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ECONOMIC GROWTH AND FOREIGN DIRECT INVESTMENT IN
SUB-SAHARAN AFRICAN COUNTRIES: A PANEL DATA
ANALYSIS

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Table of Contents

| Contents | Page No. |
|--|-----------------|
| Acknowledgments..... | i |
| List of Tables..... | iv |
| List of Figures..... | v |
| List of Appendice..... | vi |
| Acronyms..... | vii |
| Abstract..... | viii |
| | |
| CHAPTER ONE | |
| INTRODUCTION | |
| 1.1 Background of the study..... | 1 |
| 1.2 Statement of the problem..... | 3 |
| 1.3 Objective of the study..... | 6 |
| 1.4 Significance of the study..... | 6 |
| 1.5 Scope and limitation of the study..... | 7 |
| 1.6 Organization of the paper..... | 7 |
| | |
| CHAPTER TWO | |
| LITERATURE REVIEW | |
| 2.1 Definition of FDI..... | 8 |
| 2.2 Theoretical Literature..... | 11 |
| 2.2.1 Theories on Foreign Direct Investment..... | 11 |
| 2.2.2 Foreign Direct Investment and Economic Growth..... | 14 |
| 2.3 Empirical Literature..... | 20 |
| 2.3.1 Foreign Direct Investment in Africa..... | 23 |
| 2.3.2 Economic Performance in SSA countries..... | 26 |

CHAPTER THREE
DATA AND METHODOLOGY

| | |
|-------------------------------------|----|
| 3.1 Data..... | 28 |
| 3.2 Theoretical Framework..... | 29 |
| 3.3 Empirical Model..... | 34 |
| 3.4 Estimation Procedure..... | 39 |
| 3.5 Diagnostic Tests..... | 45 |
| 3.5.1 Multicollinearity Test..... | 45 |
| 3.5.2 Panel Stationarity Test..... | 45 |
| 3.5.3 Panel Cointegration Test..... | 47 |
| 3.5.4 Panel Causality Test..... | 50 |

CHAPTER FOUR
RESULTS AND DISCUSSIONS

| | |
|--|----|
| 4.1 Descriptive Analysis..... | 53 |
| 4.2 Multicollinearity Test..... | 56 |
| 4.3 Panel Unit Root Results..... | 56 |
| 4.4 Panel Cointegration Results..... | 59 |
| 4.5 Econometric Results and Discussions..... | 60 |
| 4.6 Analysis of Panel Causal Relationship..... | 65 |

CHAPTER FIVE
CONCLUSIONS AND POLICY IMPLICAATIONS

| | |
|------------------------------|-----------|
| 5.1 Conclusions..... | 68 |
| 5.2 Policy Implications..... | 70 |
| References..... | 71 |
| Appendices..... | 79 |

List of Tables

| | |
|--|----|
| Table 1: Descriptive Statistics..... | 54 |
| Table 2: Panel Unit Root Test Results for Level Variables..... | 57 |
| Table3: Results of Panel Unit Root Tests for Differenced Variables..... | 58 |
| Table 4: Result of Pedroni’s Panel Cointgration Test for all Sample Countries..... | 59 |
| Table 5: Estimation Results..... | 61 |
| Table 6: Wald Causality Results..... | 66 |
| Table 7: VIF Multicollinearity Test Results..... | 81 |
| Table 8: Pedroni Panel Cointgration Test Results for Low Income Countries..... | 81 |
| Table 9: Pedroni Panel Cointegration Test Results for Middle Income Countries..... | 82 |

List of Figures

Figure 1: The trend of means of variables across cross sections and time periods.....83

List of Appendices

| | |
|---|----|
| Appendix 1: Variable Description..... | 79 |
| Appendix 2: List of Sample Sub Saharan African countries..... | 80 |
| Appendix 3: List of Tables..... | 81 |
| Appendix 4: Trends of the Mean of Variables under Study..... | 83 |

List of Acronyms

| | |
|--------|---|
| ADF | Augmented Dickey Fuller |
| BPM | Balance of Payments Manual |
| BRICS | Brazil Russia India China South Africa |
| FDI | Foreign Direct Investment |
| GDP | Gross Domestic Product |
| GDPGR | Gross Domestic Product Growth |
| GDPP | Gross Domestic Product Per Capita |
| GMM | Generalized Method of Moment |
| IMF | International Monetary Fund |
| IPS | Im, Pesaran and Shin |
| LLC | Levin, Lin and Chu |
| MNC | Multi National Company |
| NEPAD | New Partnership for Africa's Development |
| OECD | Organization for Economic Cooperation and Development |
| OLI | Ownership, Location and Internalization advantages |
| OLS | Ordinary Least Squares |
| SAP | Structural Adjustment Program |
| SSA | Sub Saharan African Countries |
| UNCTAD | United Nation's Conference on Trade and Development |
| VIF | Variance Inflation Factor |
| WDI | World Development Indicators |
| WGI | Worldwide Governance Indicator |

Abstract

The emerging FDI and growth literatures stipulate that the relationship between FDI and growth is highly heterogeneous across countries and thus have not won a common consensus among economists. Therefore, this study analyzes the relationship between FDI and economic growth in 31 SSA countries using panel data from 1992 to 2009 obtained from World Development Indicators and World Bank's Worldwide Governance Indicators of 2010 using system GMM econometric technique. From the output of the growth model, its own lag, investment in physical and human capitals, external debt servicing and FDI significantly affect economic growth whereas for FDI model, its own lag, investment in physical capital, openness to international trade and macroeconomic stabilities are significant determinants of FDI. As the panel cointegration test shows existence of long run relationship between FDI and economic growth, the causality test is undertaken and the finding shows that the causality is unidirectional, causality running from FDI to GDPP in the entire sample countries. However when the countries are split into two: 19 low income countries and 12 middle income countries, the causality result is the same as that of all sample countries in the case of low income countries whereas bidirectional causality is evidenced in the case of middle income countries.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The relationship between Foreign Direct Investment (FDI) and economic growth has been a topical issue for several decades. Explosion of growth in FDI over the 1990's, especially in developing countries, has inspired a stream of literatures focusing on the impact of FDI on the dynamics of economic growth of the recipient country. The relationship between the two variables, therefore, has motivated a voluminous empirical literature focusing on both industrial and developing countries (Karimi et al, 2009)

The issue of how developing countries can accelerate their economic growth is of considerable importance. As FDI, helps by filling in the savings- investment gap, increasing their access to productive capacity, technology, and management resources, many developing countries are giving emphasis on how to attract foreign investors. In particular, it is expected that FDI will increase the domestic stock of capital and exports of manufactured goods which in turn are expected to increase output (Karikari, 1992).

There have been also suggestions that show economic growth can influence FDI. This is because the size and growth of the market in the host country will encourage FDI particularly for market seeking FDI. A study by Dunning (1981) indicated that there is generally a relationship between a country's international investment position and its stage of economic development. In particular, it is suggested that, as the economic situation of a country improves, it changes the ownership and internalization advantages of firms and the relative locational advantages of the country in attracting FDI. This in turn affects the net international direct investment position of

the country. Thus, it is expected that the increases in economic output will affect FDI. The issue that economic output may cause FDI is important because it implies that economic output may be a prerequisite for inflows of FDI.

The growth of international production is driven by economic and technological factors. Liberalization of trade policies and FDI facilitate this growth. In this context, globalization offers an unprecedented opportunity for developing countries to achieve faster economic growth through investment. In this case, while foreign investors benefit by utilizing their assets and resources efficiently through FDI, the recipients benefit by acquiring technologies and by getting involved in international production and trade networks. There are several studies which examine the channels of transmission between FDI and growth. Econometric models of endogenous growth were combined with studies of diffusion of technology in an attempt to show the effect of FDI on the economic growth of several economies (Lucas, 1988). In these models, technology plays an important role in economic development. The factors contributing to the mobility of capital and technology have been the single most reason for low income countries to grow at a higher rate than developed countries. FDI has been seen as an effective channel to transfer technology and foster growth in developing countries, within this framework.

However, the impact of FDI on economic growth is more contentious in empirical than theoretical studies, hence inviting the need to examine the relationship between FDI and growth in different economic backgrounds. FDI may have a positive impact on economic growth leading to an enlarged market size, which in turn attracts further FDI (ibid).

Nevertheless, FDI could adversely influence economic output. For instance, if FDI results in a non competitive market structure, then industrial concentration may increase and the degree of

competition in the long run may be seriously impaired, even though, in the short run, competition may be enhanced. Generally, FDI may be inefficiently allocated in most developing countries because market prices are seriously distorted by various policies such as trade protection, subsidy measures, overvalued exchange rates, and a wide range of direct controls on prices, production, and factor use ((Krugman, 1981, 1998).

1.2 Statement of the Problem

Despite the plethora of studies on the relationship between FDI and economic growth, the empirical evidence is not clear for country groups. Following the criticisms in recent studies of the traditional assumption of a one-way causal link from FDI to growth, new studies have also considered the possibility of a two-way (bidirectional) or non-existence of causality among these variables (Kholdy, 1995). In other words, not only FDI can cause economic growth, but economic growth can also cause the inflow of FDI or there could be no causal linkage between the two variables. From the numerous existing studies, the causal link between FDI and economic growth as an empirical question seems to be dependent upon the set of conditions in the host country economy.

Although a number of economic theories point to a positive relationship between foreign direct investment and economic growth, the direction of causality between the variables has continued to generate controversy among economists as empirical literatures on different countries with different economic background show different results on the topic.

Sub Saharan African governments have changed themselves from being generators of employment and spillovers for the local economy to governors of states that promote competition and search for foreign capital to fill the resource gap. The effort by several African

countries to improve their business climate stems from the desire to attract FDI. In fact, one of the pillars on which the New Partnership for Africa's Development (NEPAD) was launched is to increase available capital through a combination of reforms, resource mobilization and favorable environment for FDI (Funke and Nsouli, 2003).

Unfortunately, the efforts of most sub Saharan African (SSA) countries to attract FDI have been futile in spite of the perceived and obvious need for FDI in the continent. The economic development is also disturbing, sending very little hope of economic development and growth for these countries except the recent improvements in some of the economies in the region. Furthermore, the pattern of the FDI that does exist is often skewed towards extractive industries, meaning that the differential rate of FDI inflow into SSA countries has been adduced to be due to natural resources, although the size of the local market may also be a consideration (Asiedu, 2001).

Recently, endogenous growth theorists emphasize the importance of external factors on economic growth. The supporters of this school of thought opine that factors such as foreign direct investment helps to fill saving gap in developing countries as in most of developing countries saving is less than what is required for investment and hence promotes capital formation. In addition, foreign direct investment enhances transfer of technology and skills, and creates job opportunities, thus accelerating economic growth in the host countries. This school concludes that foreign direct investment facilitates economic growth (Barro and Sala-i-Martin, 1995).

The other view on the issue is that some scholars argue higher economic growth encourages foreign direct investment inflows in the host countries. They suggest that economic growth can

lead to inflow of higher foreign investment, especially when foreign investment is seeking consumers' market or when economic growth results to economies of scale. In fact, authors like Chowdhury and Mavrotas (2005) confirmed that economic growth encourages inflows of foreign direct investment.

Understanding the causal relationship between economic variables is very important because it provides useful information on the variables government and its agencies need to control in order to achieve the desired levels of targeted variables (Sajid and Sarfraz, 2008). For instance, if empirical analysis indicates that causality runs from foreign direct investment to economic growth, then government and policy makers would employ strategies to attract foreign direct investment so as to promote economic growth. On the other hand, if causality is found to run from economic growth to foreign direct investment, government would employ policies that accelerate economic growth in order to encourage foreign investment inflows.

This study, therefore, is devoted to investigate the causal relationship between foreign direct investment and economic growth in the specified SSA countries although other determinants of the two variables are also considered. Here we look for one of the following possible types of causal relationship: 1) Growth-driven FDI, i.e. the case when the growth of the host country attracts FDI 2) FDI-led growth, i.e. the case when FDI improves the rate of growth of the host country and 3) the two way causal link between them 4) the possibility of no causality at all.

1.3 Objective of the study

The main objective of this study is to investigate the relationship between foreign direct investment and economic growth in the sample countries of sub Saharan Africa.

The specific objectives are:

- To model economic growth and FDI independently so as to identify their determinants.
- To investigate the existence of long run relationship between foreign direct investment and economic growth in the specified sub Saharan African countries.
- Given the existence of co-integrated relationship, to identify the direction of the causality between the two variables.
- To show if the direction of causality changes if the sample countries are split into low income and middle income countries.

1.4 Significance of the study

Saving and investment gap is a common problem in most of developing countries, especially in SSA countries characterized by poor economic performance. In this situation, countries may see FDI as one of the options to fill this saving-investment gap and improve their economic performance. Foreign investors may also consider different preconditions like economic performance before deciding where to invest their resources. This study, therefore contributes significantly to the literature by providing new and robust evidence on FDI-growth causal relationship in SSA countries under consideration using a dynamic system GMM econometric technique. It will also help by presenting evidence on whether the relationship changes if these sample countries are split into low income and middle income countries. The findings on determinants of FDI and growth using dynamic models in the region, is also its contribution. Some policy implications for possible considerations by the various concerned bodies based on the results obtained and its contribution to other interested people to undertake further study on the issue is also indispensable.

1.5 Scope and Limitation of the Study

This study is mainly devoted to the relationship between foreign direct investment and economic performance of the sample SSA countries even though the determinants of FDI and growth are highlighted. Although, the issue also concerns other Sub- Saharan African countries, this study is limited to only 31 countries of the region due to the problem of availability of data on the variables used in the study and the time period covered. As data on FDI is not available for many of the countries under study before the year 1992, this study is limited to the period from 1992 to 2009. Thus, the major limitations of this study, among others, are the problem of getting data for longer period of time and for more countries in the region under consideration.

1.6 Organization of the Study

The study is organized into five chapters. Chapter one deals with the introductory part of the topic whereas chapter 2 is devoted to both the theoretical and empirical review on the relationship between FDI and growth. The data and methodology to be employed in the thesis are dealt with under chapter three before going for the econometric results and discussions given in chapter four. Finally, the conclusions and policy implications are drawn in chapter five, depending on the findings of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition and Conceptual Framework on FDI

Foreign direct investment is not just a capital movement. In addition to capital, a controlled subsidiary often receives direct input of managerial skills, technology and other tangible and intangible assets. Unlike portfolio investors, direct foreign investors have substantial control over the management of foreign subsidiary. In fact, balance of payment accountants define FDI as any flow of lending to, or purchase of ownership in, a foreign enterprise that is largely owned by the residents (usually firms) of the investing country, (Thomas A. and Peter H. 2000).

FDI definition according to the BPM5¹ refers to an investment made to acquire lasting interest in enterprises operating outside of the economy of the investor. The investor's purpose in this case is to gain effective control in the management of the enterprise. A threshold of 10 percent of equity ownership is necessary to qualify investor as a foreign direct investor. This definition is not adequate due to several reasons. Firstly, it suggests that FDI involves international transfer of money ignoring situations where FDI capital could be raised in the host country. Secondly the definition of FDI flows is expressed in terms of money capital when it incorporates the transfer of other income generating assets. Thirdly the definition does not take into account the new organizational forms that have appeared in the global economy over the last few decades as firms today can exercise various forms of control over distance enterprises without direct ownership.

¹ Definitions of FDI are contained in the Balance of Payments Manual: Fifth Edition (BPM5) (Washington, D.C., International Monetary Fund, 1993) and the Detailed Benchmark Definition of Foreign Direct Investment: Third Edition (BD3) (Paris, Organization for Economic Co-operation and Development, 1996).

Fourthly the FDI measures are considered sufficiently accurate only in the short run² (Contessi and Weinberger, 2009). Redefining FDI is therefore required in order to take into account non-monetary aspects of FDI as well as new forms of control that have emerged with multinationals changing strategy to cope with globalization.

The macro-economic time series available for FDI include the nominal value of the flows in or out of the country stock values. The measures have problems that sometimes undermine the cross-country comparability of the series, especially because statistical agencies of different countries may use different definitions of FDI. A second problem with datasets available from international organizations, such as the IMF, the World Bank, and the UNCTAD, is that they often have missing data points, particularly for developing countries. A third issue with the use of aggregate data in studying FDI is that the records may not capture a part of the investment in the foreign project especially when the project is financed from local sources in the host country.

According to World Bank (2010), foreign direct investments are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. The study takes foreign direct investment based on this definition of World Bank (2010).

There are different types of FDI which include Greenfield investment, cross border merger and acquisition, and reinvested earnings. Greenfield investment refers to the establishment of a new

² The valuation of capital stock changes over long periods because of inflation and the exchange rates, causing problems with the adjustment of its own valuation.

firm that in turn enables to create productive assets in a host country. Usually, it is financed by capital coming from the investor's country. A transfer of ownership of local productive assets to a foreign investor is referred as international or cross border merger and acquisition. Reinvested earnings refer part or all of the profit that is not repatriated to the investor's country but reinvested in the host country (UNCTAD, 1998).

FDI can also be classified into market-seeking, export- oriented and government initiated FDI. A market-seeking FDI is highly determined by the growth potential and the size of national market, access to regional & global markets and country-specific consumer preferences. When a foreign firm produces raw materials, intermediate and final goods and sells these products for non-local market, this FDI is referred as export-oriented FDI. An investment is called government initiated FDI, when governments of host countries invite and give incentives to direct foreign investors to invest in specific sectors and industries with a view of addressing socio-economic problems like unemployment, regional disparities and deficits in the balance of payment (Accolley et al, 1997).

In a similar way, again based on the primary motives of the direct foreign investors, FDI can also be classified into the following three groups: market seeking, resource/asset-seeking and efficiency seeking (UNCTAD, 2007). A market-seeking FDI is determined by the growth potential and the size of national market and country-specific consumer preferences. A resource/asset seeking FDI is attracted by availability of low-cost unskilled & skilled labor, strategic natural resources and raw materials. An efficiency-seeking FDI is significantly determined by productivity of labor resource, costs of inputs and intermediate goods.

2.2 Theoretical Literature

2.2.1 Theories on Foreign Direct Investment

Early explanations of multinational production were based on neoclassical theories of capital movement and trade within the Heckscher-Ohlin framework. However, these theories were founded on the assumption of existence of perfect factor and goods markets and were therefore unable to provide satisfactory explanation for the nature and pattern of FDI. In the absence of market perfections, these theories presumed that FDI would not take place. Nevertheless, the presence of risks in investing abroad implies that there must be distinct advantages to locating in a particular host country.

To fill this gap in international trade theory and capital flow, Vernon (1966) has developed a product-cycle model to describe how a firm tends to become multinational at a certain stage in its growth. He argues that in the early stage of the development of a new product, production will take place in the home country for whose market the product is intended. This is because producers require continuous feedback from consumers and need good communications with their numerous suppliers. Because countries are at different stages of economic development, new markets are available to receive new products through the demonstration effect of richer countries. At this stage, expansion into overseas markets is by means of exports. Later, when the product becomes standardized, other countries may offer comparative cost advantages so that gradually production shifts to these countries. It is possible then to export back to the country that originally invented the product. There are many examples of products that have followed this cycle. Presently, Japan and other Asian countries are major exporters of radio sets and other electronic appliances originally invented in the United States and Europe.

The product cycle hypothesis is useful on several counts. It explains the concentration of innovations in developed countries, and offers an integrated theory of international trade and FDI. Furthermore, it provides an explanation for the rapid growth in exports of manufactured goods by the newly industrialized countries. It, therefore, presents a useful point of departure for the study of the causes of international investment.

However, the hypothesis does not resolve the question of why MNCs opt for the use of FDI rather than licensing their technology to local firms in the host countries. This issue has been examined with reference to the theory of the firm, notably by Hymer (1976), and Dunning (1988). Hymer (1976), in a groundbreaking viewpoint on industrial organization as an incentive for FDI, focuses on the advantages that some firms enjoy. Such advantages include access to patented technology, team-specific management skills, plant economies of scale, special marketing skills, possession of a brand name, and so on. Before a firm invests abroad, the potential gains from these advantages must outweigh the disadvantages of establishing and operating in a foreign country, such as communication difficulties and ignorance of institutions, customs and tastes.

Dunning (1988), on the other hand, has proposed three conditions necessary for a firm to undertake FDI. His eclectic theory of FDI, often referred to as the OLI framework, attempts to integrate other explanations of FDI mentioned earlier. OLI stands for ownership advantages, location advantages and internalization advantages, which are conditions that determine whether a firm, industry or country will be a source or a host of FDI (or perhaps, neither).

The ownership advantage is anything that gives the firm enough valuable market power to outweigh the disadvantages of doing business abroad. It could be a product or production process

that other firms do not have access to, such as a patent, trade secret or blueprint. The advantage could also be intangible like a trademark or reputation for quality. Second, the foreign market must offer location advantage that makes it more profitable to produce in the foreign country than to produce at home and then export to the foreign market. Such location-specific advantages offered by a host country include access to local and regional markets, availability of comparatively cheap factors of production, competitive transportation and communications costs, the opportunity to circumvent import restrictions, and attractive investment incentives (Chery, 2001).

Third, the MNC must have an internalization advantage. Precisely, internalization involves the question of why an MNC would want to exploit its assets abroad by opening or acquiring a subsidiary versus simply selling or licensing the rights to exploit those assets to a foreign firm. Though this theory has been criticized for only listing the conditions necessary for FDI without explaining its phenomenon, it has widely contributed to international production theory.

The vast literature on FDI identifies a number of reasons for firms investing across national boundaries. It is difficult in reality in many countries to isolate the different motives, as one motive may overlap into another. The major motives often identified that have particular relevance to Africa are (Basu and Srinivasan, 2002):

- Natural-resource-seeking investment, which aims to exploit the natural resource endowments of countries. Companies extracting oil (in Nigeria), gold (in Ghana) and diamond (in Botswana) belong to this category.
- Market-seeking investment, which aims to access new markets that are attractive as a result of their size and/or growth.

- Efficiency-seeking investments, which aim to take advantage of special features in a certain area such as the costs of labor, the skills of the labor force, and the quality and efficiency of infrastructure.

2. 2. 2 Foreign Direct Investments and Economic Growth

The relationship between foreign direct investment and economic growth process has been a topic of intense debate for a long time. There is a large amount of literature analyzing the linkages between economic growth and FDI. Whether FDI is an important determinant of economic growth, especially in the host developing countries, and whether economic growth in turn determines the inflow of FDI is still debated among the economists. In fact, the role of FDI in promoting economic growth has been viewed differently under different economic growth theories.

The debate has been dominated by an orthodox perspective comprising the classical and neo classical school, endogenous growth models and the development economists on one hand and the dependency school on the other. According to the classical school the rate of economic growth depends on the rate of physical capital accumulation. The neo classical school stress on the rate of capital accumulation as a means of poor countries raising their standards of living. Development economists emerging after the Second World War have advocated for a big push and more coordination by governments if poor countries are to develop. In addition they stress on the importance of social overhead capital or infrastructure, good leadership and capital accumulation as the way to develop.

Based on the various schools of thoughts, several economic models have been developed over the years in an attempt to explain the determinants of economic growth both in the short and long run. In the short run the classical school identifies physical capital accumulation as the determining factor affecting the pace of economic progress. This is captured in the Harrod Domar model which is also known as capital fundamentalism. The main emphasis in this model is that economic growth is dependent on the savings investment ratio. According to the standard neoclassical theories, economic growth is based on the utilization of land, labor and capital in production. Since developing countries in general, have underutilized land and labor and exhibit low savings rate, the marginal productivity of capital is likely to be greater in these countries than in the developed countries.

Thus, these theories of development assume that interdependence between the developed and the developing countries can benefit the latter. This is because capital will flow from rich to poor areas where the returns on capital investments will be higher, helping to bring about a transformation of 'backward' economies. The neo classical model based on the Solow's growth model largely emphasizes on the importance of investment. Technological progress, though important in the long run, is regarded exogenous to the economic system and therefore it is not adequately examined by this model. The model predicts convergence in growth rates on the basis of poor economies will grow faster compared to richer ones. The reality, however, is that over years divergence has been the case. The volume of capital flow to the poor economies relative to the rich has been low.

The neoclassical theory of economic growth has sought to provide an explanation on the consequences as well as the causes of the presence of FDI in developing countries. In the neoclassical theories, FDI

inflows are a solution to fill the saving-investment gap, the foreign exchange gap, and the fiscal gap in host developing countries³. Rostow (1971) has developed an economic growth model of the stages of growth to explain the presence of FDI inflows in the economic transition process in developing countries. In the model, FDI inflows into developing countries are viewed as a way to meet the requirements of capital as well as to transfer new technologies during their transitional economies.

Admittedly, in neoclassical growth models with diminishing returns to capital, FDI has only a short-run growth effect as countries move towards a new steady state and thus, the impact of FDI on growth is identical to that of domestic investment. According to this theory, in the long run, given the diminishing marginal returns to physical capital, the recipient economy could converge to the steady state growth rate as if FDI had never taken place leaving no permanent impact on the growth of the economy (De Mello, 1997).

In contrast, in endogenous growth models, which emphasize on the importance of external factors like FDI on economic growth, FDI is generally assumed to be more productive than domestic investment, since FDI encourages the incorporation of new technologies in the production function of the host economy (Borensztein et al., 1998). In this view, FDI-related technological spillovers offset the effects of diminishing returns to capital and keep the economy on a long-term growth path. Endogenous growth models acknowledging the role of technological progress in the long run, propose that introduction of new accumulating factors such as knowledge, human capital, innovation will induce self maintained economic growth. Triggered by Lucas' (1988) three significant sources of growth were highlighted: new knowledge,

³ Developing countries on the way to “take off” are widely recognized as facing constraints including the saving-investment gap, the foreign exchange gap and the fiscal gap (Rostow 1971).

innovation and public infrastructure. These models suggest that convergence would not occur at all and that productivity is more important than capital accumulation.

Blomstrom and Kokko (1998) argued that MNCs bring modern technologies into host countries in order to allow them to compete successfully with other MNCs and local enterprises. This forces local firms to look for, as well as to imitate, new and more effective technologies. MNCs can have a positive impact on human capital in host countries through the training courses they provide to their subsidiaries' local workers, managerial skills, research and development. The training courses influence most levels of employees to be accessible to advanced technical and managerial skills. Research and development activities financed by MNCs also contribute to human capital in host countries and thus enable their economies to grow in the long term.

Moreover, some economists see FDI as having a direct impact on trade in goods and services. Trade theory expects FDI inflows to result in improved competitiveness of host countries' exports (Blomstrom and Kokko, 1998). FDI has also benefits to the balance of payments which include improvement in the capital account due to the inflows of new capital into the host country and improvements in the current account balance because of possible decline in imports of goods and services which would otherwise have been imported. The additional taxes from multinational corporations also have the potential to improve the budget situation of the host country.

On the other hand, some scholars opine that higher economic growth helps to attract foreign direct investment, especially if foreign investment is seeking consumers' markets or if growth leads to economies of scale. For example, the Electric Theory of FDI, which was developed by

Dunning (1988), provides a tool to analyze the relationship between FDI and economic growth⁴. Based on the location advantages, many empirical studies have found that economic growth is an important determinant of FDI. Asiedu (2002) pointed out that higher economic growth increases more FDI inflows as it is defined as a measure of the attractiveness of the host countries.

In sum, the classical, neoclassical growth theories and the endogenous growth theories support strongly the role of FDI in promoting economic growth in host countries. According to the classical and neoclassical theories, FDI is viewed as a way to allocate capital to a place where it is most productive and hence enhances economic growth through filling the saving investment gap. For the endogenous growth theories, FDI, in addition to filling the saving investment gap, helps as a channel to transfer knowledge, promote learning by doing, and bring in technology spillovers and human capital augmentation. Consequently, FDI stimulates economic growth in host countries. The Eclectic Theory of FDI, on the other hand, provides a tool to explain the influence of economic growth on FDI attraction to host countries.

However, the growth effect of FDI does not win unanimous support. There are some pessimistic arguments on the role of FDI on economic growth of the host country. These pessimist views were particularly important during the 50s and the 60s. They are still defended by several recent firm or industry level studies which emphasize poor absorptive capacity, crowding out effect on domestic investment, external vulnerability and dependence, a possible deterioration of the balance of payments as profits are repatriated, destructive competition of foreign affiliates with domestic firms and market-stealing effect.

⁴ In the Eclectic Theory of FDI, often called the OLI framework, “O” is defined as ownership advantages; “L” is defined as location advantages; and “I” is defined as international advantages.

Several scholars have presented an alternative view to the development process from the orthodox view. The institutionalists argue that institutions⁵ of the economy are the main subjects of economic analysis. Their main argument is that poor countries should invest in education in order to develop. In addition, initial conditions determine economic growth of places in a self-sustaining and incremental way. The structuralists led by Prebisch (1950) and Singer (1950) commonly known as the Singer-Prebisch hypothesis suggest that the relations between the developed countries (centre) and the less developed countries (periphery) were antagonistic and detrimental rather than complementary and harmonious. This thinking was further influenced by Marxism giving rise to the dependency school.

The dependency theory found the cause of underdevelopment to be external to the socioeconomic formations of the less developed countries. They argued that FDI not only resulted to enclave development but also diminished the possibilities of development. The dependency idea is also considered in the literature of unequal exchange. These literatures suggest that the North-South division is mainly due to structural difference, innovations in the North and initial conditions favoring the North to produce industrial goods (Krugman, 1981).

There are several other theoretical arguments that deal with why developing countries may not gain from FDI. Krugman (1998) argues that the transfer of control from domestic to foreign firms may not always be beneficial to the host countries because of different problems. FDI undertaken within a crisis situation may transfer ownership of firms from domestic to foreign

⁵. Institutions are defined as the form of production, ownership, work processes, and ideologies which combine to create economy and society. According to Acemoglu et al (2005) define “good” institutions as corresponding to a social organization which ensures that a broad cross-section of the society have effective property rights

firms that are less efficient. This concern is particularly important to the developing countries including the SSA countries, where, as part of privatization, state owned enterprises are sold to foreign firms simply because foreign firms have more available funds than domestic ones. As pointed out by Agosin and Mayer (2000), FDI may also crowd out domestic firms through unfair competition. There is also a concern that the enclave nature of many foreign owned firms and their minimal linkage to the rest of the economy could reduce the potential spillover contribution to the national economy. Moreover, potential subsequent outflow of foreign firms' subsidiary earnings to their parent companies could also cause deterioration in the balance of payments. It is also argued that foreign corporations tend to produce inappropriate goods that are tailored to satisfy the wealthy portion of the host country's consumers, thereby increasing inequality and engaging in transfer pricing.

Generally, there is no common consensus regarding the relationship between foreign direct investment and economic performance. Some group having an optimistic view towards foreign investment on its role in economic performance whereas others reflect a negative outlook on the issue. Within the group having a positive outlook themselves, there is a divergence in idea on whether FDI has a lasting effect on the economy of the host country or plays the same role as domestic investment.

2.3 Empirical Literature

A large number of empirical studies on the role of FDI in host countries suggest that FDI is an important source of capital, complements domestic private investment, creates new job opportunities, enhances technology transfer, and boosts overall economic growth in host

countries. On the other hand, different findings also show that FDI in turn is caused by the economic performance of a country.

Many empirical studies have been done to ascertain the relationship between foreign direct investment and economic growth. In their work, Borenzstein et al (1998) find that FDI is an important vehicle for the transfer of technology, contributing more to growth than domestic investment. However, according to these studies, higher productivity holds only when the host country has a minimum threshold stock of human capital. From the literature it is clear that a country's ability to take advantage of the positive effects of FDI might be limited by local conditions such as the development of the local financial markets, or the educational level of the population of the country which are generally called absorptive capacity. Alfaro et al (2004), provide evidence that, only countries with well developed financial markets and human capital gain significantly from FDI in terms of their growth rates.

The debate on whether FDI directly causes economic growth without preconditions has also been explained in De Mello (1997) that argues FDI leads to growth when there are efficiency spillovers to domestic firms. In other words, FDI leads to growth when domestic firm's production processes improve as a result of exposure to more technologically advanced methods of the transnational corporation. The various findings with respect to the FDI growth linkage have significant policy implications for Africa. First, the fact that the FDI-growth linkage is not automatic implies that right policies must be designed by various countries to ensure that FDI is directed to areas and sectors where it will have the greatest impact. Second, the issue of absorptive capacity mentioned in terms of human capital development, and financial development are important. Thus, policy must be all encompassing in order to derive positive

impacts. It can therefore be said that whether FDI contributes to development depends on macroeconomic and structural conditions in host countries.

Liu et al (2002) tested the existence of a long-run relationship among economic growth, foreign direct investment and trade in China. Using a co-integration framework with quarterly data for exports, imports, FDI and growth from 1981 to 1997, the research found the existence of a bi-directional causal relationship among FDI, growth, and exports.

In their paper, Hansen and Rand (2004) investigated the direction of causality between FDI and GDP for a sample that consist 31 developing countries covering the 1970-2000 period. The authors reported the following findings. According to them, FDI was shown to have a lasting effect on the economic growth of the countries. They, therefore, concluded that FDI causes growth through knowledge transfers and adoption of new technology.

Sridharan et al. (2009) analyzed the causal link between foreign direct investment and economic growth among the BRICS (Brazil, Russia, India, China and South Africa) countries. The results revealed a bi-directional causal relationship between growth and foreign direct investment for Brazil, Russia and South Africa, while unidirectional causality runs from foreign direct investment to growth in the case of India and China. Oscar (2007) investigated the causal relationship between foreign direct investment and economic growth in Uganda. The author's results indicated that foreign direct investment causes economic growth, and that the variables are positively related.

Huseyin and Ilhan (2007) examined the effect of FDI on economic growth of Turkey and Pakistan during the (1975-2004) period. The authors employed both Engle-Granger co-integration and Granger causality techniques to analyze the direction of causality between FDI and economic growth. The econometric results indicated that it is GDP that causes FDI in the case of Pakistan, while bi-directional causality was reported between the variables for Turkey. Moreover, the results revealed that the variables are co-integrated for both Pakistan and Turkey. Magnus and Fosu (2007) investigated the causal relationship between FDI and GDP growth for Ghana for the pre- and post Structural Adjustment Program (SAP) periods. The results did not confirm the existence of causality between FDI and economic growth for the entire period as well as the pre-SAP period. However, it was shown that FDI granger caused GDP growth in the post-SAP period. In their study, Aitken and Harrison (1999) do not find any evidence of a beneficial spillover effect between foreign firms and domestic ones in Venezuela over the (1979-1989) periods.

To sum up, the relationship between foreign direct investment and economic growth seems to be more controversial in the empirical world than in theory. In some cases, FDI causes growth whereas growth doesn't cause FDI. In other cases, economic growth causes FDI while FDI doesn't cause growth. The existence of bidirectional causality is also observed in some country contexts. The result on whether FDI has a lasting effect or a short run effect on economic growth also shows divergence across different empirical literatures in different countries. As De Melo (1999) points out, whether FDI can be deemed to be a catalyst for output growth, capital accumulation, and technological progress seems to be a less controversial hypothesis in theory than in practice.

2.3.1 Foreign Direct Investment in Africa

The flows of foreign direct investment to developing countries have been unevenly distributed. The fast growing Asian economies have greatly benefited from these increases. Of the total of \$161.34 billion in foreign direct investment flowed to developing countries during the periods 1983 to 1990, \$89.61 billion (55.5 percent of the total) flowed to Asian countries. The large domestic markets together with strong industrial capabilities, good infrastructure and liberal investment policies helped these countries to secure large inflows of foreign direct investment (Ghirmay S. and Marc C., 1998)

Sub Saharan African countries; on the other hand, have not been able to attract foreign direct investment on a large scale. Many factors have restricted these countries from receiving large inflows of foreign direct investment. They include, among others, high level of external indebtedness, small domestic investment and slow economic growth and hence small domestic markets, poorly developed physical infrastructure and thus difficult and expensive transport and communication links with the outside world, a poorly skilled labor force, continuing civil conflicts, political crises and natural disasters, especially drought (UNCTAD, 1994).

According to Ajayi (2006), Africa's share of world FDI inflow rose from a share of about 0.7 percent in 2000 to a share of 2.4 percent in 2001. In 2002, 2003 and 2004 Africa's share stood at 1.8 percent, 2.9 percent and 2.8 percent, respectively of world FDI inflows. Africa suffered a dramatic decline in FDI inflows from \$20 billion in 2001 to about \$13 billion in 2002, a decline of 35 percent. In comparison to other regional groupings, Africa received less. Asia and Oceania received a share that was never less than 10 percent over the years. Indeed, they received a share of 22 percent in 2004 as opposed to a share of about 21 percent in the period 1993-98. Latin

America and the Caribbean increased their share from about 7 percent in year 2000 to 10.4 percent in 2004.

Over the past few decades, the governments of African countries had actively liberalized their FDI regimes and undertaken a wide range of policy reforms to attract FDI. However, FDI flows to Africa are significantly small compared to flows to other developing regions. According to Solomon (2008), although a slight improvement was observed in (2000-2006), Africa's share in FDI flows to developing countries decreased from 19% in the 1970s to 11% in the 1980s and 6% in the 1990s. On the contrary, Asia and the Caribbean countries have increased their share in FDI flows to developing countries from 33% in the 1970s to 62% in 2000-2006.

According to UNCTAD (2003), FDI in the oil industry remained dominant; the FDI that goes into Africa is concentrated in a few countries. The traditionally biggest recipients of a significant proportion of FDI include: Egypt, Angola, Nigeria and South Africa. The inflows that South Africa has enjoyed in recent times have been attributed mainly to the privatization process and the interest of investors in the South African large domestic market. Of the increase in FDI flows to Africa between 1987-90 and 1995-98, 33 percent went to four oil-producing countries: Angola, the Congo Republic, Equatorial Guinea and Nigeria.

FDI in the oil industry remained dominant in 2002 with Angola, Algeria, Chad, Nigeria and Tunisia accounting for more than half of the FDI inflows in the year. In the same year, Egypt, Angola, Nigeria and South Africa had a share of 61.9 percent. In 2003, the share of Egypt, Angola, Nigeria, South Africa and Tunisia was 70.11 percent out of the total flow of FDI to the continent. Swings of FDI to these countries have a major impact on the flows of FDI to Africa as

a whole. In 2004, Angola, Equatorial Guinea, Nigeria and Sudan (all rich in mineral resources) and Egypt were the top recipients accounting for a little less than half of all inflows to Africa (Ibid).

FDI inflow to Africa is unevenly distributed in the sub regions of the continent itself. For example, Solomon (2008) shows that in the range of years (2003-2006), the average inflows to the sub regions is 42%, 18%, 9%, 21% and 10% to North Africa, West Africa, East Africa, Central Africa and Southern Africa, respectively.

2.3.2 Economic Performance in SSA Countries

Sub Saharan African countries are characterized by widespread of poverty and slow growth rate with the exception of the recent past. In growth literature, the factors for its underperformance range from macro economic variables to the poor performance of its political and economic institutions including the quality of political leaders. According to the argument of Easterly and Levin (1997), African economic history since 1960 is best explained with unfulfilled potentials, instability, poorly developed financial systems, and large disastrous consequences.

These performances were strongly associated with low schooling, political instability, underdeveloped financial system, distorted foreign exchange market, high government deficits, low infrastructure, ethnic fractionalization and spillovers from neighbors. Sachs and Warner (1997) also explain that Africa has performed worse on different economic policy variables: openness to international trade, average annual inflation, and national saving rates. Most of sub Saharan African countries are also landlocked; large fraction of their land area falls in tropical latitudes; there exist high dependence on natural resources, greater ethno-linguistic fractionalization and short life expectancy.

There is evidence that investment is a key ingredient to sustained growth. Countries that have grown are those that have devoted a significant proportion of their GDP to investment, in other words, countries that have a high Investment-GDP ratio. Over the last few years, FDI has played a growing role in most developing countries' total investment (Borenzstein et al, 1998). This is due to the fact that in countries like SSA, investment to GDP ratio is very low if they rely on only domestic investment as saving falls short of the investment demand. As these countries suffer from poverty, the amount of domestic financing for investment is by far lower than what is necessary for their targeted economic growth.

Many of African countries occupy the lowest rank on the standard of international comparisons such as income per capita, level of extreme poverty, literacy, life expectancy, infant mortality and others. Another major developmental challenge facing Africa is the poor state of infrastructures. Most African countries lack the required infrastructures needed to propel growth and development. All these indications and many others lend credence to the position of Easterly and Levine (1997) which described Africa as a continent suffering from economic growth tragedy.

The SSA economy is based, in general, on traditional exports, mainly agriculture. The level of demand and prices for traditional products can be strongly affected by cyclical changes in global economic activity. These induced demand changes have been an important cause of instability in commodity prices and revenues that had serious adverse impacts on development planning and industrialization of these countries; to the extent that good export performances have proven to be a major source of growth and foreign reserves—thus, development financing.

CHAPTER 3

DATA AND METHODOLOGY

3.1 Data and Data Sources

The data set refers to a panel data for 31 sub Saharan African countries observed from 1992 – 2009 time period. The starting year of data for this study, 1992, is motivated by the availability of FDI data for the whole set of countries under study. A list of countries used in the study is reported in Appendix (2). The countries are selected depending on the availability of data for all of the variables employed in the study.

All of the data used in this study are secondary in nature. Almost all of the data are taken from the World Development Indicators published by the World Bank (2010) except for data of institutional quality which is from World Bank's Worldwide Governance Indicators (WGI) (2010).

The World Bank's Worldwide Governance Indicators (WGI) project (Kaufmann et al. 2010) estimates the institutional quality of a particular country in terms of political stability and no violence, government effectiveness, regulatory quality, voice and accountability, rule of law and control of corruption. Each index is initially ranked from -2.5 to 2.5, a better mark corresponding to a higher quality of the related institution. This study follows Nunn (2007) and adds 2.5 to each index, before dividing it by 5, so that all indexes are finally ranked from 0 to 1. Finally, we compute an aggregate index, which is equal to the arithmetic mean of each individual index.

3.2 Theoretical framework

For this study, we first develop the FDI model and the growth model so as to see the determinants of the two variables in the sub Saharan African countries before dealing with the causal relationship between the two variables. Therefore, we will briefly consider the theoretical framework on which the FDI model and the growth model are based, respectively.

Dunning (1988) has proposed three conditions necessary for a firm to undertake FDI. His eclectic theory of FDI, often referred to as the OLI framework, attempts to give explanations of determinants FDI. OLI stands for ownership advantages, location advantages and internalization advantages, which are conditions that determine FDI.

The ownership advantage is anything that gives the firm enough valuable market power to outweigh the disadvantages of doing business abroad. It could be a product or production process that other firms do not have access to, such as a patent, trade secret or blueprint like a trademark or reputation for quality. Second, the foreign market must offer location advantage that makes it more profitable to produce in that foreign country than to produce at home and then export to the foreign market. Such location-specific advantages offered by a host country include access to local and regional markets, availability of comparatively cheap factors of production, competitive transportation and communications costs, the opportunity to circumvent import restrictions, and attractive investment incentives. The foreign direct investment inflow is determined by different variables. Third, the MNC must have an internalization advantage. Internalization involves the question of why an MNC would want to exploit its assets abroad by opening or acquiring a subsidiary versus simply selling or licensing the rights to exploit those assets to a foreign firm.

This study emphasizes on the location advantage of FDI determinants in SSA countries. These location advantage determinant variables of FDI among others include the market size, macroeconomic stability, cheap factors of production, openness to international trade, infrastructural developments and institutional quality.

The size of the domestic market is a fundamental determinant of FDI. Most of the time GDP per capita income, which is an indicator of effective demand, is used to measure the size of local market. The domestic market growth which is measured in terms of economic growth also determines the inflow of FDI into a country. However, if a firm is export-oriented and not market seeking, the size of domestic market will not be an important determinant of FDI (UNCTAD, 1998).

The macroeconomic stability is also one of the major determinants of foreign direct investment. Any investor whether domestic or foreign prefer to invest in an environment where macroeconomic stability is there than economies where macroeconomic instability prevails. Macroeconomic stability may be either internal or external. Inflation rate of a country may use as proxy of domestic macroeconomic stability whereas external debt service to export ratio of a country uses as a proxy of external macroeconomic stability. According to Demekas et al, (2007), instability at the macro level seems to be unfavorable to capital accumulation and economic growth. High inflation and external debt are assumed to increase uncertainty, worsen the business climate and consequently reduce growth. Labor force is a major component of total production and the productivity of firms. Cheap labor force variables have thus been often included in the empirical literature and this is particularly true for labor-intensive production activities where a higher wage would deter FDI (Tsai, 1994). In this model, the ratio of

population in the working age to the total population of the country is used as a measure of labor cost in a country.

Infrastructure development has high importance for the expansion of FDI because efficient and adequate infrastructure implies better access to natural resources and potential market. Availability and reliability of telecommunication services, developed and adequate road and air transport services, reliable water and electricity supply facilities have paramount importance for the profitability of foreign companies and in attracting FDI (Asiedu, 2002). Investment in human capital also affects the inflow of foreign direct investment as it helps the workers in the host country to be internationally competitive. If the workers in the host country are educationally fit, it means that a country's workforce is internationally competitive in terms of education and productivity and hence attracting more FDI inflow to the country.

The theoretical framework of growth model is based on human capital augmented neoclassical model which was developed by Mankiw et al (1992). According to this model, the aggregate production function is given as a function of different variable inputs such as physical capital, labor, technology and human capital. The model of this type hence is given as;

$$Y_t = K_t^\alpha H_t^\beta [A_t L_t]^{1-\alpha-\beta} \quad (1)$$

Where Y is output, K is physical capital, L is Labor input, A is level of technology, and H is human capital. Furthermore, the model assumes that $\alpha + \beta < 1$, implying that there is decreasing returns to overall capital, where α is the share of physical capital in total income and β is the share of human capital in total income. When the production function is explained in terms of

effective unit of labor, we can denote it in the following form. This is done by dividing each of the variables in equation (1) above by effective unit of labor.

$$\bar{y}_t = \bar{k}_t^\alpha \bar{h}_t^\beta \quad \text{where} \quad \bar{y}_t = Y_t / A_t L_t, \quad \bar{k}_t = K_t / A_t L_t, \quad \bar{h}_t = H_t / A_t L_t \quad (2)$$

Moreover, the assumption in the model is that both labor force and technology exhibit an exponential growth patterns. Accordingly, population growth rate and technology improvement rate are given by n and g , respectively. Given this, therefore, the effective unit of labor $A_t L_t$ grows at $(g+n)$ rate. Furthermore, Mankiw et al (1992) assume that both physical and human capital stock depreciate annually at the same δ rate; this study also makes use of the same assumption. Assuming that the proportions of output invested in physical and human capital in the economy are denoted by s_k and s_h , respectively; the evolution of physical capital and human capital in the economy are given as:

$$\dot{\bar{k}}_t = \frac{d\bar{k}}{dt} = s_k \bar{y}_t - (n + g + \delta) \bar{k}_t \quad (3a)$$

$$\dot{\bar{h}}_t = \frac{d\bar{h}}{dt} = s_h \bar{y}_t - (n + g + \delta) \bar{h}_t \quad (3b)$$

Solving equation (3a) and (3b) above for the steady state values in terms of the parameters and the fractions of income invested into physical capital and human capital, the steady state value of physical and human capital are found, respectively, as given in equations below.

$$\dot{\bar{k}}_t = (s_k^{1-\beta} s_h^\beta / (n + g + \delta))^{1/(1-\alpha-\beta)} \quad (4a)$$

$$\dot{h}_t = (s_k^\alpha s_h^{1-\alpha} / (n+g+\delta))^{1/(1-\alpha-\beta)} \quad (4b)$$

Then substituting equations (4a) and (4b) into the production function in equation (1) and transforming it into natural logarithms while taking into account the assumption that $\delta_h = \delta_k = \delta$ (i.e human capital and physical capital depreciate at the same and constant rate) gives us the steady state level of per capita income represented as:

$$\ln \left[\dot{y}_t \right] = \ln A_t + (\alpha / (1-\alpha-\beta)) \ln s_k + (\beta / (1-\alpha-\beta)) \ln s_h - (\alpha + \beta / (1-\alpha-\beta)) \ln(n+g+\delta) \quad (5)$$

Equation (5) implies that the natural logarithm of output per worker depends on exogenous state of technology, the natural logarithms of investment in physical and human capital and log of labor force growth rate n plus common rate of technological change g and depreciation of capital.

In the above equation, the initial level of technology $\ln A_0$ is unobserved and, therefore, it can be captured by the error term, i.e $\ln A_0 = a + \varepsilon$, where a is constant and ε represents country specific shocks. Thus, substituting this in equation (5) gives,

$$\ln \left[\dot{y}_t \right] = a + (\alpha / (1-\alpha-\beta)) \ln s_k + (\beta / (1-\alpha-\beta)) \ln s_h - (\alpha + \beta / (1-\alpha-\beta)) \ln(n+g+\delta) + \varepsilon \quad (6)$$

According to Mankiw et al (1992) and some other related literatures such as Bates and Nkuruziza (2003), $g + \delta$ is assumed to take a value of 0.05. Therefore, this convention is also considered in this study. Though these are the major important variables affecting growth in the

labor augmented model, there are also other variables to be considered in the empirical model of this study to be dealt with in the next section.

3.3 Empirical Model

The empirical model of this study for the two models is specified based on their respective theoretical frameworks discussed in the above section taking into account other variables that are believed to be important in explaining the models better in the context of the countries under study. In this regard, the variables to be included in the models are briefly discussed along with simple explanation of how they are related with the two dependent variables, foreign direct investment and economic growth.

To start with the case of macroeconomic stability, the variable includes both internal and external macroeconomic stability. The impact of the external and internal macroeconomic stability is captured by the inclusion of the external debt service to export ratio and inflation, respectively. For many authors, it is precisely the episodes of high inflation and excessive external debts experienced by some developing countries (especially during the 80s and 90s, after the debt crises) that have hindered their economic development and the potential spillovers from investment during these years. When these variables have a high value, uncertainty increases which leads to a worsening in the economic environment that deters economic growth and potential spillovers. Thus, besides its contribution to economic growth, these macroeconomic stability variables also affect the inflow of foreign direct investment. Krugman (1988) stated that debt servicing has an adverse effect on economic performance of a country due to the fact that many highly indebted poor countries frequently divert resources, including foreign aid and other foreign exchange resources, to take care of pressing debt service

obligations, particularly debt owed to the multilateral institutions, which is deemed non re-schedulable. Borensztein (1990) also cited that debt overhang had an adverse effect on private investment, both on domestic and foreign investment. As noted by neo-classical economists labor cost is one of the factors that affect the investment decision of foreign investors and this fact has been proven in numerous locations.

This study also includes infrastructural development as these infrastructural facilities, investments in physical capital, are the stimulants of higher economic growth of a country as included in the labor augmented model considered in the theoretical framework of growth. It is expected that countries with a decaying infrastructural development show low economic growth rate. In the same manner, foreign investors are highly interested in areas where infrastructural facilities are developed, and countries where infrastructural facilities are poor discourage foreign investors. Authors like Lucas (1988) in what they amended the neoclassical growth model have acknowledged the role of physical capital in growth of an economy. In addition to domestic investment in physical capital, they have tried to explain the contribution of the presence of FDI in the economy of developing countries. Balasubramanyam et al. (1996) pointed out that many of the growth driving factors identified by the new growth theory can be initiated and nurtured to promote economic growth through FDI. In their paper, they found that FDI has been seen as a major tool to promote growth through learning by doing and knowledge spillovers.

Institutional quality of a country is also an important thing to determine the economic situation of a country. While stable, transparent and reliable legal and regulatory frameworks, political stability, less corrupted institutions promote both domestic and foreign investment, an inefficient and ineffective institutional setup is an impediment to enforce laws and contracts and hence

discouraging both domestic investors and hence negatively affecting economic growth. Moreover, a country that has better institutional quality is expected to have better protection of property rights and law enforcement capacity which encourages investment in research and development. This also can attract foreign direct investment, through which knowledge would be transferred and thereby affecting the growth rate of the economy Romer (1996). In addition to its direct contribution to growth, the institutional quality also plays a role as a main attractor of FDI. Good institutions lead to reduced investment related transaction costs such as corruption related costs. Alongside this research, the empirical literature is increasingly suggesting that a positive FDI growth nexus requires a functioning legal framework. In line with this argument, a stable institutional environment may increase spillovers from FDI as it directly affects business operating conditions Prüfer and Tondl (2008).

One of the variables that determine the economic performance of a country is whether a country is open to international trade. This is due to the assumption that an economy which is more open to international trade would be more accessible to technological knowhow and hence improving the technological progress in the economy which intern enhances economic growth. Openness to international trade also encourages foreign investors to invest in the country as foreign investors are interested in an economy that is open to export their product to the potential market. This is consistent with arguments of authors like (Dollar and Kraay, 2001). According to them, faster growth is achieved with greater trade.

The financial development of a country is also an important variable in determining the growth of a country. Countries with well developed financial institutions have a better opportunity to enhance their economic growth than those having underdeveloped financial institutions. In

countries having well operating financial institutions, economic entities are accessible to finances and hence can smoothly transfer their incomes across different income periods through saving and borrowing in times of high income period and low income period, respectively. According to McKinnon (1973) development of financial markets allows financial deepening which reflects an increasing use of financial intermediation by savers and investors and the monetisation of the economy, and allows efficient flow of resources among people and institutions over time. This encourages savings and reduces constraint on capital accumulation and improves allocative efficiency of investment by transferring capital from less productive to more productive sectors.

In the theoretical model part of economic growth, equation (6), we have thrown the unobservable component part of technological component in the error term part. However, in this model, technology is assumed to be determined in the model within its determinate explanatory variables such as openness to international trade, institutional quality and government expenditure on education. The assumption made here is that countries which are with better institutional qualities are with more technological progress as institutional qualities encourage more investment on research and development as copy rights and patent rights are well protected. In the same manner, it is also assumed that countries which are more open to trade would be more accessible to more technological knowhow and hence technological improvement. Furthermore, countries which invest in education are assumed to be technologically better off as educationally competitive labor forces are more inventive and innovative.

Taking into account the variables discussed above, the empirical models of foreign direct investment and economic growth are given below. The foreign direct investment is given in

natural logarithms as a function inflation, institutional quality, investment in physical capital, gross domestic product per capita, education, openness, labor force and external debt. A port dummy which shows whether a country is landlocked or has port is also included in this model as it shows proximity to international market and low cost of transportation as countries having port has cheap cost of transportation compared to landlocked countries (Svetlana, L. 2007).

$$\ln FDI_t = \beta_0 + \beta_1 POR_t + \beta_2 \ln INF_t + \beta_3 \ln INST_t + \beta_4 \ln INV_t + \beta_5 \ln GDPP_t + \beta_6 \ln EDU_t + \beta_7 \ln OPEN_t + \beta_8 \ln LAB_t + \beta_9 \ln DEB_t + \varepsilon_t \quad (7)$$

Taking into account the case of panel analysis, the model can be represented as;

$$\ln FDI_{it} = \beta_0 + \beta_1 POR_{it} + \beta_2 \ln INF_{it} + \beta_3 \ln INST_{it} + \beta_4 \ln INV_{it} + \beta_5 \ln GDPP_{it} + \beta_6 \ln EDU_{it} + \beta_7 \ln OPEN_{it} + \beta_8 \ln LAB_{it} + \beta_9 \ln DEB_{it} + \eta_i + \varepsilon_{it} \quad (8)$$

Where FDI= foreign direct investment, POR= port dummy, INF= inflation, INST= institutional quality, INV= investment in physical capital, GDPP= GDP per capita, EDU= education, OPEN=openness, LAB= labor force, DEB= external debt. The coefficients to be estimated in the model are represented by β_i , where $i = 0, \dots, 9$ whereas η_i and ε_{it} are the individual effect and the error terms, respectively.

The growth model is also given in natural logarithms as a function of natural logarithms of financial development, inflation, institutional quality, investment in physical capital, foreign direct investment inflow, education, openness, labor augmented population growth rate and external debt.

$$\ln GDPP_t = \alpha_0 + \alpha_1 \ln FIN_t + \alpha_2 \ln INF_t + \alpha_3 \ln INST_t + \alpha_4 \ln INV_t + \alpha_5 \ln FDI_t + \alpha_6 \ln EDU_t + \alpha_7 \ln OPEN_t + \alpha_8 \ln N_t + \alpha_9 \ln DEB_t + \omega_t \quad (9)$$

Specifying this in the context of panel data analysis, it can be represented as;

$$\ln\text{GDPP}_{it} = \alpha_0 + \alpha_1 \ln\text{FIN}_{it} + \alpha_2 \ln\text{INF}_{it} + \alpha_3 \ln\text{INST}_{it} + \alpha_4 \ln\text{INV}_{it} + \alpha_5 \ln\text{FDI}_{it} + \alpha_6 \ln\text{EDU}_{it} + \alpha_7 \ln\text{OPEN}_{it} + \alpha_8 \ln\text{N}_{it} + \alpha_9 \ln\text{DEB}_{it} + \lambda_i + \omega_{it} \quad (10)$$

Where FIN= financial development, N= labor augmented population growth rate and the other variables included in this model are as defined in FDI model. The coefficients to be estimated in the model are represented by α_i , where $i = 0, \dots, 9$ whereas λ_i and ω_{it} are the individual effect and the error terms, respectively.

As this study uses a dynamic model where the lag of the dependent variable is included as an explanatory variable, we need to develop the dynamic form of the above models. Representing all of the explanatory variables of one of the models above, say that of FDI, by a vector X, the dynamic model of FDI including its own lag as additional regressor is given as:

$$y_{it} = \mu y_{it-1} + \beta X_{it} + \eta_i + \varepsilon_{it} \quad (11)$$

Where $i = 1, \dots, 31$ represents the countries under study and $t = 2, \dots, 18$ represents the time period under consideration.⁶

3.4 Estimation procedure

In this section we will look at the methods used in analyzing the data. In the presence of country specific effect and endogenous problem, OLS methods of estimation would lead into inconsistent and biased estimates (Blundell and Bond, 1998). As Bond (2002) points out, if the covariance of the individual effect and explanatory variables is different from zero, OLS is inconsistent.

⁶ The dynamic model for the growth model is also given in the same form.

However, we can avoid these difficulties by using an instrumental variable estimator as proposed by Arellano and Bond (1991). This method solves these problems by first differencing and avoiding the individual effect from the system and appropriate instruments are also employed to eliminate the problem of endogeneity.

Nevertheless, GMM which takes first differences to eliminate the individual specific effects and use lagged instruments to correct for endogeneity has got some problems that arise due to a possibility of using weak instruments or even completely uninformative instruments in the regressions. To understand this, let's consider a case of AR (1) including individual effect as given below.

$$y_{it} = \delta y_{it-1} + \lambda_i + \omega_{it} \tag{12}$$

$$i=1, \dots, n, t=2, \dots, T$$

In this case, if the observations are independent across individual i , the following are expected to be satisfied.

$$E(\lambda_i) = E(\omega_{it}) = E(\lambda_i \omega_{it}) = 0, \text{ for } i=1, \dots, N, t=2, \dots, T \tag{13a}$$

$$E(\omega_{it}, \omega_{is}) = 0 \quad \forall t \neq s \text{ for } i=1, \dots, N \tag{13b}$$

while the initial condition is given by;

$$E(y_{i1} \omega_{it}) = 0 \text{ for } i=1, \dots, N, t=2, \dots, T \tag{13c}$$

These conditions together imply the following moment restrictions, which is sufficient to identify and estimate δ .

$$E(y_{it-s} \Delta \omega_{it}) = 0 \text{ for } t=3, \dots, T \text{ and } s \geq 2 \tag{14a}$$

Where, $\Delta \omega_{it} = \omega_{it} - \omega_{it-1}$ (14b)

These moment restrictions used by the linear first difference GMM estimators imply the use of lagged levels dated t-2 and earlier as instruments for the equations for the first difference. Even though the GMM developed by Arellano and Bond (1991) is a means to avoid problems that arise when dealing with dynamic models, there is a possibility of using weak instruments or even completely uninformative instruments in our regressions. As stated by Bond, Hoeffler and Temple (2001) this leads to the estimator having poor finite sample properties, giving imprecision and bias. According to them, this problem may be worsened if the variance of the individual effects increases relative to the variance of the transient shocks. In order to avoid these problems, we can instead look at the system GMM estimator which is fully developed by Blundell and Bond (1998) that estimates both the levels equation and the difference equation.

In order to avoid these problems, therefore, Blundell and Bond (1998) and Arellano and Bover (1995) propose additional restrictions on the initial condition which allows exploiting additional moment conditions for the level equation in GMM framework. The additional assumption hence is given as;

$$E(\lambda_i \Delta y_{i2}) = 0 \quad \text{for } i=1 \dots N \quad (15c)$$

$$E(\varepsilon_{it} \Delta y_{it-1}) = 0 \quad \text{for } i=1 \dots n, \text{ and } t=3 \dots T \quad (15b)$$

This allows the use of lagged first difference of the series as instrument for level equation. Therefore, the Blundell and Bond (1998) and Arellano and Bover (1995) estimators combines the system of equations that contain the level equations with lagged first differences as instruments and first differenced equations with lagged levels as instruments. Hence with the existence of endogenous regressor the first order autoregressive model becomes;

$$y_{it} = \delta y_{it-1} + \beta X_{it} + \lambda_i + \omega_{it} \quad \text{for } i=1 \dots N, t=2 \dots T \quad (16)$$

In taking the first difference of this equation to eliminate the individual effect, the additional moment condition would be:

$$E(X_{it-s}\Delta\omega_{it}) = 0 \text{ where } t=3, \dots, T \text{ and } s \geq 2$$

The vector X is the regressor used in the system. Here, the regressor may be endogenous, predetermined or exogenous.

For strictly exogenous covariates:

$$\text{cov}(x_{it}\omega_{it-s}) = 0, \quad \forall s \tag{18}$$

Whereas for predetermined covariates, we can relax this in such a way that;

$$\text{cov}(x_{it}\omega_{it+j}) = 0, \quad \forall j \geq 0 \tag{19a}$$

$$\text{cov}(x_{it}\omega_{it-j}) \neq 0, \quad j > 0 \tag{19b}$$

However, we can see that if the covariates are merely predetermined then they will become endogenous when we take first differences, and so entering the differences of the explanatory variables into the instrument matrix will be invalid. Instead, we would need to consider some other instrument such as the lags of levels. We have similar problems for endogenous covariates which is the case if explanatory variables are correlated with error terms of all time periods;

$$\text{cov}(x_{it}\omega_{it}) \neq 0 \tag{20}$$

There is a difference between how we treat endogenous and predetermined covariates. As with the lag of the dependent variable, for both predetermined and endogenous variables, we need to use the lag of levels as instruments for the dynamic case. For the predetermined case, we can use $X_{t-1}, X_{t-2}, X_{t-3}, \dots$ as valid instruments for ΔX_t . However, if we treat the variable as endogenous, we can see that if we were to use X_{t-1} as an instrument for ΔX_t then it would necessarily be

correlated with the error term, and so could not be used as a valid instrument. So, we can only use levels dated prior to $t-1$, i.e. $X_{t-2}, X_{t-3}, X_{t-4}, \dots$ etc. This problem does not arise with the predetermined variable since if X is merely predetermined then X_{t-1} will not be correlated with either ε_t or ε_{t-1} and is thus a valid instrument.

The system GMM estimation procedure allows us to directly address several econometric problems. The convenience of this method in empirical growth models has been emphasized on many occasions (Bond et al, 2001). First, as in other fixed-effect panel estimators, the system GMM method enables us to consider the presence of unobserved country-specific effects due to differences in the initial conditions, or possible bias of omitted variables that are persistent over time. As initially mentioned by Islam (1995), allowing differences in the steady state (through fixed individual country effects) enables us to account for divergence among countries that were not primarily considered. In addition to this, by exploiting the time-series dimension, panel data estimation increases the degrees of freedom and reduces collinearity between variables, leading to more efficient estimates.

This methodology, moreover, appears to be more appropriate for the estimation of growth models than the standard GMM estimator developed for dynamic panel data (Arellano and Bond, 1991). According to Blundell and Bond (1998), the instruments used in the standard GMM estimation can behave poorly when explanatory variables present a strong autoregressive component such as income or capital level. As Soto (2009) demonstrates, the system GMM estimator has a lower bias and higher efficiency than other estimators including the standard

first-differenced GMM estimator proposed by Arellano and Bond, (1991) if certain persistence exists in the series.

However, the system GMM method shows certain weaknesses that are primarily related to the goodness of their instruments and to the accuracy of the initial assumption of no serial correlation in the errors. Thus, following the suggestions of Arellano and Bond (1991), we verify the consistency of our estimates through two tests for correct specification: the Sargan test of over-identifying restrictions and a test to explore the problem of error term autocorrelation.

Initially, we examine Sargan test of over identification of the model in order to test the validity of the instruments used. A fundamental assumption for the validity of GMM is that the instruments are exogenous. In this, if Z_j is instrument (number of instruments running from 1 to m) used in the model and ω_{it} is the error term, Sargan test tests the joint null hypothesis that,

$$\text{cov}(Z_j, \omega_{it}) = 0, \quad \forall j \in \{1, \dots, m\} \quad (21)$$

Therefore, given that Z_j is an instrument for explanatory variable and ω_{it} being error term, Sargan test tests the validity of all of the instruments used in the model.

Secondly, the Arellano Bond test that the average autocovariance of the residuals is zero is looked at. Here, we may reject the first order autocorrelation of the error terms, as consecutive error terms might be autocorrelated. We will expect, however, that the average second order autocovariance of the residuals will be zero. If, however, we were to find the average second order autocovariance, we would have evidence of model misspecification implying that the instruments are invalid.

This study also attempts to avoid the potentially misleading inference highlighted by Blonigen and Wang (2005), which might be related to the combination of very different economic realities. According to these authors, pooling data implies that the effects of FDI are similar for countries with different level of development, which can lead to error of inference. Hence, in an attempt to partially control for this effect, the study will split the total sample of the countries under study into two. Therefore, in this paper results obtained for both, the entire sample group (for the 31 countries) and those obtained when the data set is split into two different income level groups as defined by the World Bank in 2011 is presented. The first group consists of 19 countries classified as low income countries whereas the second group includes 12 countries, defined as middle income countries.

3.5 Diagnostic Tests

3.5.1 Multicollinearity Test

Most of the time, it is common to test if there is multicollinearity among explanatory variables before going into estimation and interpretation of the model. Most econometric literatures reveal that the presence of multicollinierity results in inflated standard errors which make inferences from estimation highly problematic (Gujarati, 2004). To test for this problem, therefore, this study employs variance inflation factor test for multicollinearity.

3.5.2 Panel Stationarity Test

Before undertaking estimation process, it is common to examine the stationarity properties of the data series. In stationary time series, shocks will be temporary and over time their effects will be eliminated as the series revert to their long run mean values. On the other hand, non-stationarity

series will contain permanent components. In fact, most of the economic variables show a trend and therefore in most cases they are non stationary. These non stationary time series can easily lead the regression results to incorrect or spurious conclusions. Thus, a key way to test for non-stationarity is to test for the existence of unit root.

It has become well-known that the traditional Augmented Dickey-Fuller (ADF)-type tests of unit root suffer from the problem of low power in rejecting the null of stationarity of the series, especially for short-spanned data. Recent literatures suggest that panel-based unit root tests have higher power than unit root tests based on individual time series. A number of such tests have appeared in the literature. Recent developments in the panel unit root tests include: Levin, Lin and Chu (LLC) (2002), Im, Pesaran and Shin (IPS) (2003), Maddala and Wu (1999), Choi (2001), and Hadri (2000).

From these different panel unit root tests developed in the literature, LLC and IPS are the most popular tests. Both of the tests are based on the ADF principle. However, LLC assumes homogeneity in the dynamics of the autoregressive coefficients for all panel members. In contrast, the Im, Pesaran and Shin (2003) panel unit root test, which is commonly known as IPS is more general in the sense that it allows for heterogeneity in these dynamics. Therefore, it is described as a “Heterogeneous Panel Unit Root Test”. It is particularly reasonable to allow for such heterogeneity in choosing the lag length in ADF tests when imposing uniform lag length is not appropriate. In addition, slope heterogeneity is more reasonable in the case where cross-country data is used. In this case, heterogeneity arises because of differences of country context. As a result, the test IPS has higher power than other tests in its class, including LLC.

IPS begins by specifying a separate ADF regression for each cross section:

$$\Delta y_{i,t} = \alpha_i + \beta_i y_{i,t-1} + \sum_{j=1}^{p_i} \rho_{i,j} \Delta y_{i,t-j} + \varepsilon_{i,t} \quad (22)$$

where $y_{i,t}$ ($i=1, 2, \dots, N$; $t=1, 2, \dots, T$) is the series for panel member (country) i over period t , p_i is the number of lags in the ADF regression, and the error terms $\varepsilon_{i,t}$ are assumed to be independently and normally distributed random variables for all i 's and t 's with zero means and finite heterogeneous variances σ_i^2 . Both β_i and the lag order ρ in (22) are allowed to vary across sections (countries). Hence, the null hypothesis to be tested is:

$$H_0: \beta_i = 0, \forall i$$

Against the alternative hypothesis

$$H_1: \begin{cases} \beta_i = 0 & \text{for some } i\text{'s.} \\ \beta_i < 0 & \text{for at least one } i. \end{cases}$$

The alternative hypothesis simply implies that some or all of the individual series are stationary.

3.5.3 Panel Co-integration Test

If stationarity test shows that some or all of the series are non stationary at level, but after first difference, the co-integration test will be undertaken as cointegration is expected between variables. The co-integration test is performed to determine the existence of the long run relationship between the variables of interest. The testing of hypothesis is null for non co-integration against the alternative hypothesis, which means the existence of co-integration. The

Johansen's test of integration (Johansen, 1988) is usually used for cointegration test. The estimated co-integration equation is of the following form:

$$Y_{it} = \beta_{i0} + \beta_{i1}X_{i1t} + \beta_{i2}X_{i2t} + \dots + \beta_{ik}X_{ikt} + \varepsilon_{it} \quad (23)$$

The equation can be re-written as:

$$\varepsilon_{it} = Y_{it} - (\beta_{i0} + \beta_{i1}X_{i1t} + \beta_{i2}X_{i2t} + \dots + \beta_{ik}X_{ikt}) \quad (24)$$

Where $i= 1, \dots, N$ represents the individual members of the panel and $t=1, \dots, T$ represents the time period.

Johansen's procedure is useful in conducting individual co-integration tests, but does not deal with co-integration test in panel settings. Instead, panel co-integration test which is recently developed by Pedroni (1999, 2004) provide a technique that allows for using panel data and thereby, overcoming the problem of small samples, in addition to allowing for heterogeneity in the intercepts and slopes of the co-integrating equation. The test starts with the following panel regression.

$$Y_{it} = \alpha_i + \sum_{j=1}^{P_i} \beta_{ji} X_{jit} + \varepsilon_{it} \quad (25)$$

$$\varepsilon_{it} = \rho_i \varepsilon_{i(t-1)} + \omega_{it} \quad (26)$$

Where, ε_{it} represents the disturbance term from the panel regression; α_i allows for the possibility of country-specific fixed effects and the coefficients of β_{ji} allows for the variation across individual countries. X_{jit} is a vector of explanatory variables. In equation (26), ρ_i and ω_{it} are the coefficient and error terms of the equation.

The null hypothesis, no co-integration, of the within-dimension estimation is given as:

$$H_0 : \rho_i = 1, \forall i$$

Against the alternative hypothesis,

$$H_1 : \rho_i = \rho < 1$$

Here, under alternative hypothesis, the within-dimensional estimation assumes a common value for $\rho_i = \rho$. That means it does not allow an additional source of possible heterogeneity across individual country members of the panel.

The null hypothesis, no co-integration, of the between-dimension estimation is given as follows:

$$H_0 : \rho_i = 1, \forall i$$

Against the alternative hypothesis,

$$H_1 : \rho_i < 1$$

Here, under alternative hypothesis, the between-dimensional estimation does not assume a common value for $\rho_i = \rho$. That means it allows an additional source of possible heterogeneity across individual country members of the panel.

Pedroni suggested two types of test to know the existence of heterogeneity of co-integration vector. First, is the test based on within- dimension approach (i.e. panel test) which includes four statistics such as panel v- statistic, panel ρ - statistic, panel PP- statistic and panel ADF- statistic. These statistics pool the autoregressive coefficients across different members for the unit root tests on the estimated residuals. The second test is based on between- dimensional approaches (group test). It includes three statistics such as group ρ -statistic, group PP-statistic and group ADF-statistic. These statistics are based on estimators that simply average the individually estimated coefficients for each member. These tests are able to accommodate individual specific

short-run dynamics, individual specific fixed effects and deterministic trends as well as individual specific slope coefficients (Pedroni, 2004).

3.5.4 Panel Causality Test

Pedroni's heterogeneous panel co-integration method tests only for the existence of long run relationships. The tests indicate the presence or absence of long run links between the variables, but do not indicate the direction of causality when the variables are co-integrated. Causality which shows the direction of the long run relationship between the variables is traditionally tested by the standard Engle and Granger causality procedure.

A typical example of traditional panel data causality testing is Holtz-Eakin et.al (1988, 1989). Given two variables X and Y having a long run relationship, being cointegrated, the causality equation is given by running each variable as a function of its lags and the lags of the other variable in the following form.

$$Y_{it} = \sum_{k=1}^K \alpha_k Y_{it-k} + \sum_{l=1}^L \delta_l X_{it-l} + f_{yi} + u_{it} \quad (27)$$

$$X_{it} = \sum_{m=1}^M \beta_m Y_{it-m} + \sum_{n=1}^N \gamma_n X_{it-n} + f_{xi} + v_{it} \quad (28)$$

Where Y_{it} and X_{it} are the two co-integrated variables, $i=1 \dots N$ represents cross-sectional panel members, $t=1 \dots T$ represents the time period, u_{it} and v_{it} are error terms. This model differs from the standard causality model in that it adds two terms, f_{xi} and f_{yi} which are individual fixed effects for the panel member i .

Given these two variables, causality may run from X to Y, or X causing Y if, after controlling for the information in the past value of Y, the past value of X add significantly to the explanation of current Y, we can say that X causes Y. Similarly, if we control for the information in the past value of X and then, if the past value of Y add significantly to the explanation of current X, we can say that Y causes X. If only one of these two relationships hold, it implies that there is unidirectional causation. But, if both of them hold, there will be bidirectional relationship between them.

Generally, to test for the causality between the two variables, the joint hypotheses $\delta_l = 0$ for $l = 1, \dots, L$ and $\beta_m = 0$ for $m = 1, \dots, M$ is simply tested. The variable X is said not to Granger-cause the variable Y if all the coefficients of lagged X ($\delta_l = 0$ for $l = 1, \dots, L$) in equation (27) are not significantly different from zero, because it implies that the history of X does not improve the prediction of Y. In the same manner, the variable Y is said not to Granger cause the variable X if all the coefficients ($\beta_m = 0$ for $m = 1, \dots, M$) of the lagged X in the equation (28) are not significantly different from zero as it implies that the history of Y does not improve the prediction of X.

Therefore, following the same approach, we can form the granger causality model for the variables of our interest in this study which are foreign direct investment inflow and GDP per capita in the following form.

$$\ln GDPP_{it} = \sum_{k=1}^K \alpha_k \ln GDPP_{it-k} + \sum_{l=1}^L \delta_l \ln FDI_{it-l} + \phi_i + u_{it} \quad (29)$$

$$\ln FDI_{it} = \sum_{m=1}^M \beta_m \ln FDI_{it-m} + \sum_{n=1}^N \gamma_n \ln GDPP_{it-n} + \tau_i + v_{it} \quad (30)$$

Where ϕ_i and τ_i are individual specific effects of the countries in the equations of GDPP and FDI, respectively. The time period in this case is represented by $t=1 \dots 18$ whereas the individual panel member is given by $i=1 \dots 31$. The error terms are given by u_{it} and v_{it} , for equations (29) and (30), respectively. In this case the Wald causality test is employed to test the causal relationship between FDI and GDP per capita. To determine the causal relationship between them, the null and alternative hypotheses for equation (29) are respectively given as:

$$H_0 : \delta_l = 0$$

$$H_1 : \delta_l \neq 0 \text{ where } l=1 \dots \dots \dots L.$$

Similarly the null and alternative hypotheses for equation (30) are respectively given by:

$$H_0 : \gamma_n = 0$$

$$H_1 : \gamma_n \neq 0 \text{ where } n=1 \dots \dots \dots N$$

In the above tests we say that there is a unidirectional relationship between foreign direct investment and economic growth if we fail to reject one of the two null hypotheses. If, however, we fail to reject both of the null hypotheses, then bidirectional relationship is said to exist between the two variables. Foreign direct investment and economic growth will have no causal relationship if both of the null hypotheses are rejected.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Descriptive Analysis

In this section, the discussion of the descriptive summary statistics of the variables under consideration is briefly analyzed. In this summary statistics, the mean, standard deviation and the number of observations for each variable under study are given. In addition to these, the maximum and minimum values of the observations across time period and cross sections are also provided.

Table (1) shows summary statistics of variables included in estimated models in such a way that each row depicts summary statistics for the respective variables. The investment in physical capital statistical summary is illustrated in the second row. The variable shows cross sectional variation with a maximum of 70.82% in Lesotho during the year 1992 and a minimum of -23.76% in Mauritania during the year 1996.

The domestic credit to the private sector which is a proxy of financial development is illustrated in row three with minimum and maximum values of 0% in Zambia in 1992 and 87.78% in Mauritius in 2008. According to this statistics, in Zambia during the year 1992, there was no domestic credit given to the private sector. The variable shows a mean of 14.80% for the overall observation. External debt service to export ratio, the variable in the fourth row, shows a great variation among the cross section members. The minimum value of 0.46% corresponds to Sudan in 1994 whereas the maximum value of 134.02% corresponds to Burundi in 2004; the mean of the overall observation being 12.91%.

The variable in the fifth row is institutional quality which is indexed between zero and one; zero shows relatively the worst institutional quality whereas one shows the best institutional quality in relative terms. As a case of the other variables, this variable also shows a great variation across the cross sectional members. In this regard, the minimum value of the variable which is 0.12 is observed in Rwanda in 1996 whereas its maximum value which is 0.67 is observed in Botswana in 2004. The mean of the variable for the overall observation is 0.39. The labor augmented population growth rate variable, which is put in row six shows a variation across cross sections with a maximum of 10.09% and a minimum value of -8.22% showing a mean 2.53% of for overall observation. The maximum and minimum values are both observed in Rwanda in the years 1998 and 1993, respectively.

Table1: Descriptive statistics

| Variable | Observations | Mean | Std. Deviation | Min | Max |
|----------|--------------|--------|----------------|--------|---------|
| INV | 533 | 20.02 | 9.36 | -23.76 | 70.82 |
| FIN | 530 | 14.80 | 12.00 | 0 | 87.78 |
| DEB | 450 | 12.91 | 12.05 | 0.46 | 134.02 |
| INST | 341 | 0.39 | 0.12 | 0.12 | 0.67 |
| N | 558 | 2.53 | 1.13 | -8.22 | 10.09 |
| FDI | 557 | 3.40 | 5.91 | -8.59 | 46.49 |
| OPEN | 538 | 72.74 | 37.69 | 10.83 | 209.41 |
| LAB | 527 | 73.94 | 10.17 | 50.4 | 90.8 |
| EDU | 327 | 4.63 | 2.49 | 0.93 | 14.15 |
| INF | 557 | 79.64 | 33.94 | 0 | 206.22 |
| GDPP | 558 | 751.71 | 1075.35 | 102.29 | 4917.83 |

Source: Own Computation Based on Available Data.

The seventh row shows the FDI ratio to GDP which is used as a measure of inward FDI flow. As can be seen from the table, the variable has great variation among the cross section with the maximum being 46.49% to GDP in Chad in 2002 whereas the lowest is -8.59% which is in Gabon in the year 1996. The mean of the variable for the entire year and countries under consideration is 3.40%. The statistical summary of openness to GDP ratio is depicted in the eighth row. This variable is expressed as the sum of export and import to GDP ratio and is used as a proxy of openness to international trade. The variable has its maximum value of 209.41% in Swaziland in 2003 and a minimum of 10.83% in Ethiopia in 1992, showing a high variation across cross section members with a mean of 72.74% for the overall observations.

The ninth row shows the summary statistics of labor force as a percentage total population of the country. The variable has a maximum value of 90.8% which is experienced in Burundi in the years 1995 and 1996 whereas a minimum value of 50.4% was experienced in Sudan in 1993; the variable is with a mean of 73.94% for the overall observation. The public expenditure on education as a ratio to gross domestic product of a country is depicted in row ten. As a case in other variables, this variable also shows a great variation across the cross section members with a minimum value of 0.93% in Congo Republic in 2009 and a maximum value of 14.15% in Lesotho in 2005, showing a mean of 4.63% for the overall observation.

The eleventh row illustrates statistical summary of inflation is used as a proxy of internal macroeconomic stability. As one can see from the table above, there is a great variation in the variable within the cross sections. Accordingly, a maximum value of 206.22 is observed in Ethiopia in 2009 while a minimum value of 0 is observed in Congo, Rep. in the year 1997 and in

Rwanda in 1994; the mean of the overall observation being 79.64. The GDP per capita statistical summary is illustrated in the last row. As can be seen from the table, this variable shows a high variation across the cross section members. The minimum value of the variable is 102.29 observed in Ethiopia in 1992 whereas its maximum value of 4917.83 is observed in Mauritius in 2009. The mean of the variable for the overall observation is 751.71.

The general trend of the variables under study is depicted in the appendix (4) when the vertical line shows the mean of the respective variable and the horizontal line being the time period included in this study.

4.2 Results of Diagnostic Tests

4.2.1 Results of Multicollinearity Tests

As it is important to test for multicollinearity before going for estimation and interpretation, this study uses the variance inflation factor (VIF), and the result of this test has been reported in the appendix (3) part of table (7). Depending on different authors like Maddala (1992) VIF greater than 10 or $1/VIF < 0.10$ indicates the presence of serious multicollinearity. As can be seen from the tables, since the VIF statistics for these series are less than 10, there is no indication of serious multicollinearity problem for all variables under consideration.

4.2.2 Panel Unit root test results

It is common to test the stationarity of variables in the first place before estimating the regression of an equation as the presence of unit root leads to spurious results. Accordingly, a panel unit root test developed by Im Pesaran and Shin (2003) is employed in this study. This method of testing a panel unit root allows for differences across the panel members. Therefore, the null

hypothesis of this test is that all countries have a unit root for the variable against the alternative hypothesis that at least some panel members are without unit root. Based on this method, the result of the test is given in the following table.

As can be seen from table (2), variables like inflation level, investment in physical capital and institutional quality are stationary at level under both with only individual effect and with individual effect and time trend. Openness is stationary at level only under the case of with only individual effect and shows the presence of unit root under the case of with individual effect and time trend. On the other hand, variables such as GDP per capita income, financial development, augmented population growth rate, investment in human capital , FDI, external debt service to export ratio and labor force show the presence of unit root under both cases of only individual effect and individual effect and time trend having no strong evidence for rejection of the null.

Table 2: Panel Unit Root Test Result for Level Variables

| Variables in level | With only individual effect | With individual effect and time trend |
|--------------------|-----------------------------|---------------------------------------|
| Ln_GDPP | -0.4691 | -2.2534 |
| Ln_INF | -2.4625*** | -2.4266** |
| Ln_INV | -1.7428** | -2.2414** |
| Ln_OPEN | -1.8587*** | -2.1827 |
| Ln_FIN | -1.3785 | -2.2084 |
| Ln_FDI | -1.5907 | -1.52617 |
| Ln_N | -1.2463 | -1.1479 |
| Ln_EDU | 0.04430 | -0.85835 |
| Ln_INST | -1.8568*** | -2.8897*** |
| Ln_DEB | 4.04342 | 1.246407 |
| Ln_LAB | -0.6472 | -1.5715 |

Note: The values of 1%, 5% and 10% significance levels for with only individual effects are -1.820, -1.730 and -1.690, respectively.

The values of 1%, 5% and 10% significance levels for individual effects and time trend are -2.460, -2.380 and -2.330, respectively.

*The signs ***, ** and * denote significances at 1%, 5% and 10% levels, respectively.*

In a unit root test, if a variable is non stationary at level, the next step is to difference the variable and undertake a unit root test in first difference. Therefore, the unit root for the first difference of variables is reported in the following table.

Table 3: Panel Unit Root Test Result for Differenced Variables

| Variables in difference | With only individual effect | With individual effect and time trend |
|--------------------------|-----------------------------|---------------------------------------|
| $\Delta \text{Ln_GDPP}$ | -3.7350*** | -3.8418*** |
| $\Delta \text{Ln_OPEN}$ | -4.6019*** | -4.6939*** |
| $\Delta \text{Ln_FIN}$ | -3.6904*** | -4.1770*** |
| $\Delta \text{Ln_FDI}$ | -11.1558*** | -8.56498*** |
| $\Delta \text{Ln_N}$ | -16.9835 *** | -13.0050*** |
| $\Delta \text{Ln_EDU}$ | -5.56771*** | -4.82666*** |
| $\Delta \text{Ln_DEB}$ | -7.29236*** | -5.70391*** |
| $\Delta \text{Ln_LAB}$ | -3.2795*** | -3.9397*** |

Note: The values of 1%, 5% and 10% significance levels for with only individual effects are -1.820, -1.730 and -1.690, respectively.

The values of 1%, 5% and 10% significance levels for individual effects and time trend are -2.460, -2.380 and -2.330, respectively

*The signs ***, ** and * denote significances at 1%, 5% and 10% levels, respectively.*

In the case of the first difference, all of the variables of concern are stationary even at 1% level of significance under both cases: only individual effect case and individual effect and time trend case. Thus, the null hypothesis of existence of unit root is rejected for GDP per capita, openness, domestic credit for private sector, FDI, labor augmented population growth rate, external debt service to export ratio and labor force for the first differences of the variables. Generally, the unit root test shows that variables which are stationary at level are integrated of order zero, $I(0)$ at

level, whereas the variables which become stationary after first differencing are integrated of order one, I(1) at level but become I(0) after first differencing.

4.2.3 Panel Cointegration Test Results

Having established that the FDI and GDPP series are integrated of order one, I(1), in the stationary test undertaken above, the next step is to test for the cointegration relationship between the two variables, in order to determine if there is a long-run relationship between them. The test for the long-run relationship between both variables using Pedroni's heterogeneous panel test has been conducted and table (4) reports the test results. It can be seen from the test results in the table that out of eleven of Pedroni's statistics, eight of them significantly reject the null of no cointegration in favour of the presence of cointegration between the two variables. This implies that there is a long run relationship between FDI and GDPP.

Table 4: Pedroni Panel Co-integration Test

| | Statistic | Prob. | Weighted Statistic | Prob. |
|---------------------|-----------|--------|--------------------|--------|
| Panel v-Statistic | -2.440826 | 0.9927 | -3.177153 | 0.9993 |
| Panel rho-Statistic | -1.142841 | 0.0266 | -2.349433 | 0.0094 |
| Panel PP-Statistic | -3.731597 | 0.0001 | -6.677551 | 0.0000 |
| Panel ADF-Statistic | -4.507717 | 0.0000 | -6.361712 | 0.0000 |
| Group rho-Statistic | -0.043183 | 0.4828 | | |
| Group PP-Statistic | -7.198344 | 0.0000 | | |
| Group ADF-Statistic | -6.429465 | 0.0000 | | |

The cointegration test results for the case of low income countries and middle income countries are reported on the appendix (3) part of table (8) and (9), respectively.

4.3 Econometric Results and Discussions

This section presents the results of empirical growth and foreign direct investment econometric models using a panel data of 31 sub Saharan African countries from the year 1992 to 2009. Table (5) shows the estimation results of a system GMM econometric technique. In this table the results of two models are reported: model (1) representing empirical economic model in which the natural logarithms of GDP per capita is used as a dependent variable whereas in model (2), the determinants of foreign direct investment in which natural logarithms of foreign direct investment to GDP ratio is a dependent variable.

In model (1), the dependent variable, natural logarithm of GDP per capita, is used as a proxy of economic performance. The regressors are variables used in the human capital augmented growth model of Mankiw et al (1992) and some other additional variables like macroeconomic stability, institutional quality, financial sector performance and openness. In this model, as the study is concerned with dynamic panel model, the lag of the dependent variable is also used as regressor.

Looking at the significance of the regressors, the first lag of the dependent variable is statistically significant at even small levels of significance with the expected positive sign. This implies that the past economic performance of countries plays a great role in improving their current economic growth. The macroeconomic stability is decomposed here into internal macroeconomic stability and external macroeconomic stability which are explained by inflation and external debt, respectively. In this study, the external macroeconomic stability is significant determinant of economic growth at 10% significance level with the expected negative sign.

Accordingly, high external debt services to export ratio hampers the economic performance of sub Saharan African countries. The internal macroeconomic stability variable, inflation, is unfortunately statistically insignificant even though it is with the expected negative sign.

Table 5: Estimation results

Model 1 is a system GMM model when Ln_GDPP is a dependent variable whereas Model 2 is a system GMM model when Ln_FDI is a dependent variable.

| Estimated coefficients | Model 1 | Model 2 |
|------------------------|--------------------------|---------------------------|
| Ln_GDPP | | |
| L1 | 0.904993*** (0.0969112) | 0.735159 (2.945324) |
| Ln_DEB | -0.0067955* (0.0041174) | -0.7085491*** (0.1631597) |
| Ln_FDI | - | - |
| L1 | 0.0032463* (0.0018711) | 0.3958483*** (0.0552249) |
| Ln_EDU | 0.0210851*** (0.0076189) | 0.0198834 (0.3256222) |
| Ln_INV | 0.0393264*** (0.0151119) | 1.31595*** (0.4104679) |
| Ln_FIN | 0.0117059* (0.0067166) | - |
| Ln_N | -0.0147268 (0.0159096) | - |
| Ln_INF | -0.0039941 (0.0080458) | -1.847883*** (0.6035772) |
| Ln_INST | -0.02364 (0.0157095) | 0.7191167 (1.205566) |
| Ln_LAB | - | 0.376639 (1.044406) |
| Ln_OPEN | -0.0200705 (0.0165057) | 0.6402035* (0.3453157) |
| POR | - | 0.0380071 (0.3419532) |
| -CONS | -0.0113685 (0.1305616) | -0.26547 (6.460007) |
| Sargan test, p-value | 0.1368 | 0.5957 |
| AR(1), p-value | 0.0219 | 0.0623 |
| AR(2), p-value | 0.4044 | 0.7508 |

Note: values in parenthesis are standard errors.

****, ** and * show significance at 1%, 5% and 10% significance levels, respectively.*

The first lag of the variable foreign direct investment is statistically significant at 10% significance level. This implies that sub-Saharan African countries benefit in encouraging

foreign direct investment as it improves their economic performance. This goes in line with the schools having optimistic view on the role of FDI on economic performance of countries and Sridharan et al. (2009) that find FDI positively affecting the economic growth of BRICS countries. The fact that FDI positively affect economic growth in the region implies that variables that affect FDI also affect economic growth indirectly. Investment in human capital which is proxied by public spending on education to GDP ratio is statistically significant even at 1% level of significance thus showing that investing in human capital helps sub Saharan African countries to accelerate the economic performance of the region.

As the case in investing in human capital, investment in physical capital is also highly statistically significant at 1% level. This is due to the fact that investing in physical capital increases capital labor ratio hence increasing productivity. Moreover, investing in infrastructural facilities decreases the costs of transportation and communication being an incentive for economic entities to actively take part in economic activities of the countries. Financial development, proxied by domestic credit to the private sector, is also statistically significant in sub Saharan African countries with the expected positive sign. This variable among other things shows the accessibility of different economic entities to financial sector and allocative efficiency of capital. Accordingly, the study shows that development in the financial sector helps a lot to enhance the economic growth of the countries in the region.

In the case of model 2, the model of the determinants of foreign direct investment, where the natural logarithm of FDI is used as a dependent variable whereas variables such as economic growth, investment in physical and human capital, openness, labor force and macroeconomic stabilities are used as regressors. As the model is of dynamic panel, the lag of the dependent

variable is also used as the regressor of the model. In addition to this, the port dummy which shows whether the country has port or is landlocked is also employed as one of the determinant variable.

Coming to the significances of the explanatory variables, its own first lag is statistically significant at 1% level significance. This implies that the past level of FDI affects positively the current FDI. This might hold in a case when foreign investors who invested in the previous time help as promotion for other foreign investors to come and invest in those countries. In addition to this, the statistical significance of the lag may arise when the foreign investors reinvest the profit they gain in the host countries rather than repatriating it to their home countries. Both of the macroeconomic stabilities are statistically significant at 1% level of significance with the expected negative sign. This shows that foreign investors take into account both internal and external macroeconomic environments of sub-Saharan African countries before they decide to invest in the region. Therefore, the finding implies that unstable macroeconomic environment discourages foreign investors not to invest in the region.

Investment in physical capital is also statistically significant determinant of FDI at 1% level of significance. This is in line with findings of Berhanu (1999). According to him, availability and reliability of telecommunication services, developed and adequate road and air transport services, reliable water and electricity supply facilities have paramount importance for the profitability of foreign companies and in attracting FDI. Therefore, the investment in infrastructural facilities and other physical capital encourages foreign investors to come and invest in the region as it reduces the cost of transportation and communication thereby stimulating investment. The variable of openness to international trade is also significant at 10%

with the expected positive sign, showing that the more the countries are open to international trade the more they reap the benefits of FDI.

Coming to the specification of the model and the issue of autocorrelation, the results of sargan test and autocorrelation test of order one and order two are given at the bottom part of table (5) in this section. For the case of autocorrelation test, the null hypothesis is that there is no autocorrelation. The first order autocorrelation test for both growth and FDI models reject the null hypothesis of no autocorrelation in favor of the presence of autocorrelation at 5% and 10%, respectively. This statistics of order one autocorrelation test however, is misleading and most of the time rejects the null hypothesis and hence is not dependable. According to Roodman (2007), relying on first order autocorrelation test is not dependable as it depicts the presence of autocorrelation and hence, there is a need to undertake a second order autocorrelation test which is dependable. The test results of AR (2) for both models fail to reject the null hypothesis of no autocorrelations. Therefore, the Arellano-Bond test for second order autocorrelation is accepted for both models implying that both models have no problem of serial correlation.

The case of over identification test is also given for both models in table (5). The null of this sargan test is that over identifying restrictions are valid. As can be seen from the model, the null hypothesis of valid specification in the Sargan tests are not rejected in both cases. This shows that the set of instruments used in the model are valid and the models are well specified. In general, autocorrelation tests and Sargan tests show that both models have no problems of autocorrelations and are well specified.

4.4 Analysis of Panel Causal Relationship

If two variables are cointegrated, there is a long run relationship between them and at least there will be a one directional relationship between the two variables. Under the Pedroni cointegration test, it has been found that FDI and GDP per capita are cointegrated and hence has been shown that they are related in the long run. However, the cointegration test doesn't show the direction of their relationship. The causality test between the two variables, therefore, is considered in this section so as to identify the direction of causality.

The equations (29) and (30) were estimated accounting for endogeneity and individual effect problem using system GMM technique. Each of these equations was estimated and the joint significance of the coefficients of the lags of the variables was tested by Wald causality test to determine the kind of causality between FDI and GDP per capita. Accordingly, for equation (29), the joint significance of the lags of FDI was tested to determine whether FDI causes GDP per capita or not. As can be seen from table (6), the null hypothesis that says FDI doesn't cause GDPP is rejected at 5% implying that FDI causes economic growth in the sub Saharan African countries under consideration. In the same token, the joint significance of the lags of GDPP is tested for equation (30) to see if GDPP causes FDI. In this case we fail to reject the null hypothesis even at 10% and hence showing that economic growth doesn't cause FDI inflow in sample countries of the region.

From this results we can see that there is a unidirectional relationship between FDI and economic growth in sub Saharan African countries under study; the causality running from FDI to growth. The fact that there is a long run relationship between FDI and economic growth and FDI causes economic growth shows that the results support the endogenous growth theorists. According to

them, in contrast to the classical and neoclassical theories that believe FDI has the same role as that of domestic investment and hence only a short run effect on economic growth due to diminishing returns to capital, FDI has a lasting effect as it offsets the diminishing returns to capital through knowledge transfers and adoption of new technologies.

Table 6: Wald Causality Results

| | Null hypothesis | FDI doesn't cause economic growth | Economic growth doesn't cause FDI |
|-------------------------|-----------------|-----------------------------------|-----------------------------------|
| All sample countries | χ^2 | 8.66 | 3.65 |
| | p-value | 0.0132 | 0.1614 |
| Low income countries | χ^2 | 9.97 | 3.46 |
| | p-value | 0.0068 | 0.1772 |
| Middle income countries | χ^2 | 6.20 | 22.68 |
| | p-value | 0.0449 | 0.0000 |

This result is in line with Hansen and Rand (2004) who investigated the direction of causality between FDI and GDP for a sample that consists of 31 developing countries covering the period from 1970-2000. The authors' findings showed that FDI has a lasting effect on economic growth in the sample countries. They, therefore, concluded that FDI causes growth through capital formation, knowledge transfers and adoption of new technology.

As the panel analysis is pooling countries of different income group, there may be a problem of wrong inference in the conclusion made on the causality between these variables. This is highlighted by authors like Blonigen and Wang (2005). Therefore, so as to partially control for this effect, it is of logical reasoning to consider if changes in the direction of causality occur by splitting the countries into two: low income countries and middle income countries. This category of countries is taken from the World Bank's world countries classification based on

their income in 2011. Accordingly, all sample countries are classified into 19 low income countries and 12 middle income countries.

Considering the low income countries, the null hypothesis of FDI doesn't cause economic growth is rejected even at low level of significance. Therefore, in the low income countries of the sample countries of sub Saharan African countries, the inflow of FDI accelerates the economic growth of the countries. However, the null of economic growth doesn't cause FDI is not rejected implying that economic growth doesn't cause FDI in the low income countries of the sample countries in the region. The causal relationship under the low income countries coincides with the case of the total sample countries.

For the middle income countries case, the null of FDI doesn't cause economic growth is rejected at 5% level and hence implying FDI causes economic growth in these countries. The null of economic growth doesn't cause FDI is also rejected at 1% showing that economic growth causes FDI unlike the cases of the total sample countries and low income countries. Therefore, under the case of middle income countries, economic growth attracts foreign investors to come and invest in the countries. In this case, hence, there is a bidirectional relationship between foreign direct investment and economic growth whereas only unidirectional relationship exists in the cases of entire sample countries and low income countries; causality running from FDI to economic growth only.

This outcome seems to be consistent with the argument of authors like Görg and Strobl (2001) and Herzer et al, (2008). The argument of these authors is that individual country studies find more robust evidence on the causal relationship between foreign direct investment and economic growth than panel studies do.

CHAPTER 5

CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Conclusions

There is strong debate among economists on the relationship between foreign direct investment and economic growth in developing countries. The case becomes more attractive when it comes to SSA countries as these countries experience poor economic performances and a high saving-investment gap. Whether there is a need to rely on FDI as an alternative means to fill the high saving-investment gap and attain the required level of economic performance is a fundamental concern. At the same time the issue is also about whether these nations need to have good economic performance if they want to attract more FDI; in other words, it is about whether good economic performance is a prerequisite for foreign investment inflow to these countries among others.

In order to address these issues, this study undertakes analysis on the relationship between foreign direct investment and economic growth in 31 sub Saharan African countries using data from World Bank development indicators and Worldwide Governance Quality for the period from 1992 to 2009. In this case, the determinants of the two variables are considered through modeling both of them independently. Before going into estimation, the diagnostic tests such as multicollinearity test and unit root tests have been analyzed. In these tests it has been shown that there is no multicollinearity problem. Regarding stationarity test, some variables are stationary at level whereas others become stationary after first differencing. In modeling the variables, the determinants of FDI and the augmented version of Solow growth model are used for FDI and

growth, respectively and then the system GMM econometric technique is employed for estimation purpose.

Regarding the econometric output, both economic growth and FDI are significantly affected by their respective lags at even 1% significance level. This shows that both variables are highly and positively responsive to their respective past performances. In addition, the growth model is significantly affected by foreign direct investment, investment in physical and human capital, external debt servicing and financial development. Foreign direct investment is significantly affected by variables such as investment in physical capital, openness to international trade and both macroeconomic stability variables, in addition to its own lag.

After the Pedroni's cointegration test that showed the existence of long run relationship between foreign direct investment and economic growth, Wald causality test has been undertaken so as to investigate the direction of causality between the two variables. The results of the tests show that there is a unidirectional relationship between them; the causality is running from FDI to economic growth.

As panel model is pooling countries of different income level, there is a probability that this might lead into wrong inferences. Therefore, so as to partially control for this problem, the sample countries were divided into two: 19 low income countries and 12 middle income countries. The findings show that there is a unidirectional causality in low income countries; causality running from FDI to economic growth. This finding for the low income countries coincides with that of the total sample countries. However, in the case of middle income countries, bidirectional causality is evidenced; causality running both from FDI to economic growth and from economic growth to FDI.

5.2 Policy Implications

Based on the findings of the study, the following policy implications can be drawn.

- ✚ The fact that variables like investment in physical capital, human capital and external debt are significant determinants of economic growth imply that countries need to invest in infrastructural facilities, human capital development and retain stable macroeconomic environment to attain their targeted economic growth.
- ✚ As macroeconomic stability, infrastructural facility and openness to international trade are the determinants of FDI in the region, the countries need to make a favorable environment for foreign direct investment through working on these variables.
- ✚ The evidence that causality runs only from FDI to growth in the entire sample countries and low income countries implies that foreign investors do compromise level of economic growth to invest in the countries if the other determinants of FDI are satisfied.
- ✚ However, the fact that the direction of causality changes from unidirectional to bidirectional relationship for the middle income countries after splitting the countries into low income and middle income countries might suggest two things:
 - i. After certain level of economic performance, FDI may be motivated by economic growth and;
 - ii. More robust evidence on the relationship between foreign direct investment and economic growth is found in individual country studies than in panel studies.

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Appendices

Appendix 1: Variable Description

| | |
|------|--|
| GDPP | GDP per capita in constant 2000\$ used as a measure of economic growth |
| FDI | Foreign direct investment as a percentage of GDP |
| INV | Fixed capital formation as a percentage to GDP ratio as a measure of investment |
| N | Augmented population growth rate |
| EDU | Education proxied by public expenditure on education |
| OPEN | Openness, measured as the sum of export and import over GDP |
| INST | Institutional quality |
| INF | Inflation, measured as consumer price index in constant of 2005 \$. |
| DEB | External debt servicing to export ratio as a proxy of external macroeconomic stability |
| FIN | Financial development proxied by domestic Credit to private sector to GDP ratio |

Appendix 2: List of Sample Sub-Saharan African Countries under Study

| Low Income Countries | Middle Income Countries |
|--------------------------|-------------------------|
| Benin | Angola |
| Burundi | Botswana |
| Burkina Faso | Cameroon |
| Chad | Cape Verde |
| Central African Republic | Congo, Rep |
| Ethiopia | Cote D'Ivoire |
| Ghana | Gabon |
| Kenya | Lesotho |
| Madagascar | Mauritius |
| Malawi | Senegal |
| Mali | Sudan |
| Mauritania | Swaziland |
| Mozambique | |
| Niger | |
| Rwanda | |
| Tanzania | |
| Togo | |
| Uganda | |
| Zambia | |

Appendix (3): List of Tables

Table 7: VIF Multicollinearity Test Results

| Variable | VIF | 1/VIF | Variable | VIF | 1/VIF |
|----------|------|----------|----------|------|----------|
| Ln_INST | 2.04 | 0.490708 | Ln_GDPP | 2.06 | 0.486003 |
| Ln_FIN | 1.86 | 0.537383 | Ln_INST | 1.78 | 0.560916 |
| Ln_OPEN | 1.83 | 0.546002 | Ln_OPEN | 1.70 | 0.587921 |
| Ln_N | 1.83 | 0.547224 | Ln_INV | 1.64 | 0.608476 |
| Ln_DEB | 1.80 | 0.555785 | Ln_DEB | 1.58 | 0.634105 |
| Ln_INV | 1.78 | 0.562703 | Ln_INF | 1.42 | 0.705778 |
| Ln_FDI | 1.74 | 0.576060 | Ln_LAB | 1.19 | 0.839821 |
| Ln_INF | 1.57 | 0.638871 | POR | 1.17 | 0.857417 |
| Ln_EDU | 1.23 | 0.815044 | Ln_EDU | 1.11 | 0.901934 |
| Mean VIF | 1.74 | | Mean VIF | 1.52 | |

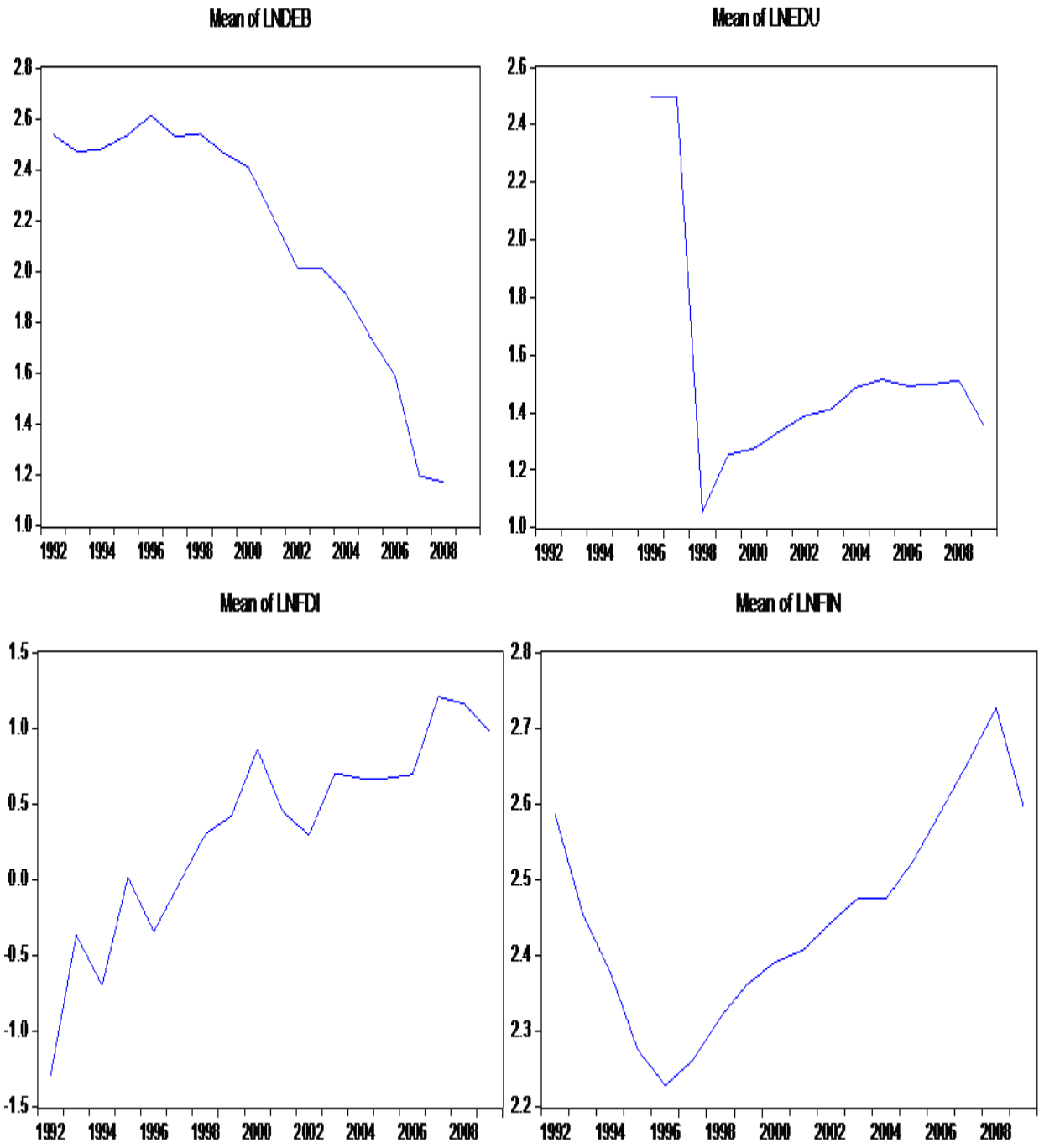
Table 8: Pedroni Panel Co-integration Test (Low Income Countries)

| | Statistic | Prob. | Weighted Statistic | Prob. |
|---------------------|-----------|--------|--------------------|--------|
| Panel v-Statistic | -4.816122 | 1.0000 | -1.635501 | 0.9490 |
| Panel rho-Statistic | -1.647790 | 0.0497 | -2.676338 | 0.0037 |
| Panel PP-Statistic | -8.413042 | 0.0000 | -8.621725 | 0.0000 |
| Panel ADF-Statistic | -7.238811 | 0.0000 | -7.706594 | 0.0000 |
| Group rho-Statistic | -1.216956 | 0.1118 | | |
| Group PP-Statistic | -11.46994 | 0.0000 | | |
| Group ADF-Statistic | -7.200008 | 0.0000 | | |

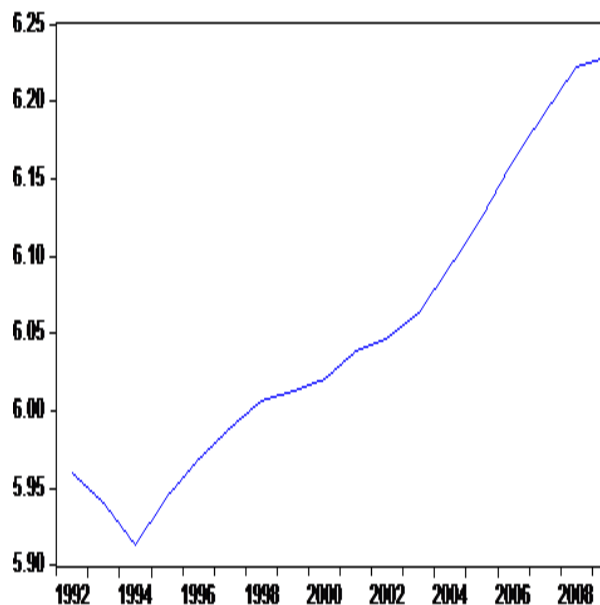
Table 9: Pedroni Panel Co-integration Test (Middle Income Countries)

| | Statistic | Prob. | Weighted Statistic | Prob. |
|---------------------|-----------|--------|--------------------|--------|
| Panel v-Statistic | -4.215919 | 1.0000 | -1.117250 | 0.8681 |
| Panel rho-Statistic | -3.252065 | 0.0006 | -2.362681 | 0.0091 |
| Panel PP-Statistic | -9.406735 | 0.0000 | -6.525884 | 0.0000 |
| Panel ADF-Statistic | -10.61146 | 0.0000 | -7.056879 | 0.0000 |
| Group rho-Statistic | -0.768523 | 0.2211 | | |
| Group PP-Statistic | -9.058258 | 0.0000 | | |
| Group ADF-Statistic | -7.300225 | 0.0000 | | |

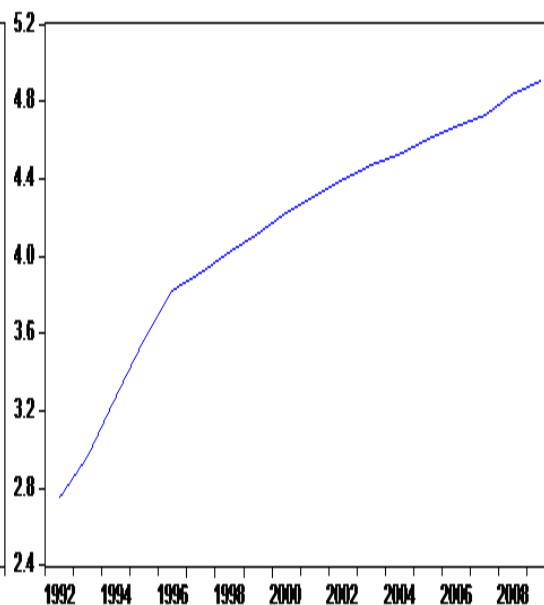
Appendix (4): Trends of the Mean of Variables under Study



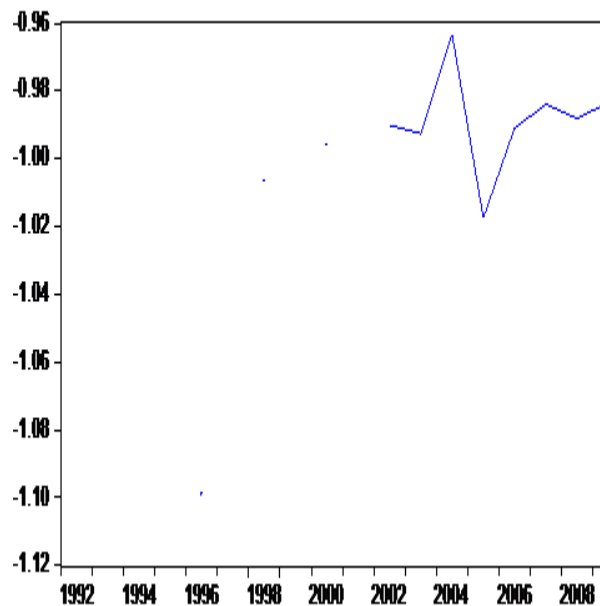
Mean of LNGDPP



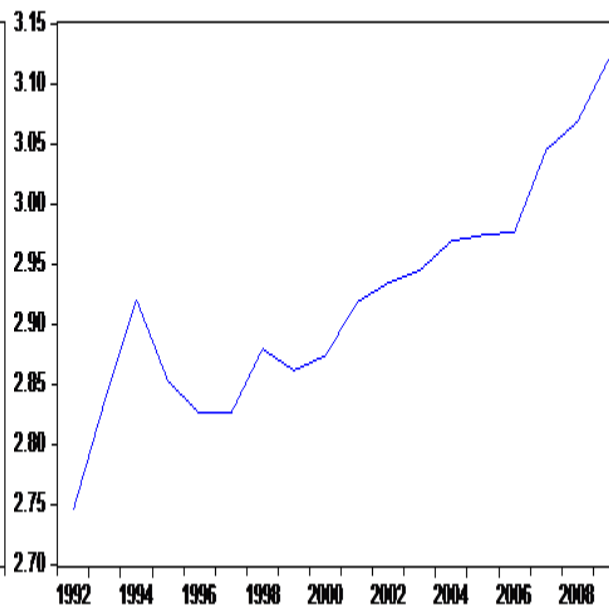
Mean of LINF



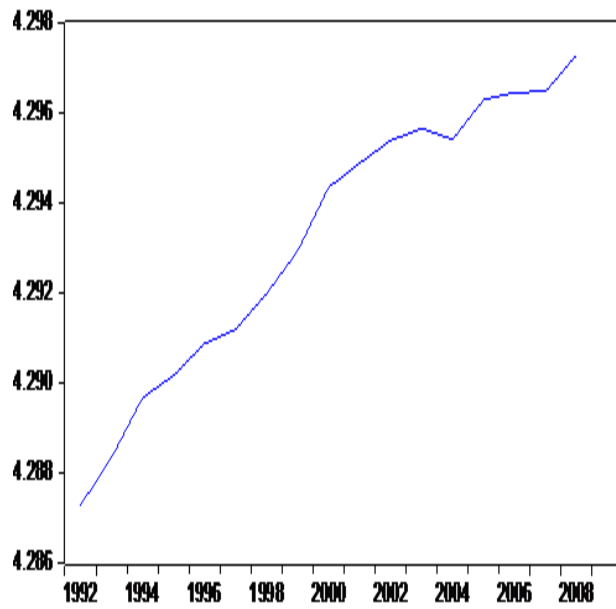
Mean of LINFST



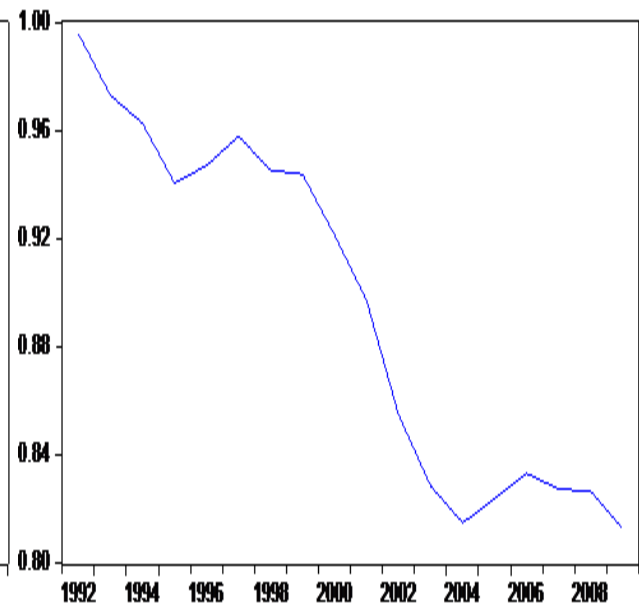
Mean of LINFV



Mean of LNLAB



Mean of LNN



Mean of LNOPEN

