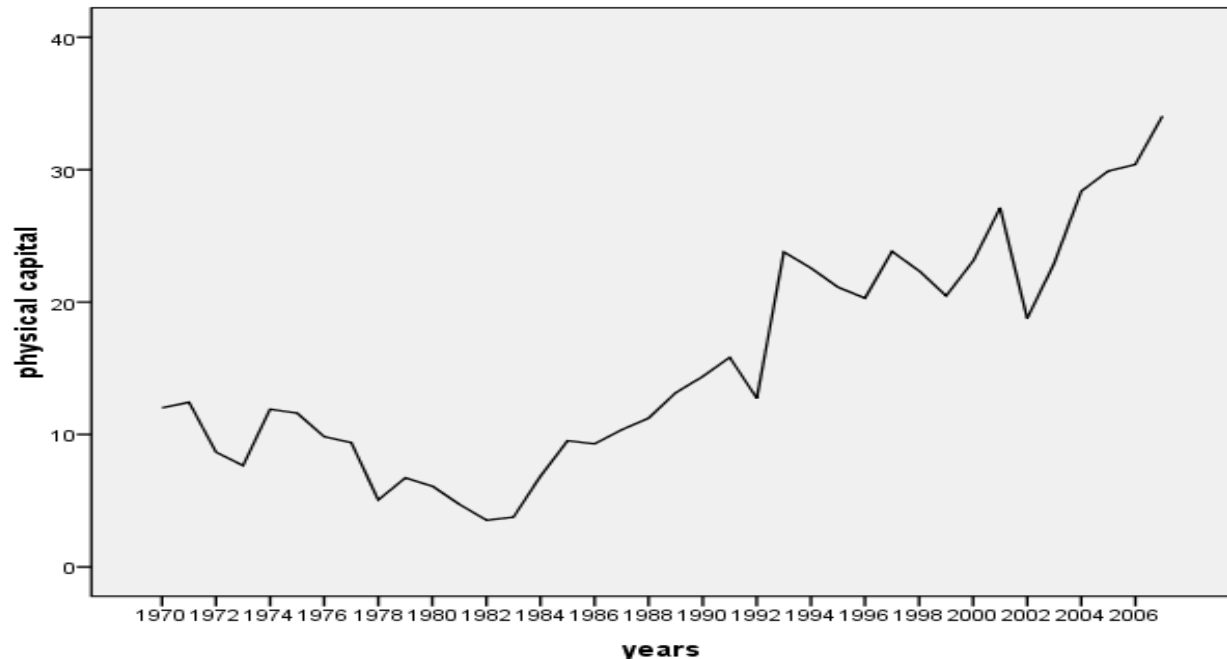
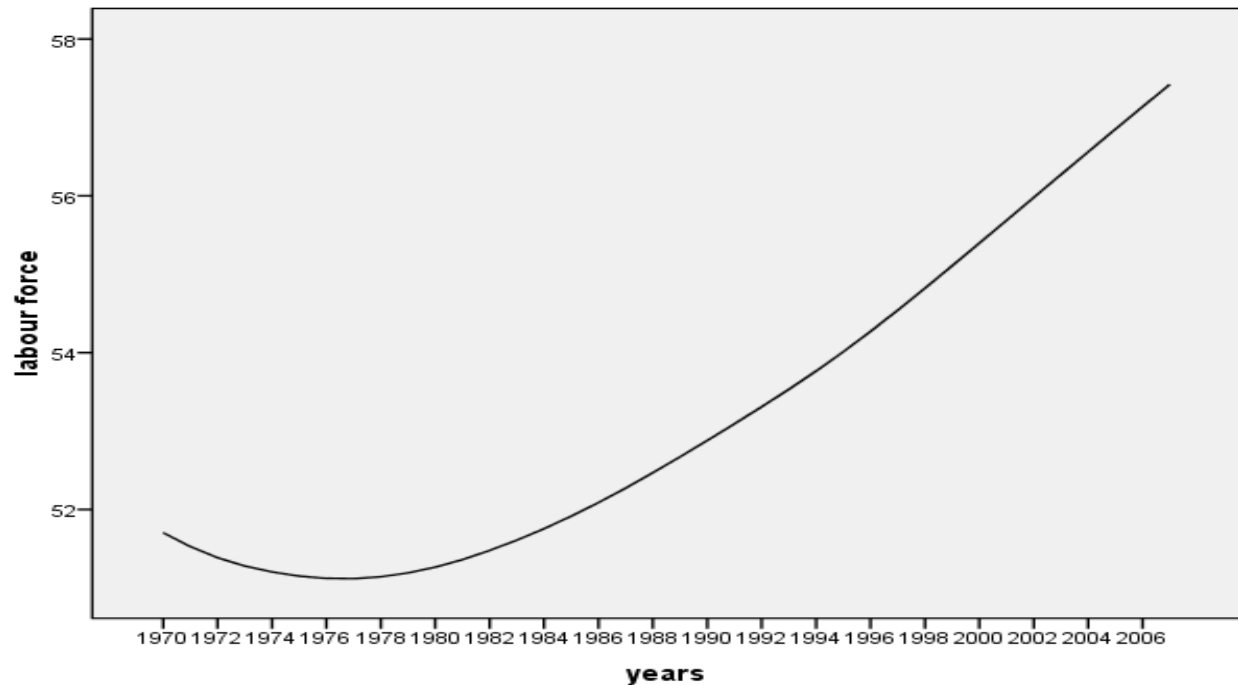


Figure 3.4 shows the trend of gross fixed capital formation as a percentage of GDP from 1970-2007. The minimum rate of gross fixed capital as a percentage of GDP was 3.53148% in 1982 and the maximum rate was 34.053148% in 2007. The distribution of gross fixed capital as a percentage of GDP was moderately skewed with the mean percentage of 15.4194%. The general trend analysis shows an increase in gross fixed capital as percentage of GDP. Reasons for the fluctuations were due to high inflation rate which scared investors during the 70s and 80s to stop investing in Ghana, high productivity in economically productive ventures by citizens which raised incomes and savings and hence increased high capital accumulation, buying of assets from abroad and high revenue accumulation through taxes.

3.3.3: Trend in Population 15-64 % of Total Population

Figure 3.5: Population Trend



The figure 3.5 depicts Ghana's population growth trend from 1970 to 2007. It can be seen from the population trend that there was a drastic decline in the population growth in the early 70s and in 1976 it reached its minimum of 51.1190. Afterwards, there has been an eventual increase in population trend from early 80s with a maximum level of 57.4205 in 2006 with average trend population of 53.2200. Population trend distribution in Ghana was moderately skewed to the right of which the degree of peakedness was not heavy. Reasons for population trend reduction from early 70s were as follows: emigration of Ghanaian into Nigeria to seek greener pastures, high mortality rate, and high maternal death rate. Reasons for population trend increment with mean 53.2200 are low education on family planning, prestige to families, assistance in family vocations and low mortality and maternal rates as a result of good health facilities with an introduction of NHIS policy in Ghana.

3.3.4: Trend in Foreign Direct Investment % of GDP

Figure 3.6: Foreign Direct Investment Trend



Figure 3.6 shows foreign direct investment percentage of GDP trend from 1970 – 2007. It can be seen that, from 1970 – 1976 there has been downwards movement from 3% to -0.660352 % which indicates the minimum FDI as a percentage of GDP in Ghana. From 1977 to 1980 saw a stable FDI as a percentage of GDP. However, there was a sudden increase of FDI as a percentage of GDP in 1981. The fluctuating and inflating trend continued until 2006 when FDI as a percentage of GDP sharply increased. The maximum percentage of 6.47379 occurred after 2006 with an average of 1.31407%. Its distribution is moderately skewed to the right of 1.52375% and its degree of peak was heavy representing 2.11926%. The fluctuating trend of FDI as a percentage of GDP in Ghana from 1970 – 2007 can find explanation in the high inflationary rate which scared potential investors. Coup d'état, that is regular overthrow of government through military interventions as experienced in the 70s and 80s put fear in both local and foreign investors to operate in the land with power conflict and excessive government regulations and policies such as high tax rates, confiscation of assets or properties belonging to foreigners and high other duties fees discouraging investors to invest. However, increases in FDI as a percentage of GDP are due to political stability, strong macroeconomic stability among others.

3.3.5: Trend in Foreign Aid % GDP

Figure 3.7: Foreign aid Trend



Figure 3.7 demonstrates the trend of foreign aid as a percentage of GDP in Ghana from 1970 – 2007. Generally, there was a continuous ascendancy of foreign aid as a percentage of GDP in Ghana from 1970 – 1989 even though there were fluctuations or ups and downs in the trend. Minimum of 1.26332% foreign aid as a percentage of GDP occurred around 1972 and 1973. The trend realized its maximum of 16.1792% around 2004 which eventually fell afterwards. The mean percentage of foreign aid as a percentage of GDP was 7.91315% with its distribution nearly skewed. Reasons for such increment in foreign aid inflows are good governance and practice, acceptance of HIPC, good macroeconomic stability issues and conducive environment for investment.

3.3.6: Trend in Inflation (Consumer Price Index)

Figure 3.8: Trend in Inflation

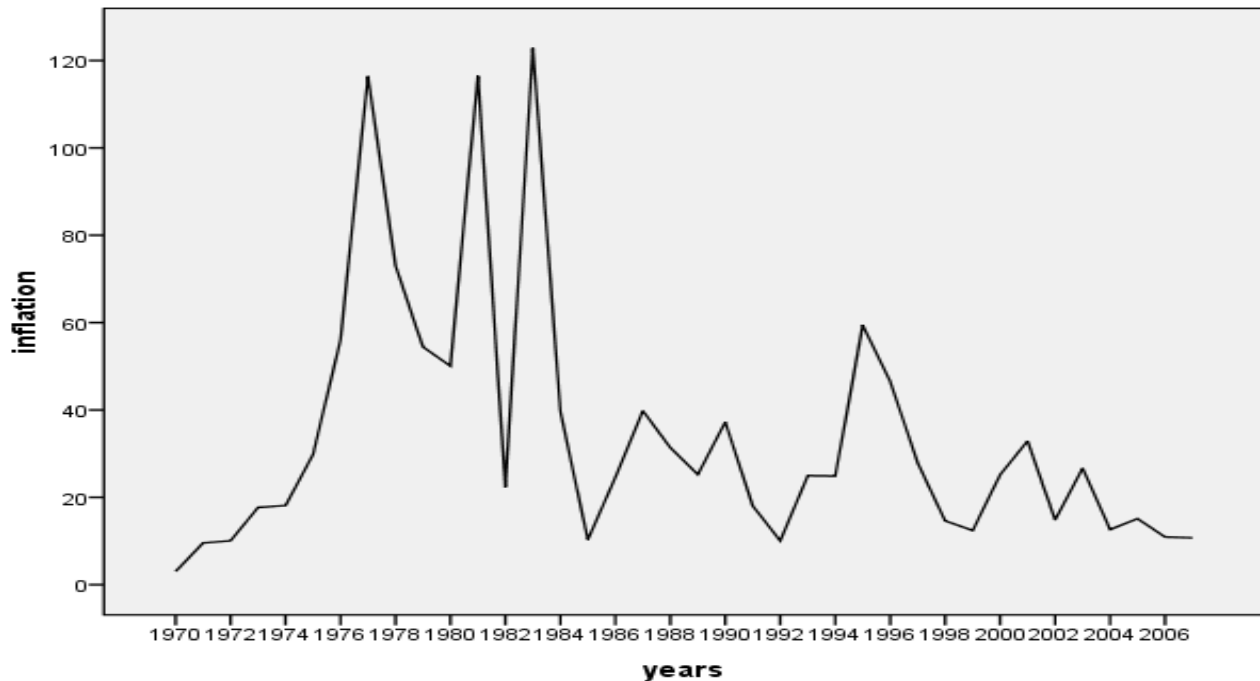


Figure 3.8 shows the trend of consumer price index from 1970 – 2007. It can be seen that inflation increased continuously from 1970 – 1978 and between 1978 – 1985 the histogram oscillated ups and downs thereby experiencing a minimum level of 3.03030% and maximum level of 122.875 around 1983. Average inflation was 34.1089%. The distribution of inflation was highly skewed to the right of 1.80591% of which the degree of peakedness of the distribution was heavy. Reason for the rise and fall in CPI are high prices of the international markets on goods and services especially on petroleum products, prolonged draught in the 1980s and high food prices.

3.3.7: Trend in Government Expenditure % of GDP

Figure 3.9: Government expenditure Trend

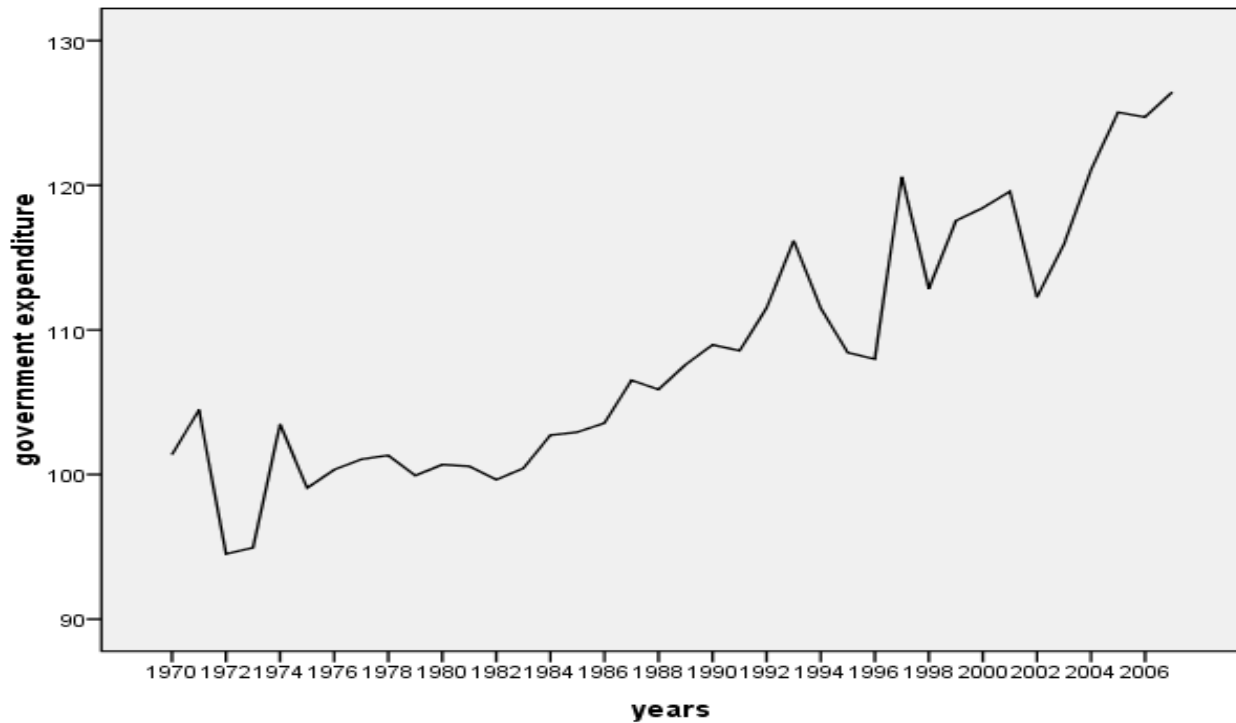
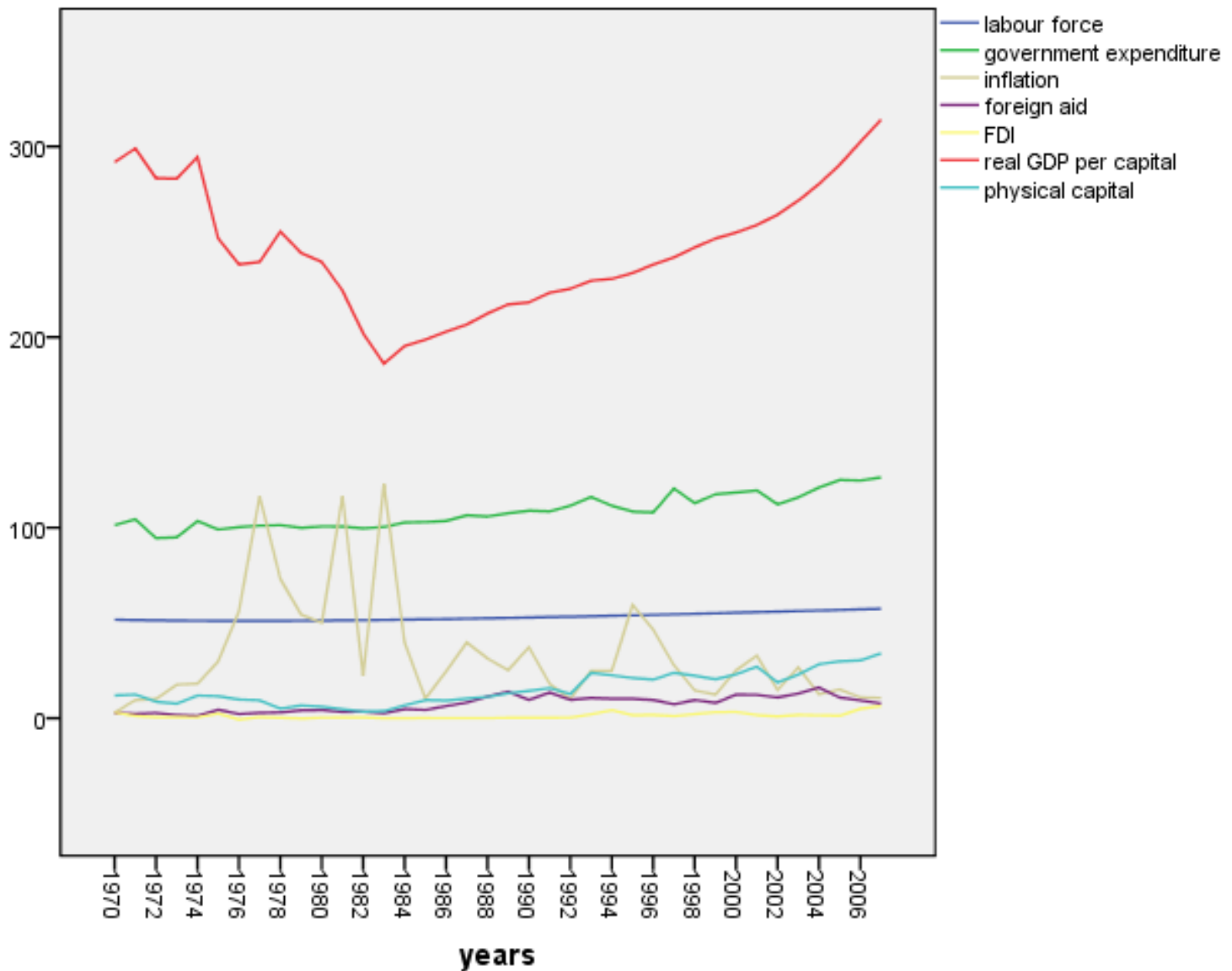


Figure 3.9 shows the government expenditure as a percentage of GDP trend from 1970 – 2007. It was indicated from the figure that government expenditure as a percentage of GDP experienced general increase even though there has been fluctuations during the stipulated period. The minimum rate was 94.5159% occurred around 1972 and the maximum rate of 126.139% in 2007. The distribution of government expenditure as a percentage of GDP was moderately skewed with low degree of peakedness. Reasons for the continuous rise in government expenditure as a percentage of GDP trend form 1970 – 2007 are government spending on infrastructural activities, high income, low taxes, and payment of government transfer to the destitute.

In summary a pool of all the trends of the variables of the study is shown in figure 3.10 below:

Figure 3.10: Trends in all the Variables of Interest



In conclusion, the Ghanaian economy has shown resilience and it is this good political situation that should spur Ghana to achieve more growth and development. However, Ghana is faced with a paradox. Despite the solid transition to democracy, recovery from the economic malaise and reductions in measured poverty remain a major concern. There is a wide spread perception of failure of the economic and political system in delivering improved living standards to the Ghanaian population. Therefore, policy makers and analysts have to confront this perception and examine it.

CHAPTER FOUR

METHOD OF STUDY AND MODEL SPECIFICATION

4.0 Introduction

This chapter describes the process of data collection and data analysis. It mainly consists of the method of study, the specification of the model, the justification of the variables and the estimation procedures.

4.1 Method of the Study

The process started with a more thorough collection and analysis of data. The type of data used for this study was secondary data. Time series data on real GDP per capita, physical capital, labour force, foreign direct investment, foreign aid, inflation and government expenditure over the study period (1970 to 2007) were obtained from World Development indicators (2009). The secondary data was used for the analysis because the verification process is more rapid and the reliability of information and conclusion is greatly enhanced. The secondary data also provided enough information to test the hypotheses of this study. Finally, it was readily available and hence, convenient to use (Ghauri, et al., 2002).

To carry out the estimation procedure of the link between real per capita GDP and its selected macroeconomic determinants based on theoretical and empirical review, annual data series from the period 1970 to 2007 were used. Therefore, the sample size of this study is 38. The period of study was chosen due to these reasons: economic crisis, economic recovery programme, Structural Adjustment Programme, multiparty democracy, and adoption of economic liberalization, privatization and globalization of the economy. Other reasons include good governance, socio-economic and political stability, intense economic expansion and availability of data for the variables of interest.

A multiple regression analysis (Johansen Cointegration estimation method) was used to analyse the data to examine the major or the key macroeconomic determinants of economic growth in

Ghana. The dependent variable is real GDP per capita. The explanatory variables are physical capital, labour force, foreign direct investment, foreign aid, inflation and government expenditure. These variables were chosen because of their authenticity in empirical literature on economic growth and the fact that the state and local policy debate frequently revolves around them. However, before the estimation of the specified long-run and the short-run growth models, the time series properties of the variables of interest were first explored to eliminate any trend element that could lead to spurious parameter estimates. In addition, to determine whether there exist any stable long-run relationships among the variables of interest, the Johansen Maximum Likelihood cointegration test was employed. The computer software used was E-Views (version 5.0).

4.2 Model Specification

Macroeconomic theory has identified various factors that influence the growth of a country from the classical, neoclassical and the new growth theories. These factors include natural resources, investment, human capital, innovation, technology, economic policies, governmental factors, foreign aid, trade openness, institutional framework, foreign direct investment, political factors, socio-cultural factors, geography, demography and many others. In order to examine the empirical evidence of the macroeconomic determinants of economic growth in Ghana, the study considers most of these factors.

Following broadly the approach adopted in Lucas (1988), the researcher specifies the economic growth function for Ghana as follows:

Real GDP per capita is a function of physical capital, labour force, foreign direct investment, foreign aid, inflation and government expenditure.

It is mathematically expressed as follows:

$$\text{RPCGDP} = f(\text{K}, \text{L}, \text{FDI}, \text{Aid}, \text{INF}, \text{GE}) \dots \dots \dots (1)$$

Thus, our growth function becomes

$$\text{LnRPCGDP}_t = \beta_1 K_t + \beta_2 L_t + \beta_3 \text{FDI}_t + \beta_4 \text{Aid}_t + \beta_5 \text{INF}_t + \beta_6 \text{GE}_t + \varepsilon_t \dots (2)$$

where,

LnRPCGDP_t represents the log of Real GDP Per Capita at time $t \equiv$ real GDP per capita growth;

K_t represents Physical Capital at time t , measured as Gross Fixed Capital Formation as a percentage of GDP;

L_t represents Labour Force at time t , measured as the % of total population aged 15-64;

FDI_t represents Foreign Direct Investment at time t , measured as Foreign Direct Investment as a percentage of GDP;

Aid_t represents Foreign Aid at time t , measured as Foreign Aid as a percentage of GDP;

LnINF_t represents the log of Consumer Price Index at time t ;

GE_t represents Government Expenditure at time t , measured as Government Expenditure as a percentage of GDP;

t = time

ε_t is the error term assumed to be normally and independently distributed with zero mean and constant variance, which captures all other explanatory variables which influence economic growth but are not captured in the model.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are the partial elasticities of real GDP per capita growth with respect to $K_t, L_t, \text{FDI}_t, \text{Aid}_t, \text{INF}_t$ and GEXP_t respectively.

4.3 Justification of the Variables

4.3.1 Economic Growth (RPCGDP_t)

There are many ways of measuring economic growth in a country. These include real output per capita and growth in real gross domestic product. This study however uses real Per Capita GDP to measure economic growth. This is because other researchers have used it in

their work as dependent variable (Anaman, 2006, Khan and Bashar, 2007 and Frimpong, J.M and E.F. Abayie, 2006). Other reasons include:

1. it has implications for the structure and condition of modern economic growth.
2. it captures the salient aspect of economic growth.
3. it is the standard measure of a nation's production and income.
4. it is an important objective of government.
5. it is often used to measure a nation's well-being.
6. it is the most widely used measure of economic growth and

4.3.2 Physical Capital (K_t)

Physical capital is any manufactured asset that is applied in production such as machinery, buildings, and vehicles. In other words, it refers to any non-human asset made by humans and then used in production (Shim J.K. et al., 1995).

Adequate capital is one of the primary needs of economic growth on theoretical and empirical grounds. Capital flows out of savings and savings out of income. More capital means more production and more production means more output and hence, more growth. This is because when saving rate is high, a larger percentage of output can be allocated for investment which may lead to faster rate of capital accumulation and output growth, all other things being equal. Summers and Hesten (1991) has shown that the experience of 84 countries over the time period 1960-1992 support this prediction: High investment rate is associated with high income per person. Capital stock is included in the model because the accumulation of capital stock remains one of the key variables in the traditional and the modern growth models. The bulk of the theoretical and empirical evidence indicates that the relationship between economic growth and capital stock is positive (Romer, 1986; Lucas, 1988; Rebelo, 1991; Hoover and Perez, 2004). Consequently, the study expects the coefficient of capital stock to be positive ($\beta_1 > 0$).

4.3.3 Labour Force (L_t)

Labour force is the total labour force or currently active population comprises all persons who fulfill the requirements for inclusion among the employed or unemployed during specified period (Shim J.K. et al., 1995).

On theoretical grounds, the stock of labour must be included in this model. According to the classical growth theorists, an increase in labour force (L_t), which is measured here as the percentage of total population aged 15-64years, is expected to lead to an increase in real GDP per capita (economic growth). All other things being equal, the higher the labour force, the higher the supply of labour and hence, output (McConnell, et al., 2002; Weil, 2005; Todaro, 2006). Therefore, the coefficient of labour is expected to be positive ($\beta_2 > 0$).

4.3.4 Foreign Direct Investment (FDI_t)

Foreign direct investment refers to long term participation by country A into country B. it usually involves participation in management, joint venture, transfer of technology and expertise (Shim J.K. et al., 1995).

Foreign direct investment plays an important role in driving economic growth through increase in productivity levels. Foreign direct investment has been acknowledged as the most crucial factor in enhancing economic development and the standard of living for emerging economies. The reasons are that foreign direct investment brings technological advancement and creates employment in host economies. It helps to adopt new methods of production and enhances productivity by bringing competition in the economy. Foreign direct investment also provides superior management and organizational skills in host economies, and explores hidden markets in the economy. Furthermore, FDI reduces the barriers in adoption of technology and brings improvements in the quality of labour and capital inputs in the host economy.

Other benefits include using local resources more efficiently and productively, increase in product diversity, improved observation of human and labour rights and creation of lots of linkage-effects in the economy, both forward and backward. All these factors help boost overall economic growth in the host countries, all other things being equal (Chowdhury and Mavrotas, 2006). Based on reference, the consensus seems to be that there is a positive correlation between FDI inflows and economic growth, provided that the receiving countries have reached a minimum level of educational, technological and/or infrastructural development (Blomstrom et al., 1994; Borensztein et al., 1998; Hansen and Rand, 2006). The bulk of the empirical evidence indicates that there is a positive relationship between foreign direct investment and economic growth (Balasubramanyam, 1996; De Mello, 1999; Obwona, 2001; Bachtiar, 2003; Eller, et al., 2005). Consequently, the study expects the coefficient of FDI to be positive ($\beta_3 > 0$).

4.3.5 Foreign Aid (Aid_t)

Foreign aid is a voluntary transfer of resources from one country to another, given at least partly with the objective of benefiting the receipts country (Shim J.K. et al., 1995).

Another factor closely related to investment is foreign aid. In theory, foreign aid could relax any or all of the three constraints on investment (Bacha, 1990). In the first place, the savings constraint arises especially in low-income countries. In such under developed economies, domestic savings are insufficient to meet (public) investment requirements. Aid (foreign savings) relaxes this constraint. Secondly, the foreign exchange constraint arises because investment requires imported capital goods and the 'free' foreign exchange available from export earnings may be insufficient. As aid is in the form of foreign exchange, it permits a higher level of (capital) imports. The third constraint is the fiscal constraint.

The fiscal constraint captures the possibility that government behaviour affects private savings and public investment can affect private investment. In this case also, Aid, by financing public investment and reducing the need to raise seignorage revenue to finance a deficit, can relax this constraint.

In addition, Chenery and Strout (1966) also posit a knowledge gap in developing countries and foreign aid in the form of technical assistance, can relax this constraint (and increase productivity). If foreign aid is used to relax these constraints, then, it is expected to be positively correlated with investment and growth (Hjertholm, et al., 2000). Gomanee, et al. (2005) show that aid has a beneficial impact on growth in Sub-Saharan African countries through financing public investment, although the impact on growth is small because productivity is low.

Papanek (1972) finds a positive relation between aid and growth. Singh (1985) finds evidence that foreign aid has positive and strong effects on growth when state intervention is not included. Snyder (1993), in addition, shows a positive relationship between aid and growth when taking country size into account. Most of the empirical studies have supported the argument that foreign aid is growth enhancing to the host countries (Gupta, 1975; Dhakal, Upadhyaya and Upadhyay, 1996; Burnside and Dollar, 1997; Dalgaard, Hansen and Tarp, 2004). Consequently, it is expected that foreign aid will have a positive impact on growth ($\beta_4 > 0$).

4.3.6 Inflation (INF_t)

Inflation is a rise in the general level of prices of goods and services in an economy over a period of time (Shim J.K. et al., 1995).

Inflation and economic growth rates are two of the most important and most closely watched macroeconomic variables. High inflation rate is a very common phenomenon in most developing countries, Ghana inclusive. Although it is agreed between economists that countries with high inflation rates should adopt policies that lower inflation in order to promote growth, the inability to find simple cross-country regressions supporting this contention is, according to Levine and Zervos (1993), both surprising and troubling. However, the evidence suggests that mild inflation, between 5% and 8%, is positively beneficial to growth. After that, the effects of high inflation can be seriously damaging (Thirlwall, 1974).

Inflation can lead to uncertainty about the future profitability of investment projects (especially when high inflation is also associated with increased price variability). This leads to more

conservative investment strategies than would otherwise be the case, ultimately leading to lower levels of investment and economic growth. Inflation may also reduce a country's international competitiveness, by making its exports relatively more expensive, thus impacting on the balance of payments. Moreover, inflation can interact with the tax system to distort borrowing and lending decisions. Firms may have to devote more resources to dealing with the effects of inflation (for example, more vigilant monitoring of their competitors' prices to see if any increases are part of a general inflationary trend in the economy or due to more industry specific causes).

Unfortunately, the average annual inflation in Ghana has never been less than 15% since 1973. The lowest rate was 10% in the year 1985 and 1992 (World Bank Database, 2006). Inflation can be perceived as an indicator for how much the government has resorted to taxing domestic financial assets through money creation (sometimes it is called inflation tax policy). Inflation could also be perceived as an indicator of macroeconomic instability. In both cases, De Gregorio (1993) finds evidence of a negative relation between inflation and growth (Fischer and Modigliani, 1978; Barro, 1995, 1996, 2003; Easterly and Levine, 1997; Motley, 1998; Gylfason and Herbertson, 2001; Andres and Hernando, 1999; Swiedan, 2004). However, Bruno and Easterly (1995) were unable to find a long run relationship between inflation and growth. Consequently, the study would expect a negative relation between inflation and economic growth in Ghana ($\beta_5 < 0$).

4.3.7 Government Expenditure (GE_t)

Government expenditure is government acquisition of goods and services for current or future use (Shim J.K. et al., 1995).

The relationship between government spending and economic growth is very important for developing countries, most of which have experienced increasing levels of public expenditure over time, Ghana inclusive. Government consumption is a component of gross domestic product (GDP).

Everything else held fixed, government consumption will increase GDP since it contributes to current demand. It will also have the same positive feedback loop on GDP as private consumption itself has, because it increases GDP which is a determinant of total consumption. However, there is also a negative effect since increased public expenditure needs to be financed. Financing public expenditure is done through taxes or by borrowing. Increased taxes will lower disposable income for households and private consumption may fall accordingly.

Public expenditure can also have a crowding out effect on private investment. This is because resources that could have been invested in the private sector, for instance, goes to the government sector instead. Public expenditure might also have a positive effect on interest rates, which in turn can decrease investment. The bulk of the empirical evidence also indicates that the relation between government consumption and economic growth is negative (Barro, 1991, 1996, 2003; Romer, 1990; Easterly and Rebelo, 1993; Hansson and Henrekson, 1994; Kneller, et al., 1998, Tanninen, 1999).

In addition, governments in poor countries like Ghana behave in a manner more detrimental to growth than regimes in rich countries on the average (Weil, 2005). This study accounts for the burden of government through a proxy, namely, the ratio of government expenditure to GDP. Consequently, the study expects the coefficient of government consumption to be negative ($\beta_6 < 0$).

Physical capital, labour force, foreign direct investment, foreign aid, inflation, and government expenditure are chosen because of their authenticity in empirical literature research on economic growth and because of the fact that the state and local policy debate frequently revolves around them.

In summary, the explanatory variables and their expected signs are shown below (Table 4.1):

Table 4.1: Summary of the Explanatory Variables and their Expected Signs

Explanatory Variables	Expected Sign
Physical Capital	+
Labour Force	+
Foreign Direct Investment	+
Foreign Aid	+
Inflation	-
Government Expenditure	-

The error correction term lagged one period, which integrates short-run dynamics in the long-run growth function is shown below through error correction model (ECM):

$$\Delta \text{LnRPCGDP}_t = \alpha_1 + \sum_{i=1}^p b_{2i} \Delta \text{LnRPCGDP}_{t-i} + \sum_{i=0}^p c_{3i} \Delta K_{t-i} + \sum_{i=0}^p d_{4i} \Delta L_{t-i} + \sum_{i=0}^p e_{5i} \Delta \text{FDI}_{t-i} + \sum_{i=0}^p f_{6i} \Delta \text{Aid}_{t-i} + \sum_{i=0}^p g_{7i} \Delta \text{INF}_{t-i} + \sum_{i=0}^p h_{8i} \Delta \text{GE}_{t-i} + \lambda \text{ECM}_{t-1} + \varepsilon_{2t} \dots (3)$$

where, ECM_{t-1} is the error correction term (the residuals that are obtained from the estimated cointegrating model of equation (3)). It is the feedback and adjustment effect which indicates how much of the disequilibrium is being corrected. It further proves the stability of the long-run relationship when it is highly statistically significant (Bannerjee, et al., 1998). The composition of ε_{2t} is similar to that of ε_{1t} as observed in equation (3). The symbol Δ represents the first-differenced form of the variables in the model. The coefficient of the various explanatory variables, b_{2i} , c_{3i} , d_{4i} , e_{5i} , f_{6i} , g_{7i} , h_{8i} , are the impact multipliers that measure the immediate impact that a change in the explanatory variable has on a change in the dependent variable. λ represents the speed of the adjustment parameter. The value of λ must be between the range $-1 \leq \lambda \leq 0$ and must be statistically significant.

Notably, the appropriate number of lags, which offers the value of ' p ', is chosen automatically by E-views (Version 5) according to the Schwarz Bayesian Criterion (SBC). The Parsimonious empirical model will be determined based on the concurrent least value of SBC at the instance of no autocorrelation with reference to Durbin-Watson (DW) statistic. With this, the appropriate empirical method for estimation is selected. To ascertain the goodness of fit of the long run

model, the diagnostic test is conducted. The diagnostic test examines the serial correlation associated with the model. The econometric package used is E-Views (Version 5.0).

4.4 Estimation Procedures

4.4.1 Unit Root Tests

This study began with the test for stationarity of the endogenous and exogenous variables within the framework of Augmented-Dickey-Fuller (ADF) test procedure. This test is important in order to avoid spurious regression which is a common problem when estimating a regression line with data whose generated process follows a time trend. The ADF test requires estimating an equation of the form:

$$\Delta y_t = B_0 + B_1 y_{t-1} + B_2 t + \sum_{i=1}^p A_i \Delta y_{t-i} + z_t; \quad H_0: B_1 = 0; H_1: B_1 > 0$$

where,

y_t is a vector for all-time series variables under consideration in a particular regression model (our variables of interest);

t is a time trend variable;

Δ denotes the first difference operator;

z_t is the error term;

p is the optimal lag length of each variable chosen automatically by E-views Version five according to the Schwarz Information Criteria (SIC) such that first-differenced terms make z_t a white noise.

The ADF test is principally concerned with the estimate of B_1 , that is, the study tests the hypothesis $H_0: B_1 = 0$. The rejection of the null hypothesis in favor of the alternative hypothesis implies that y_t is stationary and integrated of order zero, that is, $I(0)$. If the null hypothesis of unit root for the first difference is rejected, then the first difference is stationary and the variable is integrated of order one, that is, $I(1)$ (Johansen 1988; Maddala, 1977; Adenutsi, et al., 2007). The objective of this unit root test is to check whether the macroeconomic variables of interest are

integrated of order one (I(1)) before proceeding to the estimation procedure (Engle and Granger, 1987).

4.4.2 The Johansen Cointegration Test

After checking univariate time series of all-time series properties of each of the variables in the specified model are found to be integrated of same order, the study proceeded with testing of cointegration among the variables of interest. The purpose of the cointegration test is to determine whether a group of non-stationary series is cointegrated or not.

This study applied the Johansen Cointegration Maximum Likelihood Method of Cointegration developed by Johansen (1988) and applied by Johansen and Juselius (1990) to determine the number of cointegrating vectors. In this case, the study applied the trace test and maximum eigenvalue test. If these tests give contradictory results at 5% significance level, the researcher would check whether they give similar results at 10% significance level instead. If yes, the research would keep results based on 10% significance level. However, if at 10% significance level the tests still give contradictory results, the researcher would stick to the results based on maximum eigenvalue test, which is usually preferred for try to pin down the number of cointegrating vectors (Ender 2004).

On the other hand, if the variables are found to be integrated of different order, make them integrated of same order through differencing before determining the number of cointegrating vectors. For instance, if some variables are I(1) and some variables are I(2), we can first-difference I(2) variables in order to make them I(1), and then check for the number of cointegrating vectors. On the other hand, if some variables (except dependent variable) are I(0) and some variables are I(1), ignore I(0) variables while conducting Johansen-Juselius (1990, 1992, 1994) maximum likelihood method of cointegration. In case where the dependent variable itself is I(0) regardless of the order of integration of other variables, it is not possible to conduct cointegration analysis, implying that there exist no long run relationship among the variables. In this case, the research can run OLS after differencing the I(1) variables.

If the variables are found to be cointegrated, the research would estimate error correction model using standard methods and diagnostic tests. The researcher will include the $I(0)$ variables (which have been omitted in cointegration tests) while estimating vector error correction models.

CHAPTER FIVE

ANALYSIS OF DATA AND INTERPRETATION OF RESULTS

5.0 Introduction

The Johansen Cointegration method of estimation was used to examine the major macroeconomic determinants of economic growth in Ghana over the period 1970 to 2007. Before that, the stationary properties of all the variables of interest were established using Argument Dicky Fuller test. Different forms of the models were estimated to find the correct model for estimation. First, none of the variables were logged; the results were dropped because the coefficients were too large and do not make sense statistically and economically. Second, all the variables of interest were logged and that was also problematic because the results did not have reasonable interpretation once foreign aid is percent of GDP it should not be logged again (see appendix)). Finally, only the dependent variable was logged and this was more reasonable thing to do hence the model specified for evaluation (see chapter 3). Note that the coefficients here are the elasticities of the actual variables, labour force, foreign aid, Inflation etc. The analysis of data and the interpretation of the results are the main focus of this chapter.

5.1 Results of Unit Root Test

The time series properties of the variables were explored to determine the order of integration of each variable in the model. Standard procedure in the time series literature suggests that the researcher should check for unit roots in each series before estimating any equations. If a unit root exists in any variable, then that particular series is considered to be non-stationary. Estimation based on non-stationary variables may lead to spurious results with high R^2 (R^2 explains how much of the variances in the dependent variable is accounted for by the regression model from the sample) and t-statistics, but without any coherent economic meaning and inconsistent parameter estimator (Pyndick, 1998). The stationary test was performed to avoid spurious regression problems normally associated with time series econometric modeling.

The Augmented Dickey Fuller (ADF) test for estimating unit roots was applied in this study. The result of ADF testing can be seen in Table 5.1:

Table 5.1: ADF Test (Constant and Trend Included)

Levels			First Difference			
Variable	ADF-Stat	Critical value (5%)	ADF-Stat	Critical Value (5%)	Order of Integration	Conclusion
LnRPCGDP	-1.662907	-3.536601	-5.192666	-3.540328	1	I(1)
K	-2.962836	-3.540328	-5.092125	-3.540328	1	I(1)
L	-2.255898	-3.544284	-4.255898	-3.544284	1	I(1)
FDI	-2.679188	-3.536601	-4.788471	-3.568379	1	I(1)
Aid	-2.949801	-3.536601	-8.874854	-3.540328	1	I(1)
INFL	0.096457	-3.536601	-4.370882	-3.540328	1	I(1)
GE	-2.095500	-3.536601	-6.327220	-3.540328	1	I(1)

Source: Author's Computation, 2009

The results of the ADF testing for the variables reported in Table 5.1 indicates that all the variables were non-stationary in levels, I (0), but become stationary after first differencing, or integrated of order one, I(1), which provided a necessary, but not sufficient rationale for estimating cointegration and error correction models.

5.2 Results of Johansen Maximum Likelihood Cointegration Test

After conducting the unit root test, this study applies the Johansen and Juselius (1990) maximum likelihood method to investigate whether there is more than a single cointegration relationship among the variables of interest. At 5% significance level, the trace test indicates 2 cointegrating equations while the maximum eigenvalue test indicates 1 cointegrating equation among the variables. We conclude that there is one cointegrating equation among the variables based on the maximum eigen value test (Enders, 2004). The cointegrating results are shown in Table 5.2:

Table 5.2: Johansen Cointegration Tests

Trace Test					Max-eigenvalue Test		
Hypothesized No. of CEs	Eigen value	Trace Stats	0.05 Critical value	Prob**	Max-Eigen Stats	0.05 Critical value	Prob**
None	0.808290	171.0570	134.6780	0.0001	59.46371	47.07897	0.0015
At most 1	0.654748	111.5933	103.8473	0.0139	38.28534	40.95680	0.0970
At most 2	0.593101	73.30792	76.97277	0.0920	32.37085	34.80587	0.0950
At most 3	0.414046	40.93707	54.07904	0.4241	19.24248	28.58808	0.4720
At most 4	0.254373	21.69459	35.19275	0.6160	10.56707	22.29962	0.7884
At most 5	0.160065	11.12753	20.26184	0.5299	6.279511	15.89210	0.7560
At most 6	0.125993	4.848017	9.164546	0.3005	4.848017	9.164546	0.3005
Trace Test Trace test indicates 2 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values Max-eigenvalue Test Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values							

Source: Author's Computation, 2009

Thus, the null hypotheses of no cointegration are rejected, implying long-run cointegration relationships amongst the variables, when normalized for a unit coefficient on LnRPCGDP, the cointegrating regression of economic growth in Ghana can be given in table 5.3:

Table 5.3: Dependent Variable: LnRPCGDP (Linear Deterministic Trend) (Unrestricted)

Variable	Coefficient	Standard Error	t-Statistics
K	0.036692	0.00876	4.18858
L	0.208855	0.18348	1.13830
FDI	-0.067767	0.02657	- 2.55051
AID	-0.037652	0.00985	- 3.82254
INF	0.001132	0.00083	1.36385
GE	-0.037110	0.00812	- 4.570110
Trend(2)	-0.106689	0.06582	- 1.62092

Source: Author's Computation, 2009

In the estimated model in table 5.3, none of the coefficients of explanatory variables of economic growth is found to be greater than unity, indicating low responsiveness of economic growth to changes in these variables.

5.3 Interpretation of the Results

The coefficient of the physical capital is positive as expected based on theory. It is statistically significant at 5 percent significance level. Specifically, a one percent increase physical capital will cause real GDP per capita to increase by 0.037 percent approximately, *ceteris paribus*. It can be inferred that physical capital has a positive impact on real GDP per capita in Ghana, in general. This means that in the long run, increases in physical capital is vital to economic growth in Ghana. This result is in support of theory and concurs with the result obtained by Danquah (2006), Aryeetey and Fosu (2005), though statistically insignificant and E.F. Oteng-Abayie, et al. (2006) who found it to be statistically significant at 1 percent significance level.

Truly, this study has found that there is a positive relationship between labour force and economic growth in Ghana though it is statistically insignificant at the 5 percent significance level. Specifically, a one percent increase labour force will cause real GDP per capita to increase by 0.209 percent approximately, all other things being equal. This result is consistent with economic theory and the findings of Danquah (2006). However, this result is inconsistent with the findings of Aryeetey and Fosu (2005) and E.F. Oteng-Abayie, et al. (2006).

The long run results reveal yet another petrifying outcome which is in contravention with expectation as economic theory suggests. We found that the coefficient of foreign direct investment (FDI) has a negative impact on growth. It is statistically significant at 5 percent significance level. A one percent increase in FDI will lead to a fall in real GDP Per Capita by 0.068 percent approximately, all other things remaining the same. This negative relationship between FDI and real GDP per capita in Ghana is consistent with a previous study by Frimpong, J.M and E.F Oteng-Abayie (2006) but inconsistent with theory and other empirical findings by Balasubramanyam, et al. (1999), Asheghian (2004) and Vu, et al. (2006). This interesting result obtained from the empirical study confirms the mining sector FDI dominance which does not generate direct growth impacts on the wider economy (Frimpong, J.M and E.F Abayie, 2006). Some conditions that are often associated with official FDI to developing countries, Ghana inclusive, might not be directly favourable to initiating higher levels of industrial performance as well as economic growth. For instance, substantial FDI go to non-manufacturing sectors of the

economy, particularly services sector for which reason FDI will not make any significant impact on industrial performance and also on economic growth (Adenutsi, 2008).

The coefficient of foreign aid is negatively signed and is statistically significant at 5 percent significance level. A one percent increase foreign aid will cause real GDP Per Capita to decrease by 0.038 percent, all other things remaining the same. This indicates that foreign aid do not have a substantial or statistically significant effect on Ghana's real GDP per capita growth in the long-run. This result obtained is inconsistent with theory and supports the study by Papanek (1973), Gupta (1975), and Lloyd, Morrissey and Osei (2001). However, the result obtained is consistent with several studies in developing countries such as Griffin and Eno (1970) and Voivdas (1973).

Interestingly, the study found that there is a positive relationship between inflation and real GDP per capita, though statistically insignificantly at the 5 percent significance level but statistically significant at 10 percent significance level. Thus the results indicate that, if inflation increase by one percent, then real GDP per capita will significantly increase by 0.001 percent, *ceteris paribus*. This means that the inflationary level that Ghana has experienced is good for Ghana's economic growth. The result is inconsistent with the work of Alexander (1997), Fischer (1993) and Barro (1995) but consistent with previous studies by Thirlwall and Barton (1971), Gillman, et al. (2002) and Ghosh and Phillip (1998).

The potency of government expenditure in explaining real GDP per capita in the country is negative and is statistically significant at 5 percent significance level. A one percent increase in government expenditure will cause real GDP per capita to decrease by 0.037 percent, *ceteris paribus*. This result obtained means that government has not been spending more on productive sectors (provision of safe water, primary health care, education etc) of the economy. This result obtained is not in line with finding by Ram (1986) and Aschauer (1989) but consistent with other findings obtained by Landau (1986) and Barro (1990).

From the long-run estimated result, physical capital, foreign direct investment, foreign aid, inflation and government expenditure are identified as the major macroeconomic determinants of economic growth in Ghana.

5.4 Results of the Estimated Short-Run Dynamic Model

Analysis of short run dynamic equation has two important objectives. First, it can be used to investigate whether the impact of any of the explanatory variables are permanent or temporary. If responses are significant only in the short run, then the effect of changes in any of the explanatory variables is temporary. However, if the response is significant in both the short run and the long run, then it can be said that changes of any of the explanatory variables are permanent. Finally, the Dynamic Error Correction Model (DECM) provides information about the speed of adjustment in response to a deviation from the long run equilibrium, which could be useful for policy analysis (Cholifihani, 2008). The estimation of the Dynamic Error Correction Model is shown in Table 5.4:

Table 5.4: Estimated Short-run Dynamic Model

Dependent Variable: D(RGDPPK)			
Variable	Coefficient	Std. Error	t-Statistic
Constant	0.066086	0.05078	1.30137
D(LnRPCGDP(-1))	0.190926	0.19441	0.98207
D(LnRPCGDP(-2))	-0.159901	0.20005	-0.79930
D(K(-1))	-0.001052	0.00342	-0.30721
D(K(-2))	0.001074	0.00349	0.30768
D(L(-1))	-1.079207	1.99043	-0.54220
D(L(-2))	0.799855	1.88382	0.42459
D(FDI (-1))	0.019565	0.01048	1.86755
D(FDI (-2))	-0.008265	0.00702	-1.17752
D(Aid(-1))	0.008557	0.00487	1.75659
D(LnAid(-2))	0.004715	0.00437	1.07950
D(LnINFL(-1))	-0.000103	0.00026	-0.39367
D(LnINFL(-2))	-0.000282	0.00025	-1.11103
D(LnGEXP(-1))	-0.012282	0.00413	-2.97427
D(LnGEXP(-2))	-0.008731	0.00372	-2.34775
ECM(-1)	-0.203749	0.08256	-2.46793
R-squared	0.623901		
Adj. R-squared	0.326980		
Sum sq. resids	0.026924		
S.E. equation	0.037644		
F-statistic	2.101239		
Log likelihood	75.81386		
Akaike AIC	-3.417935		
Schwarz SC	-2.706919		
Mean dependent	0.002948		
S.D. dependent	0.045886		

Source: Author's Computation, 2009

In the above estimated model, foreign direct investment (lagged one year), foreign aid (lagged one year), and government expenditure (lagged one and two years) have been found important (significant) macroeconomic determinants of economic growth of Ghana in the short-run.

An examination of the econometric results shows that the overall fit is satisfactory with an R-squared of 0.624, thus 62.4% of the systemic variation in the dependent variable is explained by the ECM. The estimated coefficient of the error term (-0.203749) has been found statistically significant at 5% level with appropriate (negative) sign. This suggests that the system corrects its previous period's disequilibrium by 20.4 percent a year. The long-run model passed all the

diagnostic tests: White heteroskedasticity - 3.9727 [0.2248], Serial correlation LM test – 2.1163 [0.1511] and Ramsey Reset – 3.2520 [0.1242].

CHAPTER SIX

CONCLUSION, SUMMARY AND POLICY RECOMMENDATIONS

6.0 Introduction

This chapter consists of the conclusions, the summary of the major findings and policy recommendations.

6.1 Conclusions

The problem of this study is ascertaining the key/major macroeconomic determinants of economic growth that would drive Ghana's real per capita GDP growth towards the attainment of the targeted middle income status by the year 2015 and determine which ways these determinants influence economic policy formulation and implementation.

In this regard, the main objective of the study is to examine the major macroeconomic determinants of real GDP per capita growth in Ghana for the period 1970 to 2007 by means of Cointegration and error correction models using yearly data for a period of 38 years and then recommend actions that should be taken to speed up the growth process in Ghana.

In order to achieve the main stated objective, the following hypotheses were tested:

- I. physical capital does not have a positive relationship with economic growth in Ghana.
- II. labour force does not have a positive relationship with economic growth in Ghana.
- III. foreign direct investment does not have a positive relationship with economic growth in Ghana.
- IV. foreign aid does not have a positive relationship with economic growth in Ghana.
- V. inflation does not have a negative relationship with economic growth in Ghana.
- VI. government expenditure does not have a negative relationship with economic growth in Ghana.

Before the estimation, the stationarity properties of the variables of interest were first tested with the help of the Augmented Dickey Fuller (ADF) test. This was to ensure that all the variables of interest are integrated of the same order. The Johansen approach to cointegration was then employed to determine the long run relationship among the variables of interest.

6.2 Summary of the Major Findings

Interesting findings have emerged from this study. Our study shows that long-run economic growth in Ghana is largely explained by physical capital, foreign direct investment, foreign aid, inflation and government expenditure. It is also evident that economic growth is not affected by short-term changes in labour force. The estimated coefficient of the ECM indicates a mild speed of adjustment to equilibrium. The sign of error correction term is negative and significant, confirming that there exists a long-run equilibrium relationship among the variables.

6.3 Policy Recommendations

Based on our findings, the following policy options are recommended.

Physical capital had a positive impact on growth in this study. This implies that government should continue to invest massively in plants, machinery, raw materials, industrial buildings, engineering, technology and other capital stock that are central to production and at the same time develop the human resource capacity by increasing investment in the educational sector to ensure an efficient use of the equipment and technology that may be available. This positive result also means that physical capital is complementary government expenditure and hence, encourages the private sector to thrive.

A well-functioning financial sector enhances economic growth through ensuring that capital is not left idle and that it is directed to where it is most beneficial; bearing in mind the quality of the investment alongside its quantity.

In order to generate revenue to meet increased investment in capital stock, government must reform the tax system and improve its budget balance. The tax system should be shaped to promote investment in physical capital (For example, granting tax rebate to the private sector in their acquisition of modern equipment, machinery and technology). In addition, government should raise the rate of public saving by moving the nation's budget from deficit to surpluses that would add to the nation's flow of saving in order to stimulate investment. Private sector development should also be facilitated to enhance its performance in the economy.

The labour force variable was found to have a positive relationship with real GDP per capita. From the results, a policy suggestion is that the government should continue to devote more resources to expanding technical and vocational education. The reform of the pre-university educational system is in the right direction. Also, the government needs to devote more resources to enhance non-formal education with strong emphasis on basic literacy and skills training.

From economic theory, foreign direct investment is expected to have positive impact on growth but has been found to impact negatively on real GDP per capita in Ghana. This implies that foreign direct investment policies should be formulated to improve upon the performance of FDI in the economy. The mining sector in Ghana is dominated by FDI (E.F. Oteng-Abayie, et al., 2006) as compared to other sectors in the economy including agriculture, the backbone of the Ghanaian economy. A policy recommendation is to attract export-oriented FDI into the industrial sector and more especially agricultural sectors of the economy since agriculture is the backbone of the Ghanaian economy. Government must also create the necessary environment to attract foreign direct investment into the economy. For instance, improvement in the transportation system and industry, provision of sustainable energy and water, waste management, improvement in communication technology, building and rehabilitation of harbours and ports must be encouraged since these facilities are important in attracting foreign direct investment into Ghana.

In this study, foreign aid was found to have a negative impact on real GDP per capita. It implies that in general, foreign aid receipts from donor countries have not been allocated effectively over the period of study. The policy recommendation is that government should continue to direct foreign assistance into the programmes that produce public capital since this improves the productivity of the masses and hence, is likely to have a positive long run effect on growth in Ghana. In this case, foreign aid can help reassign resources away from activities that produce normal goods towards activities that produce public goods which benefit more people than just a single individual, for instance, projects which reduce corruption, research that helps eliminate diseases, systems that promote ownership rights and projects that stimulate the adoption of adequate technologies for the country. Also, policies that help small and medium sized enterprises in the consumer goods sector have relatively high potential for reducing poverty, as this sector benefits the two groups of urban and rural poor. Thus, it is highly recommended that foreign aid should be allocated to such sectors in order to enhance poverty reduction. However, steps should be taken to make public servants accountable and to control Ghana's debt burden overtime, otherwise Ghana will still be caught in a severe debt solving problem. Finally, it is worth noting that in this present era of global financial crises, external donor inflows from abroad are likely to reduce significantly. It is therefore, important that the government generates more revenue locally to run the national budget by widening the tax net.

Inflation was found to have a positive impact on real GDP per capita. High inflation tends to hold back economic growth through various channels. Access to funds, both in real and actual terms drops significantly during periods of high inflation and this has a negative impact on investment. In addition, consumption falls, employment declines and productivity decreases as a result of price spikes. That is to say high inflation discourages the accumulation of financial capital, thus, depriving the economic system of the necessary lubrication in the form of adequate liquidity. Insufficient lubrication hampers economic growth. As a developing country, an inflationary level of more than 10% is deemed high for Ghana and this erodes savings, discourages investment, stimulates capital flight and consequently hinders employment generation, growth and development in Ghana. Lower rates of inflation are crucial for boosting industrial performance. Government should continue to adopt policies that will control inflation in Ghana and also significantly reduce lending rates of commercial banks in order to attract

investors to seek industrial working capital. As the government aims at a single digit inflationary level, care must be taken not to inflict pain on the poor and the vulnerable in the society. Inflation can be drastically reduced if government. Strengthens the commercialization of the agricultural sector is very important since this will go a long way to minimize importation of food and ensure abundant supply of food stuffs throughout the year and hence, stabilize food prices, decrease the cost of living and improve the standard of living of Ghanaians, all other things remaining the same.

Government expenditure yielded a negative relationship with real GDP per capita over the study years for Ghana. This implies that government expenditure was not directed into pro-growth and pro-poor activities of the economy. The government should therefore take it upon itself to keep on directing it's spending into productive sectors of the economy such as education, health, water, sanitation, rural development and infrastructural development. There is the need for projects to increase the number of public educational institutions as well as ensuring quality education.

This will enhance human capital development which has the likely effect of increasing incomes of the individual as well as the life-time earnings of the individual, and hence improve living standards and serve as a means of eradicating poverty in Ghana, all other things being fixed. Infrastructure expenditure must be extended and directed into appropriate areas. For instance, the extension of electricity to cover all parts of the country is very important. This is likely to generate interest in the establishment of small-scale rural industries as well as modernizing the existing ones, by the use of electrical equipment and appliances in their operations.

Government expenditure should also be directed towards research into alternative sources of energy such as solar panels, geothermal energy, wind energy and bio fuels to enhance sustainable supply of electrical power. Moreover, there is the need to sustain the building and maintenance of road networks to facilitate the transportation of raw materials, finished goods and people. In addition, communication infrastructure, health infrastructure, housing infrastructure as well as

regular water and other vital infrastructure are essential for a sustainable growth in Ghana, *ceteris paribus*.

Prudent public expenditure management is also a key to economic growth. In this vein, good governance of expected oil and gas revenue should be ensured. In order to do this, government should come out with a national plan on how the revenue from crude oil will be used since the major cause of misuse of government revenue, apart from corruption, is lack of planning.

6.4 Areas of Future Research

Finally, there are several directions for future research. It may be important to further assess the impact of government expenditure on economic growth in Ghana by disaggregating government expenditure to different sectors, such as infrastructure, education, housing and health. In addition, this research paper may be improved by considering new or other independent variables (such as market capitalization of listed companies, domestic credit provided by the banking sector, exports and imports of goods and services, external debt, exchange rate regime, political stability, fiscal decentralization, energy consumption and others) that have similar effects as the foreign direct investment, foreign aid, inflation and government expenditure in this study as a future research agenda.

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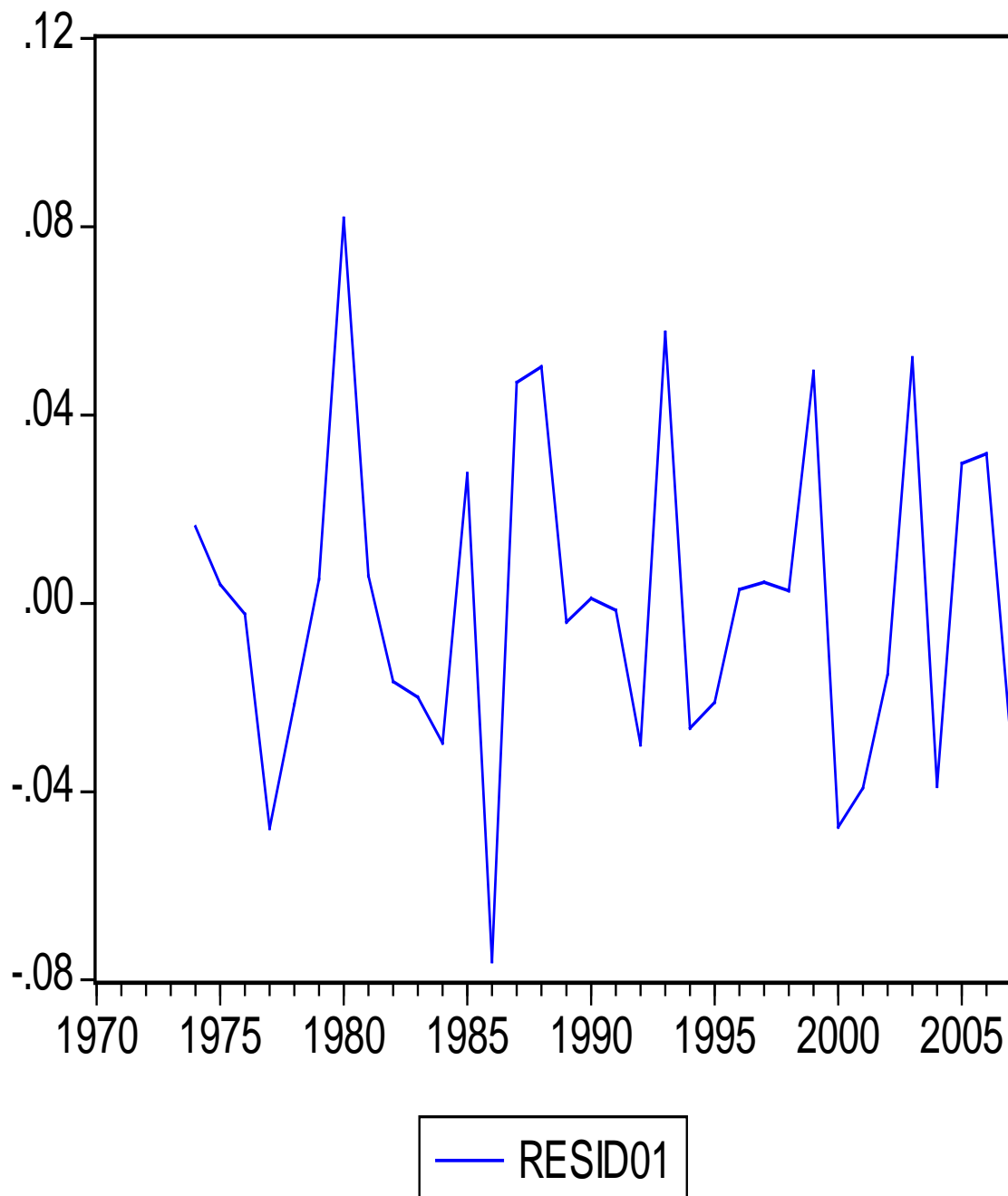
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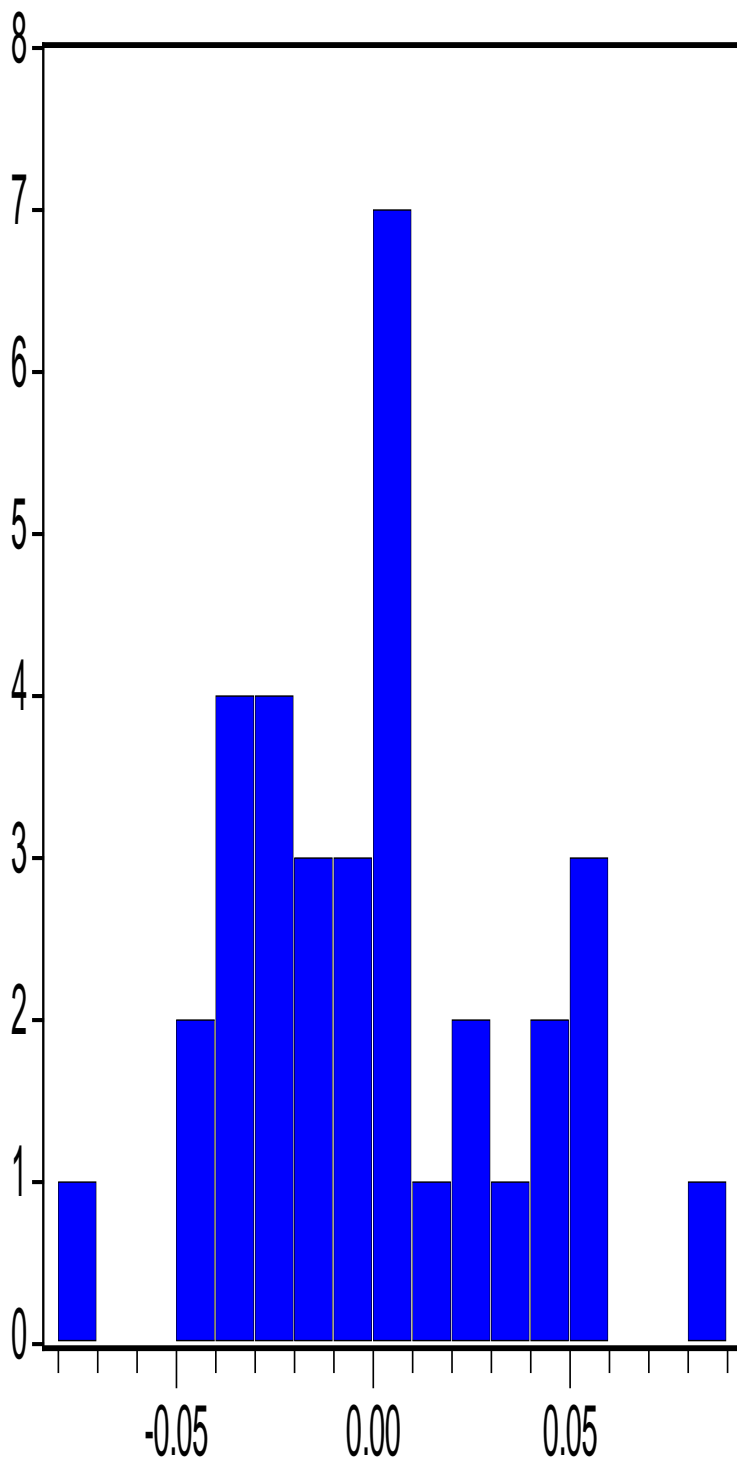
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APPENDIX

Graphical Representation of the Residuals

Residuals

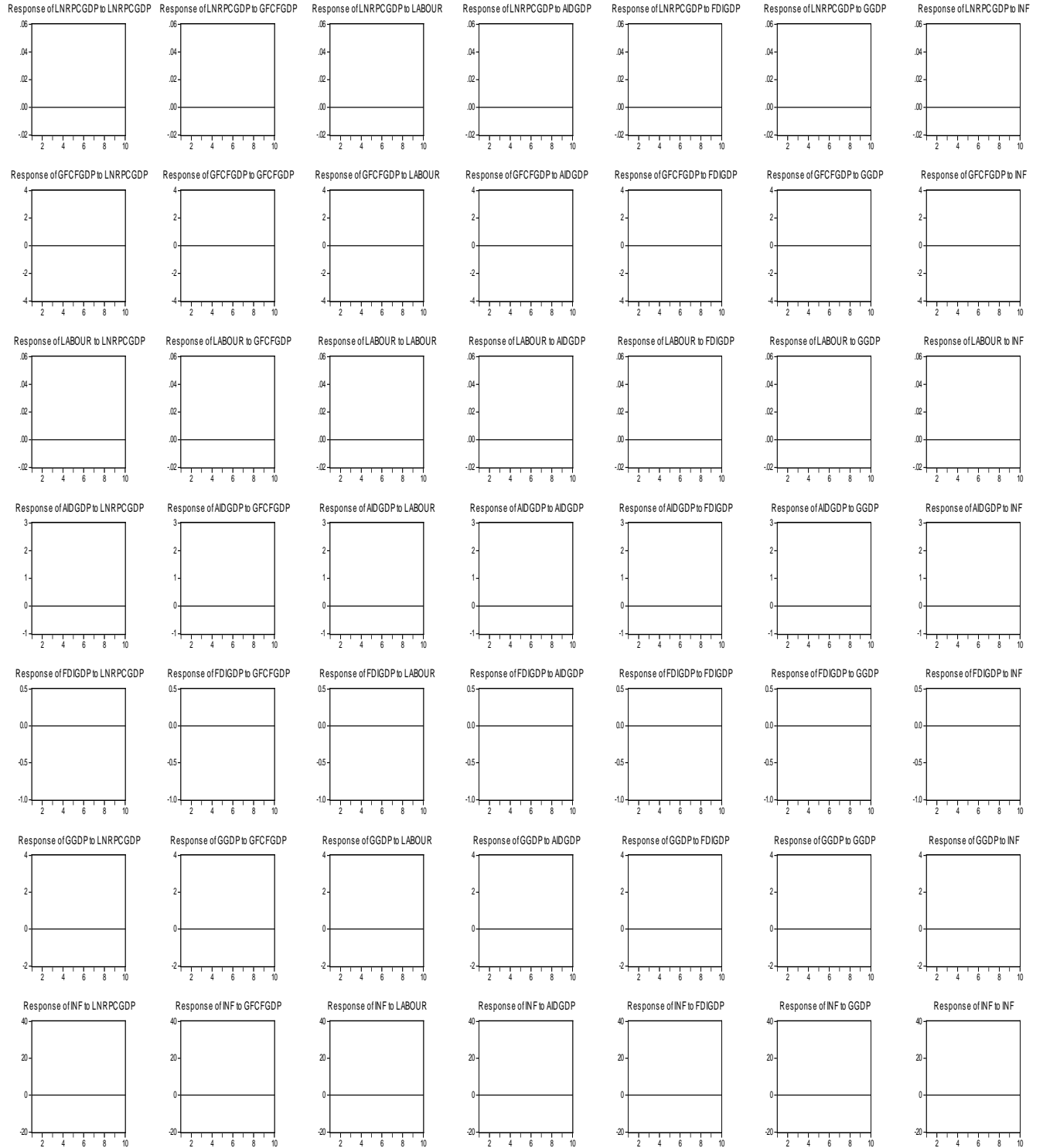




Series: Residuals
Sample 1974 2007
Observations 34

Mean	2.51e-15
Median	-0.000248
Maximum	0.081735
Minimum	-0.076068
Std. Dev.	0.035479
Skewness	0.273968
Kurtosis	2.653036
Jarque-Bera	0.595876
Probability	0.742347

Response to Cholesky One S.D. Innovations



****note; RPCGDP-real GDP per capita; GFCFGDP-gross fixed capital formation % GDP; Pop- % of total population aged 15-64; FDIGDP-foreign direct investment % GDP; FGDP – foreign Aid % of GDP; CPI – consumer price index; GGDP-government expenditure % of GDP.***

Summary Statistics, using the observations 1970 - 2007

Variable	Mean	Median	Minimum	Maximum
GGDP	108.386	107.062	94.5159	126.439
CPI	34.1089	25.0765	3.03030	122.875
FGDP	7.42721	7.91315	1.26332	16.1792
FDIGDP	1.31407	0.593272	-0.660352	6.47379
RPCGDP	245.829	240.632	186.075	314.129
GCFGDP	15.4194	12.5868	3.53148	34.0546
Pop	53.2200	52.5709	51.1190	57.4205
Variable	Std. Dev.	C.V.	Skewness	Ex. Kurtosis
GGDP	8.70886	0.0803504	0.502816	-0.791593
CPI	29.8076	0.873894	1.80591	2.67325
FGDP	4.13877	0.557244	0.162271	-1.18488
FDIGDP	1.54625	1.17668	1.52375	2.11926
RPCGDP	33.3589	0.135699	0.242637	-0.827075
GCFGDP	8.41395	0.545674	0.468244	-0.896709
Pop	2.03286	0.0381973	0.660994	-0.929044

Source: Author's Computation, 2009

**note; RPCGDP-real GDP per capita; GCFGDP-gross fixed capital formation % GDP; Pop-% of total population aged 15-64; FDIGDP-foreign direct investment % GDP; FGDP – foreign Aid % of GDP; CPI – consumer price index; GGDP-government expenditure % of GDP.*

Data used for Econometric Analysis of Growth in Ghana

Years	GEGDP	CPI	FGDP	FDIGDP	RPCGDP	GCFGDP	Pop
1970	101.3676802	3.030303031	2.723955098	3.062148465	291.744926	12.01256975	51.7052477
1971	104.475105	9.558823537	2.384412353	1.259733658	298.989874	12.43751266	51.5264058
1972	94.51587684	10.06711409	2.792164339	0.541138045	283.32979	8.666619505	51.3853663
1973	94.94459024	17.68292682	1.671357414	0.584028337	283.162222	7.654518731	51.2797666
1974	103.4763202	18.13471503	1.263317962	0.493008728	294.484055	11.90961543	51.2031734
1975	99.0706044	29.8245614	4.455368879	2.521967062	251.815089	11.61839906	51.1505317
1976	100.3386346	56.08108108	2.241928872	-0.660351944	238.136575	9.834207025	51.1217335
1977	101.0561301	116.4502165	2.837242455	0.602515154	239.407522	9.397674669	51.1189723
1978	101.3284978	73.09166667	3.070019261	0.26474398	255.374355	5.060492491	51.1422252
1979	99.92913421	54.44128833	4.199069665	-0.069647795	244.135012	6.728793581	51.1913916
1980	100.6884161	50.07013934	4.310777006	0.350938127	239.41837	6.097731615	51.2651911
1981	100.5672896	116.503604	3.423656267	0.385174086	224.338932	4.722826454	51.3616056
1982	99.64372854	22.29556641	3.446288294	0.403865759	201.965903	3.531480048	51.4776499
1983	100.4330626	122.8745146	2.695517854	0.059153002	186.075245	3.761179716	51.6100519
1984	102.7266087	39.66531379	4.883028594	0.04532804	195.279025	6.852975793	51.7564716
1985	102.9349883	10.30544067	4.391668767	0.124324483	198.655315	9.529481176	51.9157734
1986	103.5595816	24.56541608	6.407106104	0.07507504	202.799097	9.295514567	52.0881902
1987	106.5229468	39.81506788	8.284988524	0.092613938	206.606717	10.36027273	52.2732794
1988	105.8786583	31.35926763	11.36644035	0.096245607	212.382004	11.23951978	52.4691256
1989	107.6006059	25.22369203	13.94446286	0.285771937	217.197309	13.15616392	52.6727635
1990	108.9723532	37.25906649	9.694378914	0.251443949	218.265233	14.38622503	52.8817855
1991	108.5612681	18.03143901	13.56360249	0.303049664	223.321416	15.82342319	53.0941312
1992	111.5416879	10.05611674	9.716723634	0.350870348	225.377306	12.73600091	53.3102228
1993	116.1612748	24.95984247	10.62322002	2.095310031	229.597693	23.78554273	53.5328104
1994	111.5038778	24.87025544	10.24997122	4.282678869	230.584149	22.57444765	53.76597
1995	108.4302117	59.4615537	10.2520816	1.649259952	233.621831	21.13084872	54.012313
1996	107.9805844	46.56101968	9.581644191	1.73271933	238.058427	20.2986621	54.2718485
1997	120.581252	27.88520864	7.318565523	1.188258392	241.845445	23.83550385	54.5425386
1998	112.8568405	14.62416667	9.588629149	2.239758867	247.047693	22.36355227	54.8222294
1999	117.5484248	12.40866891	8.076477472	3.160907346	251.743494	20.46744342	55.1079689
2000	118.4439149	25.19321937	12.41417169	3.333005999	254.872807	23.09813093	55.3970968
2001	119.5798218	32.9054089	12.31390545	1.681999196	258.839848	27.1229213	55.6880076
2002	112.256739	14.81624006	10.90763935	0.956235991	264.202964	18.77494577	55.9797422
2003	115.9290604	26.67494973	12.9799152	1.793639059	271.57962	22.93692854	56.2711675
2004	121.0636839	12.62457406	16.17921935	1.569792705	280.356664	28.37750713	56.5614046
2005	125.044827	15.11818572	10.89229554	1.352288444	290.39607	29.90214101	56.8493976
2006	124.714751	10.91516997	9.338889193	5.002006781	302.383668	30.4	57.1362206
2007	126.439044	10.73272807	7.749815186	6.473791341	314.129006	34.05458891	57.4205199

Source: World Development Indicators, 2009