UNIVERSITY OF GHANA

MACROECONOMIC VOLATILITY AND FOREIGN DIRECT INVESTMENT IN AFRICA

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DECLARATION

I do hereby declare that this work is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All references used in this work have been fully acknowledged.

I bear sole responsibility for any shortcomings.

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CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by the University.

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DEDICATION

With the help of the Almighty God, this work is dedicated to my parents, Mr. and Mrs. Nicholas Asamoah-Mensah and also to Mr. and Mrs. Nat Adu (Dada Nat and Mama Kate), for their motivation and support. Also to my siblings, John and Maame.

I am very grateful to you all. God richly bless you.

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ABSTRACT

This study has primarily sought to examine the effect of macroeconomic volatility on foreign direct investment in Africa. The investigation covers the period between 1980 and 2010 for twenty-nine countries. The main variables of concern were Exchange rate volatility and inflation volatility, GDP Growth volatility and Real interest rate volatility.

The ARCH and GARCH Models introduced Engle (1982) and Bollerslev (1986) were used to model the volatility of the variables. The volatile variables generated were then used in the FDI determinant function. In the panel analysis the study employed the Arellano and Bond (1990) dynamic panel data estimation method to estimate and analyze the relationship between foreign direct investment and the volatility of the macroeconomic variables.

From our empirical results, the conclusion drawn was that Exchange rate volatility, Inflation volatility and Interest rate volatilities exerted significant negative effect on foreign direct investment during the period. Real interest rate, open economy, human capital and inflation were positive and significant in attracting foreign direct investment.

As recommendations for policy implementation, the study suggests that policy makers in Africa should target macroeconomic stability. To control for inflation issues involving money supply, government spending, reserve and prime rates should be of prime concern. Controlling for inflation will lead to a rise in the expected return on investment which is the interest rate. With regards to exchange rate, efforts should be aimed at strengthening local industry to boost production of certain commodities. The increase in local production will lead to an increase in exports and a decrease in imports which will lead to strengthening of the local currency. Again, the idea of local firms paying and receiving resident citizens in foreign currencies should be discouraged.

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CHAPTER ONE

INRODUCTION

1.1 Background to the Study

Right after gaining independence, most African leaders sought to engage in bilateral and multinational dealings as a means of opening up to their economies to large investors. Thus in the period after independence the obvious sources of external capital for most African countries came through over-sea assistance and mainly specific countries. Most of these leaders did not open up to FDI partly because, as Dr. Nkrumah put it, they saw it as neo-colonialism. They posit that the inflow of FDI could lead to loss of political sovereignty and also it could lead to the suppression of the growth of local economies through competition. This is what Moss et al (2004) maintained that much of African leaders' cynicism towards FDI could be traced to history partly blamed on ideology and the post independence period politics. To them most leaders were not convinced about the potential benefits that FDI could bring to the continent. By the late 1990s, A WIR (2000) noted that FDI rose to become the largest source of external capital for developing countries where the flow increased from US$ 174 billion in 1992 to US$ 664 billion by the close of 1999. The report further noted that the economies of most developing countries are being influenced by the presence of multinational enterprises through the flow of FDI. Thus attracting substantial FDI is very important for most countries as it is seemed as a major stimulus to economic growth in developing countries.

Many studies have sought to define FDI. Significantly, the most frequent used definition of FDI is the of the International Monetary Fund (IMF) which defines FDI to be an investment

made to acquire a lasting interest in a foreign enterprise with aim of having an effective voice in management. This investment could be direct or indirect. (IMF, 1995). FDI can take the form of either “greenfield” investment (also called "mortar and brick" investment) or merger and acquisition (M&A), depending on whether the investment involves mainly newly created assets or just a transfer from local to foreign firms. It is worth noting that most FDI investment have taken the form of acquisition of existing assets rather than investment in new assets ("greenfield"). Drawing distinctions between the two types of FDI, A UNCTAD (2000) research on M&As found that:

- FDI through M&As correspond to a smaller productive investment than greenfield as the financial resources do not necessarily go into increasing the capital stock;
- FDI through M&As is less likely to transfer new or better technologies than Greenfield investment;
- FDI through M&As do not generate employment at the time of entry into the host economy, and may lead to lay-offs as the acquired firm is restructured;
- FDI through M&As can reduce competition, and may be used deliberately to reduce or eliminate competition; and
- Over the longer term, cross-border M&As are often followed by sequential investment that do increase the capital stock.

For most developing economies, there is a growing desire to attract external capital, however they consider short-term flows to be mostly volatile and are thus undesirable, long-term capital flows such as foreign direct investment (FDI), which tend to be more stable, are increasingly becoming the toast of most developing economies. The ability to attract a good amount of foreign direct investments is a great concern as various studies have identified

foreign direct investment (FDI) to contribute significantly to economic growth. Through foreign direct investment, new capital and technology can be injected into the economies of most countries. Research has proved that FDI is one of the most effective ways of transferring knowledge and technology. However the inflow of foreign direct investment to most developing countries is seen to be deteriorating. As a result most countries have instituted schemes aimed at attracting foreign direct investments. Some measures include tax holidays and rebates, tax allowances, double taxation agreements and some other incentives to attract the inflow. (Abor and Harvey, 2008; Addison et al, 2004; UNCTAD, 2003; Osei et al 2002; Lipsey 2001 Dunning and Hamdani, 1997; Blomstr¨om, 1986; Blomstr¨om and Persson, 1983).

According to the World Bank, current GDP in Sub-Saharan Africa is estimated to have expanded by 4.7 percent in 2010, up from 1.7 percent in 2009. Excluding the region's largest economy, South Africa, growth in the region is estimated at 5.8 percent in 2010, up from 3.8 percent in 2009. The World Bank noted that Foreign direct investment is the most important source of private capital flows to sub-Saharan Africa. After declining by 12.3 percent in 2009, FDI recovered by 6 percent to $32bn in 2010. Indeed, foreign direct investment to the region has risen in six of the past eight years, reflecting increased investment interest in the region (UNCTAD estimates that the rate of return of FDI in Africa is the highest globally).

The current $32bn of FDI in 2010 is a significant leap as compared to what Asiedu, (2004) noted in the flow of FDI to sub-Saharan Africa between 1995 and 2005. She noted that annual flow averaged at $7bn. notably, the amount fell to $2.9bn if Angola, Nigeria and South Africa were excluded.

Significantly, the World Bank noted that the bulk of this investment (40 percent) of the current FDI went to the three largest economies: South Africa, Angola and Nigeria. Nonetheless, over 50 percent of FDI goes to the smaller countries in the region, in marked contrast with portfolio flows, 90 percent of which go to the region's largest economies. Supported by the rise in metal and energy prices in recent years most of these flows went to the extractive industries sector. Beneficiaries of these flows cover a diverse range of countries including middle income (Congo, Ghana), low income (Mozambique, Zambia, Niger), post-conflict (Liberia, Sierra Leone) as well conflict countries (Guinea).

The above goes to suggest the benefit that African economies gain from FDI. However, it is a known fact that a stable economy will not attract any form of investment. Is fdi really affected by volatility in economic issues?

1.2 Problem Statement

Strands of literature have in no doubt concluded on the positive correlation between FDI and economic growth. Thus the importance of domestic policies in attracting and retaining FDI in host countries has been emphasized, especially in Africa (Loots, 2000; Morriset, 2000). However despite these positives and the large increase in global inflow of FDI, available data shows that the portion that flows to Africa is on the decline.

The growth of private FDI in the developing world has been extremely rapid in recent decades. FDI rose from an annual rate of $2.4 billion in 1962 to $35 billion in 1990 before rising to $147 billion in 2002 reaching a record of $334 billion in 2005. Accompanying this rapid growth in FDI increase over time is great volatility of the flows to various regions. Significantly, most of the flows have been from one developed country to the other. The flows to developing countries have also been concentrated on few economies. For instance, the $334 billion flow of FDI in 2005 had over one-third ($118 billion) been invested in china

and Hong Kong. Africa's share of these flows has been minimal. Again, in 2005 FDI to Africa reached a record of $ 31 billion, but Africa's share of global FDI remained a little over 3% (UNCTAD, 2006).

According to the report this is not surprising as most private capital moves towards countries and regions where there in a higher financial return and perceived safety. Investors detest regions where there are debt problems, governments are unstable, economic reforms are not strong and the risk of capital loss is deemed high.

Thus in the quest to attract FDI, certain risk factors need to be considered. Significant among theses risk is macroeconomic volatility, these include GDP volatility, inflation volatility, exchange rate volatility and interest rate volatility. These are basic risks that confront any investors' decision to invest overseas. The volatility of these variables refer to their short run deviations from their long run trends. The volatility and therefore the risk of an investment may affect the expectations of market participants and thus have a feedback effect on the original series of interest. This volatility could be positive or negative but since investors may not be able to predict the direction of the volatility, they will prefer a stable variable. The volatility of these variables has the tendency to increase risk and uncertainty in trade and in effect discourage FDI inflows. Theories of financial derivatives posit that risk and uncertainty in investment and trade can be minimized by hedging against these risks through the use of forward and futures contracts. However, such markets are non existence in the sub region. This makes hedging against such risk impossible.

It is in the light of the above that the study seeks to re-examine the issues of FDI in Africa by looking at the impact of Macroeconomic Volatility. Most studies on FDI and any macroeconomic variable have concentrated mostly on exchange rate volatility and also

concentrated on foreign or country base (Goldberg and Klein ,1998 investigate the relationship between FDI and the real exchange rate in a regional set of South East Asian and Latin American countries and both the U.S. and Japan. Kiyota and Urata, (2004), have empirically examined the relationship between FDI and the real exchange rate from Japan to its partner countries while considering regional and sectoral differences in FDI).

A study by Coleman and Agyire-Tettey (2008) sought to find out the effect of exchange rate volatility on FDI in Sub-Saharan Africa, using Ghana as a case study. Also in a similar study on Nigeria, Udoh and Egwaikhide (2008) sought to determine the impact of exchange rate volatility and inflation uncertainty on the flow of foreign direct investment into Nigeria. Both studies however did not consider the volatility of the other macroeconomic variables.

This study seeks to expand their work by applying time-varying conditional heteroskedsatic (GARCH Family) to model macroeconomic volatility, and subsequently to investigate the impact of the volatility of these macroeconomic variables on the attraction of FDI via a panel model. Significantly, this study looks the combined effect of GDP volatility, Inflation volatility, exchange rate volatility and Interest rate volatility on FDI follows. Moreover in most panel study on FDI inflation rate is used as a measure of economic uncertainty, will the results be statistically different if inflation volatility is rather used as a measure of economic instability?Again this focuses on 29 countries from Africa.

1.3 Objectives of the Study

The main aim of the study is to:

To examine the relationship between macroeconomic volatility and Foreign direct investment in Sub-Saharan Africa. The variables are mainly Exchange rate volatility, Inflation volatility, Interest rate volatility and GDP volatility.

1.4 Significance of the Study

The findings from the study will be of immense benefit to:

1. Government and Policy makers

It is no doubt that this research will benefit government and policy makers very well.

If FDI is known to impact positively on economic growth, policy makers and government will like to know the FDI macroeconomic volatility relationship since the relationship could serve as a key input in their economic policy formulation.

2. Investors

All Investors are much concerned about the factors that could have an adverse impact on their investment. Since uncertainty affects investment, investors would also like to know the regions where the effect of uncertainty is real through empirical studies. This research will basically explore the volatility in macroeconomic variables and how it affects foreign investment in detail and that will be of tremendous benefit to many transnational corporations.

3. Academicians

This research will open a new chapter on FDI volatility relationship in Africa. It will open further discussions into the FDI-Volatility nexus

1.5 Limitation of the Study

The study used a smaller data period which was from 1980 to 2010. The study period could have been expanded a little more to cover early years

There was also problem with data. It must be stated some of the data were not available for all the years.

The number of countries used was limited to only 29 out of the 53 countries on the continent. The main reason again was data availability.

The impact of other macroeconomic variables on FDI could have also been assessed but the study was limited only four variables.

It must however be stated that the above limitations do not in any way undermine the results obtained from the study.

1.6 Organisation of the Study

The study is organized into six main chapters as follows:

Chapter One: Introduction

This chapter comprise the background of the study, statement of the research problem, objective of the study, significance of the study and the scope and limitation of the study.

Chapter Two:

This chapter looks at the global trends in the flow of FDI, Africa's misery and FDI and PDI prospects in Africa. This is known as FDI trends, Stylized Facts.

Chapter Three: Literature Review

This chapter contains a detailed review of the existing theoretical and empirical literature on macroeconomic volatility and foreign direct investment in Africa.

Chapter Four: Methodology

The chapter entail data gathering techniques which will focus on secondary data. Also the econometric model that will be used in the study will be specified in this chapter.

Chapter Five: Analysis and Discussion of Findings

In this chapter, the findings from the study are analysed and discussed. The result of the economical model is also be discussed.

Chapter Six: Conclusion and Recommendations

This chapter summarizes the findings from the study, draw conclusions and make recommendations

CHAPTER TWO

FOREIGN DIRECT INVESTMENT: STYLIZED FACTS

2.1 Global Trends

A UNCTAD predicts that the rise in FDI flows will continue to reach a record $1.4 –1.6 trillion, or the pre-crisis level, in 2011. Global foreign direct investment (FDI) inflows rose modestly in 2010, following the large declines of 2008 and 2009. At $1.24 trillion in 2010, they were 5 per cent higher than a year before This moderate growth was mainly the result of higher flows to developing countries, which together with transition economies – for the first time – absorbed more than half of FDI flows. In the first quarter of 2011, FDI inflows rose compared to the same period of 2010, although this level was lower than the last quarter of 2010. They are expected to rise further to $1.7 trillion in 2012 and reach $1.9 trillion in 2013, the peak achieved in 2007. It is expected to rise further to $1.7 trillion in 2012 and reach $1.9 trillion in 2013, the peak achieved in 2007 (UNCTAD, 2011)

Table 2.1: Global FDI inflows, average 2005–2007 and 2007 to 2010 (Billions of dollars)

Year	FDI
2005 – 2007	1472
2007	1971
2008	1744
2009	1185
2010	1244

Source: UNCTAD, and the FDI/TNC database (www.unctad.org/fdistatistics).

It is important to acknowledge the steady rise in global FDI over the years. Global inward FDI flows rose from US$59 billion in 1982 to a peak of US$1,491 billion in 2000. On an annual average basis, FDI inflows increased from 23.1% in the period 1986-90 to 40.2% over the period 1996-2000. Furthermore, FDI outflows rose from 25.7% to 35.7% within the same period (UNCTAD, 2003).

Again, a World Investment Report (WIR, 2006) noted that by the close of the 19th century, global FDI flow has risen from US$ 220 billon to US$ 870 billion between 1993 and 1999. By the end of the year 2000, the value of FDI experienced in 1999 had increased by approximately 49.5% to an absolute value of US$ 1.3 trillion. By the close of 2005 global FDI was pegged at approximately US$ 916 billion with over US$ 542 billion flowing to developed countries (World Investment Report, 2006).

The growth of FDI has however been skewed. In 2010, for example, half of the top 20 host economies to FDI were from developing and transition economies, compared to seven in 2009. In addition, three developing economies ranked among the five largest FDI recipients in the world. While the United States and China maintained their top position, some European countries moved down in the ranking. In 2010 the United States and China alone received US$ 334billion of the total FDI flow. The rise of FDI to developing countries hides significant regional differences. Some of the poorest regions continued to see declines in FDI flows. In addition to least developed countries (LDCs), landlocked developing countries (LLDCs) and Small Island developing States (SIDS) flows to Africa continued to fall, as did those to South Asia. In contrast, major emerging regions, such as East and South-East Asia and Latin America experienced strong growth in FDI inflows (World Investment Report, 2011)

The FDI flow experienced in 2010 is on the back of a drastic decline in FDI flows worldwide in 2009. After a 16 per cent decline in 2008, global FDI inflows fell a further 37 per cent to $1,114 billion, while outflows fell some 43 per cent to $1,101 billion. The fall in 2009 was partly due to the global financial crisis that occurred in the USA and some part of Europe. Again The slump in cross-border M&As accounts for most of the FDI decline in 2009. Acquisitions abroad contracted by 34 per cent (65 per cent in value), as compared to a 15 per cent retrenchment in the number of Greenfield FDI projects (WIR 2010)

The inflow to developed countries seems to be experiencing a downward trend. FDI inflows to developed countries contracted moderately in 2010, falling by less than 1 per cent to US$602 billion. Before the fall in 2010, a prior year statistics showed that FDI flows to developed countries suffered the worst decline of all regions, contracting by 44 per cent to US$566 billion. However, this setback was not as pronounced as during the previous economic downturn of 2000–2003. Europe stood out as the sub region where flows fell most sharply, reflecting uncertainties about the worsening sovereign debt crisis.

2.2 Developing and Transitional Economies

It is significant to note that the flow of FDI has been on a steady increase over the past three of four decades. Until the early 1990s, the share of FDI inflows to developed countries represented more than three quarters of the total flows. Since 1991, the share of developing countries has increased gradually, reaching a peak of 35.3% over the period 1993-98. For the period 2002-03 the share of developing countries is 27%, with Asia accounting for roughly 60% of the inflows to developing countries(UNCTAD 2004 and 2004

Table 2.2: Distribution of World FDI Inflows, 1986-2003 (%)

Region	1986-1990	1991-1992	1993-1998	1999-2000	2002-2003
Developed Countries	82.4	66.5	61.2	80	68
Developing Countries	17.5	31.2	35.3	17.9	27
Central and Eastern Europe	0.1	2.2	3.5	2	5
Africa	1.8	2.2	1.8	0.8	2.5

Source: World Investment Report, UNCTAD, 2002 and 2004, ATPC, 2005.

As noted earlier on the growth of private FDI in the developing world has been extremely rapid in recent decades. FDI rose from an annual rate of $2.4 billion in 1962 to $35 billion in 1990 before rising to US$147 billion in 2002 reaching a record of US$334 billion in 2005 Accompanying this rapid growth in FDI increase over time is great volatility of the flows to various regions. Significantly, most of the flows have been from one developed country to the other. The flows to developing countries have also been concentrated on few economies. For instance, the US$334 billion flow of FDI in 2005 had over one-third (US$118 billion) been invested in china and Hong Kong. Africa's share of these flows has been minimal (UNCTAD, 2006).

In a more recent analysis, FDI flows to South, East and South-East Asia picked up markedly, outperforming other developing regions. Inflows to the regions rose by about 24 per cent in 2010, reaching $300 billion, rising especially in South-East Asia and East Asia. Similarly, strong economic growth, spurred by robust domestic and external demand, good macroeconomic fundamentals and higher commodity prices, drove FDI flows to Latin America and the Caribbean to $159 billion. Half of the six top destinations for FDI flows are now developing or transition economies (WIR, 2010).

Just like all other regions, developing economies also had their share of the global fall in FDI in 2009. In its report for 2010, the WIR noted that FDI inflows to developing and transition economies declined by 27 per cent to $548 billion in 2009. This was on the back of a six-year uninterrupted annual increase in FDI inflow.

2.3 Africa

By the close of 2005 FDI to Africa reached a record of $ 31 billion, but Africa's share of global FDI remained a little over 3% (UNCTAD, 2006). The upsurge in 2005 was almost double the flow in 2004 which was US$ 17 billion. The flow to the region dates back to both pre and post independent period. By the late 1960s it was evident that most countries on the continent had gained political independence. Within a decade the presence of the European was felt in what Dr. Kwame Nkrumah termed neo-colonialism. By the close of 1970, Africa has received an estimated US$ 1 billion worth of FDI increasing to US$ 2.2 billion by 1980. As at 2003 Africa has received an estimated US$ 13.8 billion worth of FDI inflow.

From the period that FDI became a source of capital flow onto the continent, the flows have been declining steadily. In the 1970s, the estimated US$ 1 billion of FDI accounted for 25% of foreign direct investment to developing countries. By the early 1990s it only accounted for 5.2% whereas in 2000 it received 3.8% of the total FDI to the developing world. According to the WIR (2001) FDI inflows to Africa declined from $10.5 billion in 1999 to $9.1 billion in 2000. African share of FDI in the world fell below 1 percent in 2000. The inflow to its top recipients, namely, Angola; Morocco; and South Africa have fallen by half

The growth in 2005 was largely dispersed. South Africa was the leading recipient, with about 21% ($6.4 billion) of the region's total inflows, mainly as a result of the acquisition of ABSA (South Africa) by Barclays Bank (United Kingdom). Egypt was the second largest recipient,

followed by Nigeria. As in the past, with a few exceptions such as Sudan, most of the region's 34 least developed countries (LDCs) attracted very little FDI. Most of the FDI was in the form of Greenfield investments. The leading source countries remained the United States and the United Kingdom, along with France, Japan and Germany further behind (WIR 2009; WIR 1999)

According to a WIR for 2010, following almost a decade of uninterrupted growth, FDI flows to Africa fell to $59 billion – a 19 per cent decline compared to 2008 – mainly due to contraction in global demand and falling commodity prices. Commodities producers in West and East Africa were affected. Flows to North Africa also declined despite its more diversified FDI and sustained privatization programmes. Contraction of investment in the services sector in Africa was less pronounced than in other sectors. Sustained by expanded activity, the telecommunications industry became the largest recipient of FDI inflows. The statement further noted that TNCs from developing and transition economies have increasingly been investing in Africa over the past few years. They accounted for 21 % of flows to the region over the 2005–2008 period, compared to 18 % in 1995–1999.

From Table 2.3 below, it can be observed that Africa's share of Global FDI is always the least at among the other regions.

Table 2.3: FDI flow by Regions, 2007 – 2009 (Billons of US$)

	FDI flows, by region, 2007–2009 (Billions of dollars and per cent)		
	FDI Inflow		
Region	**2007**	**2008**	**2009**
World	2100	1771	1114
Developed Economies	1444	1018	566
Developing Economies	565	630	478
Africa	63	72	59
Latin America and The Caribbean	164	183	117
West Asia	78	90	68
South, East and South-East Asia	259	282	233
South-East Europe and the CIS	91	123	70
Memorandum: Percentage Share of World FDI inflow			
Developed Economies	68.8	57.5	50.8
Developing Economies	26.9	35.6	42.9
Africa	3	4.1	5.3
Latin America and The Caribbean	7.8	10.3	10.5
West Asia	3.7	5.1	6.1
South, East and South-East Asia	12.3	15.9	20.9
South-East Europe and the CIS	4.3	6.9	6.3

Source: UNCTAD, FDI/TNC database (www.unctad-org/fdistatistics); WIR, 2010.

In 2008 all regions in the developing world recorded an increase in the flow of FDI. This increase was led by Africa, where inflows increased by 26.6% to a record level of US$87.6 billion. To this increase, the World Bank CPIA noted in relation to Africa and FDI that

Africa's FDI ratings has improved marginally since 2007 but still remains worst when compared to other regions in the world. The relative low flow of FDI to the region is blamed on a number of factors. According to OECD (2002), some of the factors contributing to the low attraction of FDI onto the continent include poor quality services, lack of political legitimacy, closed trade regimes and unsustainable national economic policies. It stands to suggest that if attention is given to the already known hindrances, the continent will be a desirable source of FDI. According to UNCTAD (2005), If African countries are to become internationally competitive in terms of FDI attraction, it is essential that they strengthen the necessary linkages between their export sectors and the rest of the economy by building and fostering domestic capabilities in areas such as physical infrastructure, production capacity and institutions supportive of private investment.

Studies have concluded that In Africa, the main attractions for FDI are market-related, notably the size and the growth of the local market and access to regional markets

2.4 Sub-Sahara Africa

Foreign direct investment is the most important source of private capital flows to sub-Saharan Africa. After declining by 12.3 percent in 2009, FDI recovered by 6 percent to $32bn in 2010. Indeed, as already stated, foreign direct investment to the region has risen in six of the past eight years, reflecting increased investment interest in the region (UNCTAD estimates that the rate of return of FDI in Africa is the highest globally).

The flow of FDI to the region has not been even. The bulk of this investment (40 percent) went to the three largest economies: South Africa, Angola and Nigeria. Nonetheless, over 50 percent of FDI goes to the smaller countries in the region, in marked contrast with portfolio flows, 90 percent of which go to the region's largest economies. However, although most of the dollar value of FDI goes to the extractive sector, the manufacturing sector accounted for

41 per cent of the total number of Greenfield investment projects during 2003-2009, including, for example, metals (9 per cent of the total), transport equipment (7 per cent) and food and beverage (6 per cent) (UNCTAD, 2009). Besides manufacturing the services sector is also another large recipient, particularly telecommunications, transportation and banking services. In June 2010, for instance, Bharti Airtel, an Indian company, completed the acquisition of Zain's mobile operations in Africa for US$10.7bn, one of the largest acquisitions in 2010. Even though developed countries are the main source of foreign direct investment to the region, developing countries (including from elsewhere within Africa) are increasing their share of foreign direct investment within Africa. (Africa Focus, 2011)

Over the last decades, the flow of FDI to the region has been decreasing if not increasing at a decreasing rate. Close to three decades ago Sub-Saharan Africa received 6% of world FDI in 1980 but its share has since decreased to 0.5% in 2000 and 2.2% at present. This in part reflects that large countries attract a lot of FDI since these economies also have the largest markets. In fact, controlling for market size, the inward stock as a per cent of GDP is 34% in sub-Saharan Africa, 28% in developing countries, and 21% in developed countries (UNCTAD, 2005)

Table 2.4: FDI Flows to Africa on Regional Basis (Billions of dollars)

Region	2008	2009
Africa	72.2	58.6
North Africa	24.1	18.3
East Africa	3.8	2.9
West Africa	11.1	10
Southern Africa	28.7	21.6
Central Africa	4.4	5.7

Source: World Investment Report, UNCTAD (2010)

Table 2.4 above confirms the decline experienced in 2009. Almost all the region in the continent experienced a decline in FDI flow with the exception of Central Africa. In relation to FDI to Sub-Saharan Africa, Asiedu (2005) concluded that natural resources and large markets promote FDI. It further noted that lower inflation, good infrastructure, an educated population, openness to FDI; less corruption, political stability and a reliable legal system have a similar effect. These results suggest that countries that are small or lack natural resources can attract FDI by improving their institutions and policy environment. Most countries in the region have also adopted measures aimed at attracting the needed FDI inflow. More recently, a group of African countries including Botswana, Equatorial Guinea, Ghana, Mozambique, Namibia, Tunisia and Uganda have attracted rapidly increasing FDI inflows. The adoption of programmes such as SAP, FINSAP and NEPAD are all part of structures put in place to attract foreign investment.

Table 2.5: Country Value of FDI Inflow by 2009 (In US$ billions)

Above $3.0 billion
Angola, Egypt, Nigeria, South Africa and Sudan
$2.0 to $2.9 billion
Algeria, Libyan Arab Jamahiriya and Congo
$1.0 to $1.9 billion
Tunisia, Ghana, Equatorial Guinea and Morocco
$0.5 to $0.9 billion
Zambia, Democratic Republic of the Congo, Mozambique, Uganda, Niger, United Republic of Tanzania, Madagascar and Namibia
$0.2 to $0.4 billion
Chad, Côte d' Ivoire, Liberia, Cameroon, Mauritius, Seychelles, Botswana and Senegal
Below $0.1 billion
Burkina Faso, Guinea, Kenya, Cape Verde, Rwanda, Mali, Somalia, Djibouti, Ethiopia, Benin, Swaziland, Malawi, Zimbabwe, Togo, Lesotho, Gambia, Central African Republic, São Tomé and
Principe, Sierra Leone, Gabon, Guinea-Bissau, Burundi, Comoros, Eritrea and Mauritania

Source: World Investment Report, UNCTAD (2010)

Table 2.5 shows the value foreign direct investment to most countries in Africa.

2.5 FDI Prospects in Africa

Despite the above constraints, African can position itself to increase its attraction of global FDI. More of economic reforms have taken place in most countries since the early and mid-80's aimed at improving Africa's lot in economic growth. Notable among these reforms include the Structural Adjustment Programme (SAP), Economic Recovery Programme (ERP) and Financial Sector Adjustment Programme (FINSAP). Again, most countries signed on to the African Growth and Opportunity Act (AGOA) introduced by the United States in 2000 and the New Partnership for Africa's Development (NEPAD) introduced by African leaders. All these are aimed improving access to markets on the continent.

The NEPAD programme aims at maintaining macroeconomic stability, promoting good governance, encouraging peer review, and political stability on the continent. It is widely believed that if the basic principles underlining the NEPAD documents are taken seriously and implemented by African leaders, there is the high probability economic policies on the continent will be greatly improved-making in the region an attractive abode for foreign investment.

Prospect of Africa attracting the needed FDI is support by the by recent surveys of Investment Promotion Agencies (IPA's), International Investment Location Experts, and Transnational Corporations (UNCTAD, 2004). The survey shows that prospects for FDI flows to the region in the long term are good. The surveys noted that within the region, the prospects for FDI are best for South Africa, Egypt, Morocco, Nigeria, and Algeria. It is also believed that countries like Mozambique, Uganda, Tanzania, Namibia, Mauritius, and Botswana, are also likely to experience an increase in FDI flows because of the relative

improvement in their economic policies in the last few years (Dupasquier, and Osakwe, 2005). Furthermore, the survey by the IPAs' is that the preferred mode of investment in Africa is Greenfield investment as opposed to mergers and acquisition by the developed countries.

Again, most countries that feared to open their economy to trade after independence have relaxed or open their economies to trade. They have abolished restrictions on non-residents' ability to repatriate dividends, interest income as well sales proceeds. Moreover some have entered into bilateral agreements such as double taxation all aimed at attracting foreign investment. Although some governments in Africa prefer to maintain control in certain strategic sectors, they have relaxed on the ability of foreigners to participate in domestic investment. And lastly recent market reforms and structures have allowed non-residents to fully purchase securities and government securities, as most stock markets have also been automated.

2.6 Summary

In conclusion, it worth noting that the value of FDI keeps increasing but there is a directional change in the destination of most FDI. More recently, developing and transitional economies have overtaken the developed countries in the attraction of FDI. However Africa still lacks behind the rest of the world when it comes to investment destinations for multinational corporations. Yet still Africa has a chance of attracting large amounts of FDI if the right systems are put in place.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter discusses the theoretical and empirical literature on the relationship between macroeconomic volatility and foreign direct investment. The chapter first thoroughly looks at the various theories behind foreign direct investment. Subsequently, the empirical studies done on foreign direct investment is assessed. The last section of this chapter then provides a summary of the main issues raised in the literature review.

3.2 Theoretical Review

The theory underlying FDI is looked at from the point of FDI determinants. There are a lot of theories that determine FDI flow to host countries. These theories include (1) the determinants of FDI in Dunnings (1988) Electric model with the OLI framework which brought together traditional ownership advantages, location and internalization theory (2) determinants according to the Neoclassical Trade Theory and the Hecksher-Ohlin model in which capital moves across countries owing to differences in returns (Markusen, 1995); (3) ownership advantages as determinants of FDI (including monopolistic advantage and internalization theory) based on imperfect competition models and the view that MNEs are firms with market power (Hymer, 1976, Caves, 1971 and Buckley and Casson, 1976); (4) determinants of FDI base on the gravity model considering market size and geographical distance between the two countries (Linnemann, 1966; Breuss and Egger, 1997); (5) determinants of FDI according to the horizontal FDI model or Proximity-Concentration Hypothesis (Krugman, 1983, Brainard ,1993); (6) determinants of FDI according to vertical FDI model, Factor Proportions Hypothesis of the theory of international fragmentation (Helpman 1984, Dixit and Grossman, 1982), (6) determinants to the Knowledge Capital

Model (Markusen, 1997), (8) determinants of FDI according to the diversified FDI and risk diversification model (Hanson et al, 2001, Grossman and Helpman, 2002), (9) determinants of FDI based on competitiveness and agglomeration effects (Gugler and Brunner, 2007) and (10) lastly the theoretical model which considers policy variables as determinants of FDI such as interest rate and exchange rate(Corden, 1990; Barrel and Pain, 1998).

For policy macroeconomic issues, one of the main determinant of FDI is interest rate, thus interest rate is expressed as a function of FDI, that is FDI=f (I). The model is of the view that interest rate depicts return on investment. This means that for developing economies where there is insufficient capital, the cost of capital need to be increased to attract the needed capital for growth. This is not the same for developed economies where there is abundance of capital and thus the cost of it is far lower than that of the developing economies. The theoretical model also considers the impact of exchange rate as FDI determinant.

Accordingly studies have noted that an important reason for the creation of the theoretical model was to be able to generate predictions for the effect of economic processes (Bishop, 1997). In this regard, FDI which comes about through the effects of interest rate and exchange rate differentials will lead to a rise in income of the host country whiles lowering the income of the source country. The theory suggests that real exchange rate depreciation affects the flow of FDI positively to a host country, in the same way, an appreciation of a host country's currency negatively affects FDI inflow (Corden, 1990; Barrel and Pain, 1998)

Corden (1990) finds a positive correlation between exchange rate volatility and FDI inflow suggesting that investors will only invest when the exchange rate is favourable. Alternatively, Bell (2004) concluding on the theoretical model, emphasis that the effect of exchange rate

volatility on FDI is unclear as to which direction the effect takes. Whether the effect is positive or negative on the investor's net worth.

According to Dunning (1981), FDI is determined by three set of advantages that a firm seeking to invest by itself (direct investment) stands to enjoy than other available mechanisms the firm can adopt to meet the needs of its customers both home and abroad.

Dunning is of the view that FDI comes about when an organisation in a source country is able to determine the competitive advantage it has such as trademark, production and technical know-how, returns to scale as against the advantages it stands to enjoy in the host country such as cheap labour, availability of raw material, tax reliefs and holidays. The first of these is the ownership advantage. The ownership advantage depicts the view that a firm has certain advantages that are peculiar to it alone and thus allows it to benefit from operating in a foreign country. These peculiar advantages may have grown overtime and mostly intangible such as brand name, patent, economies of scale, advanced technology and so on. This allows firms to compete with the other firms in the markets it serves regardless of the disadvantages of being foreign. However, these peculiar advantages can and may change overtime as age and experience catch up with the organisation (Dunning, 1988)

The second is the location specific advantage which looks at the benefit the foreign organisation will enjoy for investing not only in his home country but for going overseas. The specific choice of a location for investment also depends on a host of factors which may include political, social and economic factors. It thus suggests that the location advantage a foreign entity will enjoy is a key determinant of countries that play host to foreign investment. It should also be noted that when the location advantage changes then the flow of FDI is also subject to change. Among the numerous advantages a foreign entity stands to enjoy could include low production cost, large domestic markets, availability of natural

resources, an educated labour force, low labour cost, good institutions, political stability, corporate and other tax rates among others.

The last of the Dunning's theory is the internationalisation advantage, this approach is used when the foreign entity believes the market does not exist or is poorly functioned so the transaction cost of the external route is high. Wheeler and Mody, (1992) depicts the internationalisation advantage as why a 'bundled' FDI approach is preferred to 'unbundled' product licensing, capital lending or technical assistance.

According to Dunning (2002), all the above three must be satisfied so that a firm can partake in international production. It is worth noting that the internationalisation advantage is just an expression of the previous two advantages. Dunning (1988) links the three as follows: the more the ownership-specific advantages possessed by an organisation, the greater the inducement to internalise them; and the wider the attractions of a foreign rather than a home country production base, the greater the likelihood that an organisation ,given the incentive to do so will engage in international production. In concluding, the underlying assumption is that FDI improves the overall welfare of both the source and host countries while still having distributional effects.

Other theories on FDI assume that the size of the host country, represented by market size and distance (geographical) are important determinants of FDI (Linnemann, 1966; Breuss and Egger, 1997). It implies that foreign investors when they decide to invest will consider the bigness of the host economy and also the cost that the distance between the two countries will bring.

It is worth noting that on assessing the determinants of FDI, almost the same variables cut across irrespective of the theory. Ajayi (2007) has identified that the following factors as determinants of FDI in theory, that is: natural resources, market size and growth, institutional environment, availability of good infrastructure, country specific risk, openness of the economy, agglomeration effects, returns on investment, and macroeconomic policies such as inflation, interest rate and GDP. The determinants were also known to include R&D and advertising expenditure, skills and technology intensity, the existence of multi plant enterprises and firm size as important ownership advantages in a number of studies, while in other studies aggregate variables such as market size, growth, trade barriers have an effect on FDI (Faeth, 2009).

According to the neoclassic economic theory, FDI to host countries influence economic growth by increasing the amount of capital per head. The theory however states the flow of FDI does not influence FDI in the long run, this is because of the diminishing return of capital. As asserted by Bengos and Sanchez-Robles (2003), although FDI is known to positively correlate with economic growth, host countries will require minimum human capital, a liberal market as well as economic stability so as to benefit from long run FDI flows.

3.3 Empirical Review

A lot of the studies on FDI have concentrated on the relationship between FDI and economic growth, FDI and export as well as on the determinants of FDI to host countries. Again, most studies have provided varied opinions based on one reason or the other. While some have

found positive relationship between FDI and some factors, other studies have found negative relationship between FDI and the same factors.

Hymer (1976) stated that a firm will invest in another country if only it can take advantage of those capabilities that firms in the host countries have refused to identify with the hope of gaining higher returns on investment. The essence of this theory is that it enables firms that invest in overseas to control more markets and increase their firm's productivity.

According to Fedderke and Romm (2006), FDI flow to host country has the ability to provide technologies, skills and capital that might not be existent in the host country through the 'spill over effect'. The use will now depend on how policies of host countries affect the realisation of these new technologies, skills and capital.

In a study by Borensztein et al. (1997), they concluded that countries that have a well-developed human stock capital stand a greater chance of attracting efficient transfer of technologies and knowledge from FDI. Thus the movement of FDI depends on the human capital of the host country. Similarly, Carbaugh (2000), suggest that the cost of labour and raw material which is a determinant factor for investment also determines the flow of FDI. This is so because the cost of production will invariably be cheaper. This may account for the increase in FDI to the Asia region where the population is huge; China, India, Japan.

Assanie et al (2001) used an endogenous growth model which was closely related but differed slight from that of Borensztein et al. (1997) by assuming that technological progress is caused by improvement in quality of products, they concluded that human capital, policy and infrastructure of developing countries is important is translating FDI into economic growth. They used a panel regression comprising 67 countries within a simultaneous equation

framework and emphasized that there exist a positive relationship between growth for the middle income countries and no impact on growth for the low income countries.

Abor, Adjasi and Hayford (2008), in a study to How Foreign Direct Investment Affect the Export Decisions of Firms in Ghana, using a probit model, the results of the study showed that there is a significantly positive effect of FDI on firms' decision to export. This indicates that firms with high foreign ownership are more likely to export as compared to domestically owned firms. The reason was that foreign firms come along with the need technology and the required management skill that can promote and aid efficiency. The other reason had to do with the fact that firms with foreign capital injection may be in a better position to finance the sunk cost involved in entering the export market.

After concluding that FDI significantly influences growth in export-promoting countries that in import-substituting countries, Balasubramanyan et al. (1996) further found a positive correlation between human capital development and FDI attraction. Their earlier study on FDI and economic growth suggested that the impact of FDI is affected by trade policies. To this, UNCTAD (1999) concludes that FDI has either a positive or negative impact on output depending on the variables that are entered alongside it in the test equation. These variables include the initial per capita GDP, education attainment, domestic investment ratio, political instability, terms of trade, black market exchange rate premiums, and the state of financial development

Empirically, there are various studies also suggesting the role of FDI in economic growth or development. If FDI brings in additional capital and new technology then the traditional argument that FDI contribute to growth in not out of place (Lensink and Morrissey, 2006). As

noted by Findlay (1978), FDI can promote economic growth by providing external capital which then spills over through technological advancement to the whole economy.

In as much as there seem to low cost of labour in most developing countries, Lucas (1990) argues that many multinational companies continue to produce in developing countries where cost of production is high, one reason among many factors is the fact that developed economies are considered to be politically stable while investments in many "low-cost" developing countries are exposed to large political risks. In a similar study, Singh and Jun (1995), using a pool model of developing countries analysed the various factors including political risk, business conditions, and macroeconomic variables that influence the flow of FDI to these countries. They concluded that political risk was a major significant factor in determine the flow of FDI. Moreover, they asserted that conditions that affect business operations is an important determinant of FDI in countries that receive high flows whiles conceding also that export orientation is the strongest variable for explaining why a country attracts FDI.

Considering other socio-political variables and the attraction of FDI, Dar et al (2004) considered the causality and long term relationship between FDI, economic growth and socio-political variables. They sort to found out whether these variables (low inflation rate, economic growth, exchange rate, unemployment and political instability) are determinants of FDI flow to Pakistan. Their study covered the period 1990-2002. Almost all the variables had the expected sign showing a two-way causality relationship.

Caves (1996) as cited by Nunnenkamp (2004) also recons that "the causal relationship between FDI and economic growth is a matter on which we totally lack trustworthy conclusions".

Moving away from the traditional determinants of FDI which are still known to be dominant factors, Sawkut et al (2009) citing Nunnenen (2002) argues that there is a startling gap between, allegedly, globalization-induced changes in international competition for foreign direct investment (FDI) and recent empirical evidence on the relative importance of determinants of FDI in developing countries. He shows that surprisingly little has changed since the late 1980s. Among non-traditional FDI determinants, only the availability of local skills has clearly gained importance. As concerns the interface between trade policy and FDI, he finds that the tariff jumping motive for FDI had lost much of its relevance well before globalization became a hotly debated issue

3.3.1 FDI, Volatility and Macroeconomic variables

It is also imperative to allude to the fact the general economy has influence on a whole lot of issues. This effect of the economy, whether stable or volatile can have an influence on the inflow of investment to a country, a phenomenon FDI flows are not exempted. For the past two or so decades, studies have shown that strong and stable macroeconomic policies are not sufficient conditions for attracting foreign investment and promoting growth. Other notably known factors includes the absence of civil conflicts, political stability, absence of bureaucracy, low level of corruption, trade openness, and a favourable business environment.

A lot of recent studies are now being focused on macroeconomic variables and the uncertainty of these variables in various forms and investment, notably FDI. Notwithstanding The empirical literature on FDI and macroeconomic volatility is quite limited, as compared to the body of research on FDI volumes

In a study by Thomas and Worral (1994) where the effect of uncertainty through security risk was addressed though a dynamic context, concluded that such risks are capable of lowering current capital inflow. For the case of developing countries, uncertainty through security risks, macroeconomic policy instability and political risks are major concerns of potential investors. Various studies have also addressed the role of government policy as a determinant factor in attracting FDI (Teece ,1985; Mudambi, 1993; and Dunning and Narula 1996).

Using a panel regression for 22 countries in Sub-Saharan Africa from 1984-2000, Asiedu (2005), emphasize that macroeconomic stability, efficient institutions, political stability and a good regulatory framework have a positive impact on FDI. Campa (1993) notes that lack of information in a volatile environment would deter investment. Basically these are macroeconomic issues.

In any rational investment, most investors attempt to minimize the level of risk by avoiding investments that are associated with volatile returns. Literature has shown that the macroeconomic environment affects the level of a country's productivity. In a study of MENA countries, Iqbal (2001) noted that maintaining macroeconomic stability has been an issue of great challenge to the countries in the region, which invariably is affecting the level of investment.

A major macroeconomic variable is the exchange rate. It is the rate at which one currency can be exchanged for another; it is known to be the value of one country's currency as compared to that of another. Exchange rate could be fixed or floating. A fixed rate is where the state government set a and maintain the official exchange rate in the country, thus no currency can be exchanged above or below the official rates. On the other hand, a floating exchange rate is

when a country's exchange rate is determined by the forces of demand and supply. The rate could be higher or less when compared with that of other countries, the devaluation of a country's currency makes it easier for foreigners to buy goods and services at a reduced price.

According to Barrell and Pain (1996), investors tend to postpone their investment when the currency in the targeted market strengthens. This occurs when they expect to benefit from the fall in the host country's devaluation, suggesting that there seem to be a relationship between FDI and exchange rate. Erramilli and D'Souza (1995) noted that exchange rate volatility is one of the contributors toward external uncertainty in an economy that have a major effect on FDI inflow.

Using a Time series data covering the period 1970-2002 were ARCH and GARCH models were employed for the determination of real exchange rate volatility, Kyereboah-Coleman and Agyire-Tettey (2008) examined Effect of exchange-rate volatility on foreign direct investment in Sub-Saharan Africa using Ghana as a case study. The results of the study showed that the volatility of the real exchange rate has a negative influence on FDI flow into Ghana. Thus, generally the depreciation of the Ghana cedi attracts FDI inflows, while volatility of the exchange rates discourages FDI inflows.

Using GARCH models to estimate exchange rate volatility and inflation uncertainty, Udoh and Egwaikhide (2008) sought to determine the impact of exchange rate volatility and inflation uncertainty on the flow of foreign direct investment into Nigeria. The study covered the period 1970 to 2005. Estimation results revealed that FDI responded adversely to exchange rate volatility and inflation uncertainty. Accounting for the effects of other

variables, the results show that infrastructural development, appropriate size of the government sector and international competitiveness are crucial determinants of FDI inflow to the country.

It is however not always the case that a volatile exchange rate negatively affects FDI flow to country, as Qin (2002) suggests that if a low differential in purchasing power parity exists between trading countries, two-way FDI can occur. In this case local producers will hedge their risk against FDI in an environment of volatile exchange rate.

Aizenman and Marion (1996) noted that previous volatility has a tendency to reduce future investment. According to them, the uncertainty that comes from high volatility has a negative effect on economic outcomes of all kind. Economic volatility of all sorts has the tendency of lowering growth in developing countries (Ramsey and Ramsey, 1995).

Buthe and Milner (2008) asserted that all investors face some future uncertainty. Using firm level data on the flow of FDI for the United States to Korea, Jeon and Rhee, (2008) noted that FDI inflows have significant association with real exchange rate and expected exchange rate changes. In as much as more studies point to the fact significant relationship between the two variables (Ramiraz, 2006; Cushman, 1985), there are also other studies that points to the contrary. Brahmasrene and Jiranyakul, (2001) looking at Thailand state there is no statistically significant relationship between the level of the exchange rate and foreign investment.

In a recent paper on Output and interest rate volatility as determinants of FDI, Cavallari and D'Addona, (2011) found out that output and interest rate volatility mainly act as push factors, i.e. they are more effective in deterring rather than encouraging foreign investments. They contended that a rise in host country volatilities does reduce the amount of FDI outflows in

the recipient country, even after controlling for the state of the cycle. Their paper sort to investigate the role of country-specific sources of cyclical volatility in driving the decision whether to engage in investments overseas. The study used a dataset that comprised bilateral FDI flows among 24 OECD economies over the period 1985-2007, the work further stated that source country volatilities, on the contrary, do not have a systematic effect on foreign investments. The findings reveal that the responses of FDI are indeed asymmetric along the cycle: interest rate volatility reduces FDI flows more in booms than in recessions while the opposite is true for output volatility in the host country. Accordingly, their findings are consistent with the view that foreign investments are to some extent irreversible. In a similar study on OECD countries and on volatility, Wang and Wong (2007) focused on the business cycle in the source country and found that an increase in output volatility reduces FDI outflows.

Inflation, which is a measure of price stability, is also a determinant factor for investors. Price instability affects pricing levels of traders. Thus a host country's economic instability can be a major deterrent to FDI inflow. Akinboade et al (2006) noted that "low inflation is taken to be a sign of internal economic stability in the host country. High inflation indicates the inability of the government to balance its budget and the failure of the central bank to conduct appropriate monetary policy." Studies have commented on the fact that the cost of inflation can have prominent effect on the economy's growth, a high or low inflation has its own consequence for any economy. Lipsey and Chrystal (2006) define hyperinflation as "Inflation so rapid that money ceases to be useful as a medium of exchange and a store of value." However, they also concede that countries with inflation rate higher than 50%, to some 200% plus, have proven to be manageable as the population adjusts in "real term". It goes to suggest that inflation relatively affects growth and thus the attraction of FDI.

Providing empirical analysis of the demand side determinants of the inflow of Foreign Direct Investment to African nations, with particular emphasis on stock market availability, Haliu (2010), concluded that Inflation has a negative effect on attracting FDI but statistically less robust. On the same issue of inflation, it worth noting that in a study of some African countries Nnadozie and Osili, (2004) noted that the rate of inflation has a negative effect on FDI inflows into those countries although less robust. Other studies outside the continent show similar effect and relationship (Brahmasrene and Jiranyakul, 2001, for Thailand). However Khair-UZ-Zaman et al, (2006) shows there is significant relationship between the rate of inflation in Pakistan and the flow of FDI to the country.

Asiedu (2006) extending her study in Asiedu (2005) assessed the role of natural Resources, market Size, government policy, political instability and the quality of host country's institutions on the flow of foreign direct investment to SSA. Using a panel data set for 22 countries in SSA as previous, the study concluded that natural resources and large markets promote FDI. It further noted that lower inflation, good infrastructure, an educated population, openness to FDI, less corruption, political stability and a reliable legal system have a similar effect. These results suggest that countries that are small or lack natural resources can attract FDI by improving their institutions and policy environment.

Nnadozie and Osili, (2004) studying the directional flow of FDI to African from USA, posits that GDP growth is an important and significant variable in attracting FDI. They also found less robust evidence on the role of GDP per capita on FDI inflow. Wint and Williams (2002) show that a stable economy attracts more FDI, thus a low inflation environment is desired in countries that promote FDI as a source of capital flow.

3.3.2 Africa and Foreign Direct Investment

As stated earlier on, the growth of private FDI in the developing world has been extremely rapid in recent decades, but Africa's share of global FDI remained a little over 3% (UNCTAD, 2006). It is however very ironic in the sense that the World Bank and IMF as well as the United Nations Economic Commission for Africa advocates that FDI is the key to solving Africa's economic problems. They are of the view that attracting large inflows of FDI would result in economic development. With this mind set, most African leaders are keen on positioning their countries so as to attract the needed FDI. The reasons are obvious but will invariably centre on gaining access to foreign markets, efficient managerial abilities, technological transfer and innovation, employment creation and so on to boost their economic growth.

However, the flow of FDI is mostly affected by external factors. FDI flow from the source countries is known to be affected by recession and boom periods. This is what Reinhart and Reinhart (2001) stated that FDI to developing countries has an important cyclical component, than other types of capital flows. However, using a panel data from Africa, Calvo and Reinhart (1999) conclude that, in contrast to other regions like Asia, the only external factor that systematically influences capital flows to Africa is world commodity prices.it implies that in commodity price booms, the flow of FDI to the continent increases and, other things equal, decline during busts.

Empirical studies suggest that the contributions that FDI brings to the development of a country varies and are widely known to include filling the gap between desired investment and domestically mobilized saving, increasing the tax revenues, and improving management, technology, as well as labour skills in host countries. The effect is that these could help the

country to break the vicious cycle of under development whiles improving the lives of its people (Hayami, 2001; Todaro and Smith, 2003)

Using a panel dataset of 29 African countries, Onyeiwu and Shrestha (2004) sort to find out whether the stylized determinants of FDI has an effect of the flow of FDI to the continent. Using fixed and random effect models, from the period 1975 to 1999, their study explained that economic growth, inflation, openness of the economy, international reserves, and natural resource availability are significant factors that affect the flow of FDI to Africa. They further concluded that political rights and infrastructures were found to be unimportant for FDI flows to Africa.

Sawkut et al (2009) also sort to find out the various potential determinants of foreign direct investment for a sample of 20 African economies through a panel data analysis. The Hausman test specification suggested that they use the fixed effect model. The study was against the back drop that despite the decline in foreign direct investment to the continent over the past decade, FDI in 2006 rose by 20% to US$36billion, twice over that of 2004. The study covered a 15 year period from 1990-2005. The conclusion drawn was that the abundance of natural resources is reported to be positive and significant, openness had a positive impact on FDI as well and is in line with the fact that an efficient environment that comes with more openness to trade is likely to attract foreign firms. The size of the domestic market, stock of human capital, though to a large extent as witnessed by the size of their respective coefficients, played a positive role while political instability and labour cost a negative role in attracting FDI in the markets.

Africa just like other continents has put in place some mechanisms to attract the needed FDI. In a recent study by the World Investment Report (2002) on the attraction of FDI, the report noted that most countries seeking to attract FDI have diverted or moved away from the first generation idea of investment which involved a country opening up of its economy to FDI to the second generation of investment which on the other hand involves a government marketing its itself through its location by setting up investment promotion agencies to attract FDI. According to WIR (2002), investment promotion agencies exist to help investors deal with regulatory and administrative requirements, change the perception of investors about the host countries by participating and organizing investor fairs and seminars.

Aside promotions to attract FDI, most countries have resorted to use incentives to win FDI into their countries. These Incentives can be described as policies used by various governments to attract internationally mobile investors. These incentives can be grouped into three main groups, namely fiscal Incentives (reduced tax rates**,** tax holidays and rebates, subsidies, import duty exemptions, etc), Financial Incentives (grants, loans, guarantees, etc) and Rules-based incentives (protection of workers' right, environmental standards, etc). Jauch and Endresen (2000) however noted that as to whether incentives are important means of attracting FDI is a matter of varied opinions.

Despite these incentives, Africa continues to receive the least amount of FDI as stated earlier on. This misery of Africa and FDI can be attributed to a lot of reasons. According to the UNCTAD (1999), the most common reason as to why Africa does not attract much FDI, is the image that Africa is an unfavourable location. Many investors view the continent as one depleted with civil wars, political unrest and unfavourable economic policies. According to UNCTAD, the bad publicity the African continent gets has played a big role in discouraging

foreign investors from investing. CUTS (2002) also noted some variables that hindered investment on the continent. These variables were noted to include market size, lack of policies, lack of profit opportunities, inconsistent setup, negative perceptions, shortage of skills, labour regulations, poor infrastructure and corruption. Other notably variables were extortion, bribery, and the lack of access to global markets.

The delay in getting the requite permission to get business started is also a determinant of investment in Africa. Since business and returns on investment are time related, the delay in getting business started is important to investors (mostly known as beaucracy). Emery et al (2000) noted the following as factors that affect starting business in time when it comes to Africa. These consist of delays beyond the necessary for approval or signatures, Lack of computerization or lack of capacity in registration or regulatory applications, high costs caused by the requirements for company formation and up-front capital taxes.

It is worth noting that FDI has been noted to help reduce the level of poverty in Africa. As part of its declaration on the Millennium Development Goals, the United Nations Assembly in September 2000 stated that "We [the United Nations General Assembly] resolve to halve, by the year 2015, the proportion of the world's people whose income is less than one dollar a day. We also resolve to take special measures to address the challenges of poverty eradication and sustainable development in Africa, including debt cancellation, improved market access, enhanced Official Development Assistance and increased flows of Foreign Direct Investment, as well as transfers of technology''.

Despite the above statement, the flow of FDI is quite slow although it seems to be on the ascendency. This according to studies can be assigned to various factors. An obvious factor is the issue of uncertainty on the continent. In spite of the enormous profitable opportunities on the continent, there is relatively high degree of uncertainty in the region and this exposes most firms to significant risks. Uncertainty can be viewed from various angles which include political instability, Macroeconomic instability, Lack of policy transparency, inefficient systems and so on.

Politically, Sachs and Sievers (1998) noted that political instability is one of the most important deterring determinants of FDI in Africa. The continent is depleted with civil wars, military interventions in democratic governments, religious and ethnic conflicts and electoral violence. Computing a regional susceptible to war indices for the continent for 40 years from the period 1960 to 2001, Rogoff and Reinhart (2003) found that wars are more likely to happen on the continent than other parts of the globe. The study further concluded on the point that there is a significant negative relationship between FDI and conflicts on the African continent.

Moreover, the macroeconomic environment of the continent is known to be unfavourable to business due to negative factors that stiffens economic and business growth. Notable among these factors include low resource endowment, ill-informed macroeconomic policies, exogenous shocks. Again, economic instability can be seen through high incidence of currency crashes, double digit inflation, budget deficits and excessive dependent on donor support for infrastructural developments. Economic performance has been on the decline since the early 80's. All these are contributing factors to the less FDI on the continent.

Recent studies on Africa suggest that countries with high inflation tend to attract less FDI (Onyeiwu and Shrestha, 2004; Ndikumana, 2003; Collier and Gunning, 1999). Lack of transparent economic policies due to lack of national policies also hinders foreign investment. Again, the atmosphere on the continent do not provide a good climate for business, a lot of obstacles exist that act as trade barriers. A study on some African countries, notably Mali, Mozambique and Uganda, found that certain African countries have been able to attract FDI, not because of natural resources, but through a broad improvement in the business environment and deliberate image-enhancing campaigns (Morisset ,2000; Basu and Srinivasan, 2002). Affirming the conclusion drawn by Morisset ,2000; Basu and Srinivasan, 2002, Asiedu (2005) finds that the decline in African FDI as a ratio of total FDI can be attributed to the partial improvements in policy environment relative to the large and quick reforms in other regions.

For investors who might prefer to inject fund into Africa through the capital market, most financial markets in Africa offer a scanty range of financial products, the financial systems are also not automated or sophisticated. Again most of the markets in African are known to be inefficient and therefore their inability to attract the needed international capital. According to Ndikumana (2003), most of the stock markets on the continent are not active whiles those that are a bit active are also small and ill-liquid. Moss (2003) noted that some African stock markets have legal limits on the amount of equity owned by non-resident foreigners. The implication is that there is a cut on the amount that can come in as foreign investment through the capital market.

The banking sector also seems to be a contributing factor in FDI attraction. Bank lending rates are relatively high and mostly short term. In most cases private investors are crowded out when they are found to compete with the government for loans. This hinders business growth and firm expansion. The banking system is still seemed to be a little inefficient with regards to credit allocation and loan repayment which has led to high incidence of non-performing loans. As Gelbard and Leite (1999) noted, some countries have made good progress in improving and modernizing their financial systems over the last decade, particularly with regard to financial liberalization and the adoption of indirect instruments of monetary policy. In many countries, however, the range of financial products remains extremely limited, interest rate spreads are wide, capital adequacy ratios are insufficient, judicial loan recovery is a problem, and the share of non-performing loans is large. Most loans total an average of 20% are recorded as non-performing in a study that comprised over 38 countries in SSA. They further noted that most banks do not issue credit cards whiles inter-bank lending still remains under-developed. The concerning is that these systems of banking will invariable affect private enterprise borrowing.

3.6 Summary of Review

This chapter sought to review the various literatures on FDI and macroeconomic volatility. The review looked at both the empirical as well as the theories underlying FDI. The review comprised the various determinants of FDI, FDI and growth and concluded on the relationship between FDI and macroeconomic variables. The last part of the chapter focused on Africa and its inability to attract the needed FDI.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter of the study looked at the methods employed to achieve the main objectives of the study, that is, the effect of macroeconomic volatility of FDI flow to Africa. The chapter looked at the main theoretical framework behind the study, variable description and justification, data description, data estimation and measures of volatility.

4.2 Study Population and Sample Size

A population for any research consists of all possible elements of interest. The population for this study constituted mainly countries in Africa. A research sample refers to a set of people or object chosen from a larger population in order to represent that population (Mason et al, 1999). In relation to this study, the sample size consisted of selected countries on the African continent.

4.3 Theoretical Framework

This study was derived from the work of Coleman and Agyire (2008), in which the effect of exchange rate volatility of FDI flow to Ghana was accessed with FDI as the dependent variable. And that of Udoh and Egwaikhide (2008), which sought to determine the impact of exchange rate volatility and inflation uncertainty on the flow of foreign direct investment into Nigeria. Both studies however did not consider the volatility of the other macroeconomic variables.

Departing from their study, the main driving force behind this study was to investigate the relationship between Foreign Direct Investment (FDI) and macroeconomic volatility. The study employed the ARCH and GARCH family models propounded by Engle (1982) as well

as Bollerslev (1986) to model and measure macroeconomic volatility, that is, exchange rate volatility, interest rate volatility, inflation and GDP growth volatility. The inclusion of other explanatory variables was largely informed by both theoretical and empirical literature. These include variables that were best known to have an impact on FDI inflow. The model generally takes the form of:

$$fdi_{it} = \alpha fdi_{i,t-1} + \beta X_{it} + \Omega_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(1)$$

Where fdi_{it} is the foreign direct investment flow to country i at time t, X_{it} represents the vector independent explanatory variables, β represents the vector of parameters that will be estimated and Ω_{it} is the error term. The matrix of variables employed in the study can be described to include:

Foreign direct investment (FDI) which is taken as a percentage of GDP

Trade Openness (OPEN), which measures how open an economy is liberal for trading activities. It is measured as the sum of total imports and total exports as a percentage of GDP.

The volatility of the macroeconomic variables,

$$\Omega_{it} = U_i + \varepsilon_{it} + \lambda_t$$

Where: U_i is the set of an unobserved country *i* effects (fixed effects) and

ε_{it} is a time varying idiosyncratic shock with the standard iid assumption

λ_t is the model error

The subscripts i and t represent a country and one-year time period respectively.

4.4 The Model

If FDI is viewed as an investment in the larger economic sense, then, the study sought to adapt the traditional augmented neoclassical investment production function as a basic model. The general form of the traditional investment model following Jorgenson (1963) is given by:

$$K^* = \frac{\alpha Y}{C_k^{\sigma}} \quad \text{..... (2)}$$

where K^* is the desired capital stock, α is a constant, Y is the output level, C_k is the user cost of capital and σ is the elasticity of substitution. By substituting investment for the capital stock, the following long-run relationship is obtained;

$$\ln(I_t) = \beta_1 + \beta_2 \ln(Y_t) + \beta_2 \ln(C_t) + \varepsilon_t \quad \text{..... (3)}$$

Equation (3) provides our baseline for modelling investment, as developed by Bean (1981) and used in studies such as Darby et al. (1999). The intuition behind equation (3) is that in the long run, determination of investment is based on a simple accelerator model. The basic model refers to the traditional determinants of investment for domestic investors. It implies with a decision to attract foreign investment the effect and importance of other variables need to be considered. When investors decide to move overseas, they consider other variables such as how open the economy is to trade, the level of public investment, the labour force and so on. Therefore considering theses variables and looking at other studies the augmented model which is an expansion of equation 3 above will be:

$$FDI_{it} = \alpha_o + \beta_1 FDI_{i,t-1} + \beta_2 EXVL_{i,t} + \beta_3 RITR_{i,t} + \beta_4 ITVL_{i,t} + \beta_5 GDPVL_{i,t} + \beta_6 IFR_{i,t} + \beta_7 IFVL_{i,t} + \beta_8 RXR_{i,t} + \beta_9 GDPG_{i,t} + \beta_{10} OPEN_{i,t} + \beta_{11} HUMCAP_{i,t} + \Omega_{i,t} \ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

All the explanatory variables with the exception of the volatile macroeconomic variables are expected to impact positively on the flow of FDI into Africa

4.5 Data Description

In this study, the panel consist of 29 selected African countries over a 30-year period, spanning from 1980-2010. The main source of the data for all variables employed was taking from World Bank African Development Indicators.

Most definition for the variables was adapted from the World Bank African Development Indicators.

Foreign Direct Investment (FDI): Foreign direct investment is 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. This series shows total net, that is, net FDI in the reporting economy from foreign sources less net FDI by the reporting economy to the rest of the world. Data are in current U.S. dollars.

Real Exchange Rate (RXR), Real exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar). Exchange rate is expected to positively affect FDI flow. The traditional elasticity approach is of the view that a devaluation of any country's currency will improve trade balances as well as the Marshall Lerner condition is satisfied. The implication of the devaluation is that more Multinational National Enterprises will find it attractive to do business in countries with a devalued currency.

Exchange Rate Volatility (EXVL): we expect a negative relationship between exchange rate volatility and FDI as postulated by Chakrabarti (2001) on FDI flows from the United States to twenty OECD countries? We still we expect an adverse relationship. Exchange rate volatility under this study is modelled by using the ARCH – GARCH MODELS.

Inflation Rate (IFR): Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

Inflation is a measure of price instability over a period of time. A high rate of inflation may indicate internal economic instability. It stands then that in a high inflationary period, firms face uncertainty in terms of product and input pricing, thus investors may limit the amount of resources invested in such economies. According to Akinkugbe (2003), inflation rate is not significant in the empirical study of the determinants of FDI inflows to hitherto neglected developing countries. However Sneider and Frey (1985) found that high inflation is a disincentive for investment by foreign firms. Annual inflation rates will be used. The effect may be inconclusive

Inflation Volatility (IFVL): We again expect an inverse relationship between the volatility of inflation and FDI flow to the host nation. We employ the ARCH-GARCH family models to model the volatility of inflation.

Real Interest Rate (RITR): Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. (ie, Lending Rate + Inflation)

This is set as the cost of capital. In the case of foreign investment two interest rates come to play: the foreign interest rate, which is the source country and the interest rate of the host country. A high interest rate in the source country represents the cost of fund to the investor

and it is expected to adversely affect foreign investment, to this Calvo et el, (1996) postulated that the lower interest rate in the US is a push factor for FDI flow to developing countries. However, attention for the relevance of this study will be focus on the real interest rate of the host country. This interest is seen an indicator of the rate of return on investment and thus is expected to impact positively on foreign investment.

Interest Rate Volatility (ITVL): Just like the other volatility variables, the ARCH – GARCH model is used to determine inflation volatility and inverse relationship is expect when the results of the work is completed.

GDP Volatility (GDPV): Economic growth will invariable attract investment because can predict that they will get the returns they require on their investments. Thus a growing economy is an attract place for foreign investors. When the economy is growing FDI comes in not only to supplement domestic investment but as noted by Alfaro *et al* (2007) it helps in the transfer of technology to the host country, creation of employment, brings about competition in the domestic market and other positive externalities. Now, if economic growth represented by GDP is expected to positively affect FDI, then we expect that a volatile economic growth will discourage FDI flow.

Trade Openness (OPEN): is the degree of openness which is measured as the sum of total imports and total exports expressed as a percentage of GDP. We hypothesize a positive relationship between openness and FDI.

Human Capital (HUMCAP): Some of the literatures on FDI have concluded that there exist a positive relationship between FDI and human capital of the host country [e.g., Noorbakhsh et al (2001), Kucera (2002)]. This comes from the fact that where the labour force is educated, productivity will be efficient which invariably can attract FDI especially where labour cannot be exported. Tertiary school enrolment as a percentage of the total population

is used as proxy for human capital of labour. We hypothesize a positive relationship between the human capital and FDI

Lag FDI (FDI_{t-1}): The reason to include the lag of the FDI variable is to investigate the long-term effect of FDI. This is because we expect that potential benefit enjoyed today will spell investors to maintain or increase their investment in a country. Is it the case that foreign investors turn to increase their level of investment in a country over time. Again, it stands to suggest that the invest climate of a country may be an important factor for future higher investments. It is expected the lag of FDI will greatly influence the flow of FDI in the subsequent year. There is the expectation that the lag of FDI will positively affect this year's FDI flow.

4.6 Modelling Volatility

We employed the ARCH and GARCH models introduced by Engel (1982) and Bollerslev (1986), respectively, because just like exchange rates, all the other macroeconomic variables have been known to best follow a GARCH process (McKenzie, 1999). Thus the volatility measures employed are as follows:

$$vol_t = \varphi + \delta vol_{t-1} + e_t \quad \text{..... (5)}$$

Where $e_t \approx N(0, h_t)$

$$h_t = \varphi + e_{t-1}^2 + \gamma h_{t-1} + \mu_t \quad \text{..... (6)}$$

The conditional variance in the volatility measure (h_t), i equation (6), is a function of three terms:

(1) The mean φ; of the conditional variance;

(2) Information about previous volatility measured as the lag of the squared residual from the mean equation e_{t-1}^2 (ARCH term); and

(3) The previous forecast error variance, γh_{t-1} (which is the GARCH term).

4.7 Estimation Procedure

4.7.1 Time Series Variables

We first estimated macroeconomic volatility, which is exchange rate volatility, inflation volatility, interest rate volatility and the volatility of gross domestic product (GDP) growth, undertook diagnostics such as unit root, estimation of mean variance series and finally examine the effect of these volatilities on the FDI flow to Africa during the study period.

- **Unit root test**.

In assessing the stationarity of the variables, the study followed Charemza and Deadman (1992) and Kyereboah-Coleman, and Agyire-Tettey, (2008), where they used the augmented Dickey-Fuller (ADF) test to ascertain the stationarity or otherwise of the time series variables. When a series is stationary in level it is said to be integrated of order zero and when it is integrated of a higher order [2] then it is differenced in order to become stationary. The result of the ADF test is presented later in chapter four which deals with the analysis and discussion of results and it shows that not all the variables were stationary in levels.

- **Estimation of Mean Variance Equation**

After testing for unit root either at the levels or differences, the mean variance equation for each macroeconomic variable was then determined. It is upon estimating this equation that the mean variance series which represents the volatility variables could be generated.

Equation (5) is the conditional mean of the volatility of the macroeconomic variables and is modelled as MA (1) to account for the first-order serial correlation in the macroeconomic variables. Equation (6) specifies the conditional variance as a linear function of past squared residuals (e_{t-1}^2) and past conditional variance (γh_{t-1}).

The (1, 1) in GARCH (1, 1) refers to the presence of a first-order autoregressive GARCH term (the first term in parentheses) and a first-order moving average ARCH term (the second term in parentheses). An ordinary ARCH model is a special case of a GARCH specification in which there are no lagged forecast variances in the conditional variance equation. That is a GARCH (0, 1).

From the conditional variance in equation (6), the ARCH parameter corresponds to $\boldsymbol{\alpha}$ and the GARCH parameter corresponds to $\boldsymbol{\beta}$ as in equation (1). The ARCH coefficient can be viewed as news coefficient, whereas the GARCH coefficient reflects the impact of old news on volatility. The sum of the ARCH and GARCH coefficients $(\boldsymbol{\alpha} + \boldsymbol{\beta})$ is the measure of volatility persistence. If $(\boldsymbol{\alpha} + \boldsymbol{\beta})$ is close to one, then volatility shocks are quite persistent. This means a shock in a given period *t*, will persist for many periods into the future. Diagnostic tests were performed to see whether the GARCH model is well specified in order to use the conditional variance series in the panel data analysis.

4.7.2 Panel Data Estimation

- **Dynamic Panel Model against OLS**

The study's main method of estimation is the use of panel data estimation to determine whether any relationship exist between foreign direct investment flow to Africa and the volatility of macroeconomic variables. The study deviates from the traditional OLS approach in panel analysis and employs the dynamic panel approach. The dynamic panel approach offers advantages over OLS and also improves on previous efforts to examine the FDI-macroeconomic variable-link using panel procedures. First, estimation using panel data -- that is pooled cross-section and time-series data – allows us to exploit the time-series nature of the relationship between FDI and macroeconomic volatility. This implies that the pooled cross panel approach contains more information than the pure cross-country approach.

Second in a pure cross-country instrumental variable regression, any unobserved country-specific effect becomes part of the error term, which may bias the coefficient estimates. Our panel procedures control for country-specific effects if there are any country-specific fixed effects that have been omitted that may help explain the flow of FDI in the conditioning set, because the OLS procedure if adopted may flaw the estimates on the macroeconomic volatility coefficients.

Third, unlike existing cross-country studies, the panel estimator (a) controls for the potential endogeneity of all explanatory variables and (b) accounts explicitly for the biases induced by including initial real per capita GDP in the FDI regression. These weaknesses may bias both the coefficient estimates and their standard errors, potentially leading to erroneous conclusions.

- **Econometric Methodology (GMM Panel Estimator)**

As an econometric model, the study is based on the Generalized-Method-of-Moments (GMM) estimators as propounded by Arellano and Bond (1991) for dynamic panel data. The model is used to capture the effect of lagged FDI on current FDI.

The use of a static FDI demand equation estimated by OLS (or GLS) fixed effects has been the common practice among empirical papers on this subject (Sawkut et al, 2009; Onyeiwu and Shrestha**,** 2004). However, as is well documented by Nikell (1981) and Kiviet (1995) the fixed effect estimator is downwards biased. This means these papers are assuming that FDI flows change instantaneously when one of the determinants varies. But this is not a realistic assumption. Foreign direct investment may change slowly from one year to another and thus partial adjustments to the desired level are the rule rather than the exception. The correct way to estimate this kind of relationship must include the dynamic component in the FDI flow demand adding the first lag of the dependent variable as a regressor to avoid misspecifications. This is the basis of the GMM as propounded by Arellano and Bond (1991), first proposed by Holtz-Eakin, *et al* (1988). Moreover, as noted by Bond (2002), even when the coefficient of lagged dependent variable is not the focus of interest, allowing for dynamics in the underlying process may be crucial for recovering consistent estimates of other parameters, in this case foreign direct investment demand determinants.

Dynamic Panel Data models contain unobserved panel-level effects that are correlated with the lagged dependent variable, and this renders standard estimators inconsistent.

As proposed by Arellano and Bond (1991), The GMM estimator will thus provide a consistent estimate for such models. This estimator often referred to as the “difference” GMM estimator takes the first difference of the data and then uses lagged values of the endogenous variables as instruments. In an elaborate description of the Arellano and Bond

estimator, Carkovic and Ross (2002) posit that in order to eliminate the country-specific effect, one must consider the first-differences of equation (1) which becomes

$$fdi_{it} - fdi_{i,t-1} = \alpha\left(fdi_{i,t-1} - fdi_{i,t-2}\right) + \beta\left(\mathrm{X}_{it} - \mathrm{X}_{i,t-i}\right) + \left(\varepsilon_{it} - \varepsilon_{i,t-i}\right) \ldots\ldots\ldots\ldots (7)$$

After the differencing it is expected that any potential biases in the unobserved fixed country effect would have been eliminated. Again, the use of instruments as propounded by Bond (1991) is for two main reasons: (1) to deal with the endogeneity of the explanatory variables, and, (2) to also solve the problem that by construction the new error term, $\varepsilon_{it} - \varepsilon_{i,t-i}$ becomes correlated with the lagged dependent variable, $fdi_{i,t-1} - fdi_{i,t-2}$. Further, Under the assumptions that (a) the error term is not serially correlated, and (b) the explanatory variables are weakly exogenous (i.e., the explanatory variables are uncorrelated with future realizations of the error term), the GMM dynamic panel estimator uses the following moment conditions:

$$\mathrm{E}\left[fdi_{it-s} . \left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0 \qquad for\ s \geq 2; t = 3, \ldots . T \ldots\ldots\ldots\ldots (8)$$

$$\mathrm{E}\left[\mathrm{X}_{it-s} . \left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0 \qquad for\ s \geq 2; t = 3, \ldots . T \ldots\ldots\ldots\ldots (9)$$

Based on the GMM estimator, these conditions are known as the difference estimator. It is worth noting that like any other model, there are statistical as well as conceptual shortfalls with the difference estimator. Using the moment conditions presented in equations (8) and (9), and use lagged two period instruments (t-2), the GMM procedure is employed to generate consistent and efficient parameter estimates. As further noted by Carkovic and Ross (2002), consistency of the GMM estimator depends on the validity of the instruments. To address this issue we consider two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1997). The first is a Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the

sample analog of the moment conditions used in the estimation process. The second test examines the hypothesis that the error term, ε_{it}, is not serially correlated. In the difference regression we test whether the differenced error term is second-order serially correlated (by construction, the differenced error term is probably first-order serially correlated even if the original error term is not).

4.8 Scope of the Study

The study used 29 selected African countries over a 30-year period, spanning from 1980-2010. The main source of the data for all variables employed was taking from World Bank African Development Indicators. The selection of the countries was due the availability of data for the all variables and all dates.

The countries used for the study were Angola, Burundi, Benin, Burkina Faso, Botswana, Chad, Cote d'Ivoire, Cameroun, Cape Verde, Central Africa Republic, Congo, Gabon, Gambia, Ghana, Guinea, Kenya, Madagascar, Mauritania, Mauritius, Malawi, Niger, Nigeria, Togo, Lesotho, Senegal, South Africa, Tanzania, Uganda and Zambia.

CHAPTER FIVE

FINDINGS AND DISCUSSION

5.1 Introduction

In this chapter, the results of the study of the study is analysed using the models specified in the previous chapter. Section 5.1 introduced the chapter, 5.2 looked at measuring the volatility of the macroeconomic variables. This involves the test for unit root to determine the stationarity of the variables, the GARCH estimation and diagnostic test. Section 5.3 then looked the panel data analysis. This comprised the descriptive statistics of the panel data the effect of macroeconomic volatility of FDI and .a detail discussion of the panel results.

5.2 Measuring Macroeconomic Volatility

5.2.1 Unit Root Tests

In the determination of volatility of macroeconomic variables, that is exchange rate, inflation, interest rate and GDP volatility, the study employed the ARCH and GARCH models developed by Engel (1982) and Bollerslev (1986). It is know that most time series data are said to be persistent or non stationary. Thus before a variable is used, a test should be performed to determine its stationarity or otherwise. Non stationary variables are known to contain stochastic (random) trends, while stationary variables contain deterministic or fixed trends. Accordingly, Badawi (2007) noted that a time series is stationary when the regression shows mean and variance reversion, whiles if it is non-stationary the mean and variance from which the series observation is drawn are time-variant. A non-stationary variable if not made stationary can lead to a problem of spurious correlation. Thus a unit root test was conducted to determine the stationarity or non-stationarity of the variables before generating the mean variance equation for onwards generation of the GARCH variance series. The results of the

unit root test conducted are presented in table 5.1 to 5.5 below. The unit root tests employed is the Augmented Dickey Fuller (ADF) test. Not all the variables were stationary at levels thus creating the need for data transformation at first difference.

TABLE 5.1 : Unit Root For Exchange Rate

Country	T - Statistics	Order of Integration
Lang	-1.866749	One
dlang	-4. 688852*	
lbdi	-0.323672	
dlbdi	-5.18870*	one
lben	-5799124*	zero
lbfa	-1.697852	one
dlbfa	-4.569831*	
lbots	-2.524152	one
dlbots	-8.432470*	
lcaf	-1.756325	one
dlcaf	-5.636985*	
lchad	-1.68734	one
dlchad	-4.850195*	
lciv	-1.65287	one
dlciv	-5.526848**	
lcmr	-4.604187*	zero
lcog	-2.733709***	zero
lcpv	-2.967767***	zero
lgab	-1.621007	one
dlgab	-4.662827**	
lgha	-0.737709	one
dlgha	-4.327064*	
lgmb	-2.699488	one
dlgmb	-4.607133*	
lgnq	-2.62742	one
dlgnq	-6.399367*	
lken	-4.813749*	zero
llso	-1.111106	one
dllso	-4.249622*	
lmdg	0.04637	One
dlmdg	-5.451321**	
lmrt	-2.205698	One

dlmrt	-8.465164*	
lmus	-1.022725	One
dlmus	-5.184933**	
lmwi	0.911103	One
dlmwi	-2.761441***	
lner	-6.399367**	Zero
lnga	-5.119758*	Zero
lrsa	-2.145666	One
dlrsa	-4.170795**	
lsen	-1.618987	one
dlsen	-4.662827*	
ltgo	-1.697954	One
dltgo	-5.582409*	
ltza	-1.772171	One
dltza	-3.667711**	
luga	-0.561138	One
dluga	-3.349631**	
lzmb	1.222482	
dlzmb	-4.178553*	one

, **, * denotes significance levels of 1%, 5% and 10% respectively*

Table 5.1 above shows a summary of unit root test for exchange rate in both levels and first differences using the ADF as stated already. The results showed that exchange rate for countries like Benin, Cameroun, Congo, Cape Verde, Kenya, Niger and Nigeria were stationary (having no unit) at the levels. The results of these countries are therefore integrated at zero or I (0). It thus implies that the remaining countries exchange rates were stationary at difference, notably at the first difference. These countries null hypothesis of unit root are not rejected at the levels. The countries were Angola, Burundi, Burkina Faso, Botswana, Central Africa Republic, Chad, Cote d'Ivoire, Gabon, Gambia, Guinea, Lesotho, Madagascar, Mauritania, Mauritius, Malawi, South Africa, Senegal, Togo, Tanzania, Uganda and Zambia. These countries exchange rate are therefore integrated at order 1 or I (1).

Table 5.2: Unit Root Test For Inflation Based on CPI

Country	T - Statistics	Order of Integration
Lang	-3.55055*	Zero
Lbdi	-4.180367*	Zero
Lben	-3.442127**	Zero
Lbfa	-4.475573**	Zero
Lbots	-3.415069**	Zero
Lcaf	-3.679474	One
Dlcaf	-6.314763*	
Lchad	-5.276379*	Zero
Lciv	-4.171761*	Zero
Lcmr	-4.207133*	Zero
lcog	-2.947925	
dlcog	-4.782110*	one
Cpv	-3.747407*	Zero
lgab	-1.766836	
dlgab	-4.302545*	one
Lgha	-4.453578*	Zero
Lgmb	-2.994083**	Zero
Lgnq	-4.378790*	Zero
lken	-3.04451	
dlken	-6.54268**	One
Lso	-1.601541	One
Dlso	-3.773357*	
Lmdg	-3.292166**	Zero
Lmrt	-2.684411***	Zero
Lmus	-3.575503**	Zero
Lmwi	-3.077266**	Zero
Lner	-3.978411*	Zero

Lnga	-2.738631***	Zero
Lrsa	-1.437501	One
Dlrsa	-1.832592***	
Lsen	-3.869512	Zero
Ltgo	-3.950529	Zero
Ltza	-0.966379	One
Dltza	-6.042998*	
Luga	-2.081694	One
Dluga	3.775857*	
Lzmb	-1.675607	One
Dlzmb	-5.028285*	

, **, * denotes significance levels of 1%, 5% and 10% respectively*

Again, Table 5.2 summarizes the unit root test in both level and first difference for inflation as proxied by the Consumer Price Index (CPI) using the ADF test. Majority of the countries were stationary at the levels, which means the inflation of these countries are integrated at zero or I (0). These countries are Angola, Burundi, Benin, Burkina Faso, Botswana, Chad, Cote d'Ivoire, Cameroun, Cape Verde, Ghana, Gambia, Guinea, Madagascar, Mauritania, Mauritius, Malawi, Niger, Nigeria and Togo. However, for a minority of the countries, their inflation is non-stationary at levels and thus need to be differenced. Stationarity for these countries were attained at first difference and are thus integrated at order one or I (0). These countries are Central Africa Republic, Lesotho, South Africa, Tanzania, Uganda and Zambia.

Table 5.3: Unit rate test for interest rate

` Country	T - Statistics	Order of Integration
lang	-2.044829	One
dlang	-3.925754*	
lbdi	-3.161761**	Zero
lben	-2.829978***	Zero
lbfa	-1.658113	One
dlbfa	3.497795**	
lbots	-4.549325*	Zero
lcaf	-3.656024**	Zero
lchad	-4.517976*	Zero
lciv	-3.076364***	Zero
lcmr	-2.569809	One
dlmr	-5.942936*	
lcog	-5.258352*	Zero
lcpv	-3.688617**	Zero
lgab	-4.118147	Zero
lgha	-2.931327***	Zero
lgmb	-2.579558	One
dlgmb	-5.162813*	
lgnq	-5.124678*	Zero
lken	-3.665822**	Zero
llso	-7.175579*	Zero
lmdg	-1.267158	One
dlmdg	-4.125682*	
lmrt	-2.553342	One
dlmrt	-6.963744*	
lmus	-1.79341	One
dlmus	-6.963744*	
lmwi	-3.925536*	Zero
lner	-2.521876	One
dlner	-4.086762**	
lnga	-4.443586*	Zero
lrsa	-5.031343*	Zero
lsen	-0.586247	One
dlsen	-3.357755**	
ltgo	-1.010377	One
dltgo	-4.415373*	
ltza	-2.188127	One
dltza	-5.089264*	
luga	-1.77732	One
dluga	-4.741860*	
lzmb	-1.448908	One
dlzmb	-4.917706*	

, **, * denotes significance levels of 1%, 5% and 10% respectively*

The same procedures were used to conduct the unit root test for interest rate and GDP growth. For both variables, variable that were not stationary at levels and thus could not be integrated at order zero or I (0) were differenced at one to attain stationarity. Hence the variables of these countries are integrated at order one or I (1). The unit root for real interest rate is presented in Table 5.3 above whiles that of real GDP Growth is presented in Table 5.4 below.

Table 5.4: Unit Root Test for GDP Growth

Country	T – Statistics	Order of Integration
lang	-3.429021**	zero
lbdi	-3.891578	zero
lben	-2.514590	one
dlben	-5.321099*	
lbfa	-6.010282*	zero
lnots	-3.493046**	zero
lcaf	-2.063688	One
dlcaf	-6.101137*	
lchad	-4.855130*	zero
lciv	-1.2424267	One
dlciv	-5.318101*	
lcmr	-3.526127**	zero
lcog	-3.273278***	zero
lcpv	-3.963935*	zero
lgab	-2.922685	One
dlgab	-5.542668*	
lgha	-3.104598**	zero
lgmb	-5.693815*	zero

lgnq	-3.479026**	Zero
lken	-3.094597**	Zero
llso	-1.072668	One
dllso	-6.751765*	
lmdg	-5.617478*	Zero
lmrt	-7.444277*	Zero
lmus	-1.950629	One
dlmus	-8.041706*	
lmwi	-6.862079*	Zero
lner	-5.143611*	Zero
lnga	-3.908443*	Zero
lrsa	-4.068967*	Zero
lsen	-3.981614*	Zero
ltgo	-5.430302*	Zero
ltza	-1.576936	One
ltza	-4.666851*	
luga	-3.240948**	Zero
lzmb	-4.036492*	Zero

*, **, *** **denotes significance levels of 1%, 5% and 10% respectively**

5.2.2 GARCH (1, 1) Model for all Macroeconomic Variables

In order to estimate or generate the mean variance series as a proxy for our volatility variables, we first need to estimate the MA (1) GARCH (1, 1) and then conduct several specification tests to see whether the chosen GARCH model is properly specified. It is only after the presence of GARCH that we can generate the conditional mean series of the macroeconomic variables. The process is to ensure that the ARCH and GARCH coefficient is

closer to one, this is what Enders (1995) concluded by stating that in order to ensure that the conditional variance is finite, then it should be that all characteristics of the GARCH model must be close to unity.

From the conditional mean equation, it was seen that the estimated coefficient of the moving average term, MA (1), is positive and statistically different from zero. The magnitude of the serial correlation in the macroeconomic variable is quite high. This suggests that past residual of the macroeconomic variables have an influence on current variables.

Table 5.5, an illustration of the exchange rate mean variance for South Africa, shows an ARCH coefficient of 0.531436and GARCH coefficient of 0.425909. The ARCH coefficient is significant at 10% while the GARCH coefficient is statistically significant at the 1% level, showing that exchange rate for South Africa, is influenced by the lagged conditional variance.

The sum of the coefficients is 0.957345 and indicates a volatility persistence of 0.957345.

Table 5.5: MA (1)-GARCH (1, 1) Estimation Output – South Africa Exchange Rate
Dependent Variable: Exchange Rate (South Africa)

	Coefficient	Std. Error	z-Statistics	Prob.
Conditional Mean Equation				
C	0.204286	0.030753	6.642794	0.0000
MA(1)	-0.396896	0.221142	-1.794755	0.0727
Conditional Variance Equation				
C	0.025291	0.015757	1.605071	0.1085
ARCH(1) α	0.531436	0.335156	1.913844	0.0556
GARCH(1) β	0.425909	0.128080	3.793781	0.0001

This was done for all the variables for each country. The results were not different from that of table 5.5 above, meaning that in order to confirm for the presence of volatility persistence, all the ARCH and GARCH coefficients were closer to one. It should be noted that some of the mean variance conditions were achieved at the levels were some to were achieved the differencing stage after the unit root test.

5.3 Panel Data Analysis

5.3.1 Descriptive Statistics

Table 5.6 below presents information on the mean, the median, the maximum, the minimum , the standard deviation of variables, the skewness, the kurtosis, as well as the number of country-year observations for of the explanatory variables the sample period 1980 to 2010. It can be observed that dispersion of variables over the sample period is quite high

The mean of the variables ranges from 1.1406 per cent, as recorded by human capital, to 29.0131 per cent, as also recorded by GDP Volatility of the countries. It is also worth noting that apart from the mean of Inflation which also lies around 11.603 percent, all the other explanatory variables have their means ranging from 3.11 per cent to 5.19 percent.

Again, the standard deviation of the variables over this period was also high especially for GDP Volatility (60.9 per cent) and Inflation (21.360 per cent). Casual observation tends to show that for most of the cases, a higher mean is also associated with a higher standard deviation. Aside the two variables, lag FDI, GDP Growth, exchange rate, interest rate volatility and exchange rate volatility had standard deviation less than 10 percent. Real interest rate, human capital and openness all had standard deviation less than 1 percent.

The skewness statistics is a measure of asymmetry of the distribution of the series around its mean. The skewness of a symmetric distribution, such as the normal distribution, is zero. The coefficients of skewness indicate that most of the series have positively skewed returns implying that most of the series have long lean right tails.

The kurtosis statistic indicates the peakedness or flatness of the distribution of the series. The kurtosis of a normal distribution is 3. The coefficients of kurtosis show that almost all the variables for the countries are leptokurtic. It is worth noting that exchange rate volatility and openness of the economy had kurtosis figures of 2.57 and 2.69.

Variables	Mean	Median	SD	Skewness	Kurtosis	Min	Max	Observations
Lag FDI	3.112465	1.157386	8.127127	9.104357	129.4736	-8.589392	145.2019	836
GDP Growth	3.829024	4	6.234268	2.905478	31.21526	-25	71	844
Interest Rate	2.182205	2.302585	0.8244192	-0.9302416	4.093703	-1.560939	4.110874	572
Exchange Rate	4.003297	5.209732	3.621957	-3.401693	18.83166	-17.32481	8.255099	894
Inflation	11.60386	7	21.36033	4.308939	35.24379	-100	200	805
Interest Rate Volatility	4.001935	4.142623	1.806221	-0.3416939	4.293819	-4.700221	9.085285	738
GDP Growth Volatility	29.01308	9.694222	60.90921	4.200607	22.17855	0.0001219	420.6126	841
Inflation Volatility	3.768902	3.900515	1.85929	-0.3071254	5.195238	-8.050423	9.25216	798
Exchange Rate Volatility	5.1939	6.598843	3.58885	-0.7503886	2.575134	-9.161551	12.06444	867
Human Capital	1.140658	1.098612	0.7816587	0.4294851	3.360703	0	4.189655	490
Openness	3.936038	3.951244	0.508497	0.0236788	2.696683	2.302585	5.308268	845

Table 5.6: Descriptive Statistics of Macroeconomic Variables

5.3.2 The Effect of Macroeconomic Volatility on FDI

Here we measure the possible effect of the selected macroeconomic variables on foreign direct investment flow to Africa. The study focused on twenty-nine countries in Africa, mainly from south of the Sahara. The selection of the countries was mainly due to the availability of data. The study period is from 1980 to 2010.

As a panel analysis, the study employed the dynamic panel data model developed by Arellano and Bond (1991) as an estimation method. As stated earlier, the dynamic panel data setting provides advantage over the traditional OLS. These are known to include the fact that the panel estimator (a) controls for the potential endogeneity of all the explanatory variables and (b) accounts explicitly for the biases induced by including initial real per capita GDP in the FDI regression. These weaknesses may bias both the coefficient estimates and their standard errors, potentially leading to erroneous conclusions.

Again, the dynamic panel data is known to be the best fit for any model that includes the lag of the dependent variable as an explanatory variable. For this study, a GMM-type estimator was employed using two lags of the dependent variable as well as the other control variables, human capital and openness as instruments.

The study followed and sought to expand the work of Kyereboah-Coleman and Agyire-Tetteh (2008), thus for the purpose of this study, the empirical FDI equation is specified to be:

$$FDI_{it} = \alpha_o + \beta_1 FDI_{i,t-1} + \beta_2 EXVL_{i,t} + \beta_3 RITR_{i,t} + \beta_4 ITVL_{i,t} + \beta_5 GDPVL_{i,t} + \beta_6 IFR_{i,t} + \beta_7 IFVL_{i,t} + \beta_8 RXR_{i,t} + \beta_9 GDPG_{i,t} + \beta_{10} OPEN_{i,t} + \beta_{11} HUMCAP_{i,t} + \Omega_{i,t}$$

5.3.3 Discussion of Panel Results

The results in table 5.7 below show the regression analysis on the impact of macroeconomic volatility on foreign direct investment to Africa. All the volatility variables are in the logarithm form, implying that they are explained as percentage changes. The other variables, that is real exchange rate, inflation, interest rate, human capital and openness are not logged and are thus explained in their absolute effect.

Table 5.7 Dynamic Panel Data Results

EXPLANATORY VARIABLES	COEFFICIENT	Std. Error	Z	P>|z|
Constant	3.705	1.076	3.440	0.001
FDI (-1)	0.272	0.017	15.920	0.000
FDI (-2)	-0.183	0.013	-14.070	0.000
Real Interest Rate	0.022	0.006	3.550	0.000
Real Exchange Rate	-0.001	0.000	-1.310	0.192
Inflation	0.0004	0.000	2.110	0.035
GDP Growth	0.019	0.009	2.080	0.038
Interest Rate Volatility (log)	-0.173	0.075	-2.310	0.021
GDP Growth Volatility (log)	-0.278	0.356	-0.780	0.434
Exchange Rate Volatility (log)	-0.513	0.117	-4.390	0.000
Inflation Volatility(log)	-0.384	0.048	-7.940	0.000
Human Capital	0.858	0.064	13.360	0.000
Openness	0.032	0.006	5.480	0.000
Wald χ^2 (12)	1620000			
Prob >χ^2	0.000			
Observations	210			
Sargan χ^2 (12)	14.770			
Prob > χ^2	1.000			
m1	z= 1.6401 (0.1010)			
m2	z= -0.4404 (0.6596)			

*, **, *** **denotes significance levels of 1%, 5% and 10% respectively**

m1 and *m2* are Arellano-Bond tests that the first and second-order serial correlations in the first-differenced residuals are zero. The test results are *z* scores and associated *p - values* showing the probability of correctly rejecting the null hypothesis of no serial correlation. The Sargan test is for the validity of instruments.

The diagnostics tests in table 5.7 report tests on the validity and robustness of the GMM estimator. For a consistent GMM estimator, Arellano and Bond (1991) indicate that the model should not exhibit second-order correlation, although the first-order correlation need not be zero. The test results show that all models pass the test for second-order serial correlation. The Sargan test for over identifying restrictions indicates that the instruments are appropriate. All diagnostic tests therefore show that the GMM estimator for the model is valid.

The results show that not all the variables had the expected signs prior to the study. Table 5.7 above shows that the volatility of real exchange rate which is one of the prime focus of the study has a negative impact on the inflow of FDI as expected and was significant at the 1 per cent level, thus indicating that exchange rate volatility or risk plays a major role in the determination of FDI. The study indicates that a 1% increase in exchange rate volatility will result is 51.3% decrease in the flow of FDI to African countries. The general implication is that exchange rate fluctuations can complicate the investment decisions of international firms by making unpredictable the absolute and relative profitability in the sector invested, as well as making uncertain the cost of new capital goods with high import content. Moreover distortions in the exchange rate can lead to a significant fall in the value of assets invested by multinational firms who try setting up in the host countries, more importantly; there is reduction in expected future profits generated by the investment. As a measure of

macroeconomic instability, the effect of the exchange rate volatility is that where multinationals decide to set up in Africa, the volatile rate will influence on the relative price of intermediate inputs imported from the parent country especially where such inputs are non-existent or final products which will be exported back to the parent country.

The result is in line with other studies that find a negative relation between these two variables. Keyreboah-Coleman and Agyire-Tetteh (2008) found the same relationship between the two variables for Ghana. Using GARCH models to estimate volatility Udoh and Egwaikhide (2008) concluded increase of the real exchange rate volatility decreases FDI inflow into Nigeria. Again, on exchange rate volatility, Chakrabarti (2001) reported a negative relationship between exchange rate volatility and FDI flows from the United States to twenty OECD countries.

Another important variable of the study was inflation uncertainty or volatility. Prior to the study, we expected the relationship between the flows of foreign direct investment to Africa to be inversely related to inflation volatility. Thus volatility in the inflation rates increased uncertainty and risk element facing foreign investors and thus adversely affect foreign investment on the continent. Uncertainty in the macroeconomic environment will obviously discourage investors from investing since it will increase the cost of investing in the country. The conclusion is that a volatile inflationary regime will discourage the flow of foreign direct investment. Inflation volatility invariably measures how volatile the stablility of an economy is. The results show that our expectation was met. The results as shown in table 5.7 indicate that inflation volatility is negatively significant at 1%. Form our study, a 1% fluctuation in the volatility of inflation will lead to a 38.4% fall in the flow of FDI. The results are in line with conclusion reached Rogoff and Reinhart (2003) when they posited that high incidence of

regional conflicts, *high and volatile rates of inflation* are key factors reasons why the flow of FDI to Africa is less than what goes to other parts the world. And again, same as Udoh and Egwaikhide (2008) who also found the same relation between FDI and inflation volatility for Nigeria

The coefficient of interest rate volatility is also negative and significant which meets our expectation. A prior result was that interest rate volatility will influence the flow of FDI but with a negative effect. The result is negatively significant at 5%. The implication is that a 1% rise is the volatility of interest rate will lead to 17.3% decrease in the FDI flow to Africa. If interest rate is seen as the cost of capital, then the high incidence of interest rate volatility will affect the value of funds borrowed from the continent. This means that most MNEs will prefer to borrow from their home countries since the cost is low. Again, if interest rate is seen as the rate of return on investment, then firms whose returns are no stable will decline future investment in the same environment. The results are in line with Cavallari, D'Addona, (2011), who found out that for OECD countries, interest rate volatility of host countries has a negative effect on FDI outflows.

The other variable of prime interest was the volatility of growth in the gross domestic product. A prior expectation was that there will an inverse relationship between GDP Growth volatility and the flow of foreign direct investment. The results indicated the expected relationship but it was however not significant. This only goes to suggest that volatility in the growth rate of countries in Africa has nothing to do with the determinants of foreign investors. This could be in cases where the multinationals come to take advantage of resource endowment and export to other countries or continent.

The findings of the study on exchange rate, although not a prime focus of this study differs from as was expected. The study shows that real exchange rate in host countries does not affect the attraction of FDI, with the relationship being negative. This is contrary to many studies, such as Blonigen (1997), Cushman (1985) but also supports the conclusion by Tsikata et al. (2000) whose study also found a negative but insignificant relation between real exchange rate and FDI flows.

Interest rate has a positive and significant relation with the flow of foreign direct investment. This implies that higher real return on investment would encourage FDI flow into the continent. The results could be looked at from the point of view of one of the theories of FDI determinants, which is the theoretical model. According to the theoretical model, the main determinant of FDI is interest rate, thus interest rate is expressed as a function of FDI, that is FDI=f (I). The model is of the view that interest rate depicts return on investment. This means that for developing economies where there is insufficient capital, the cost of capital need to be increased to attract the needed capital for growth. It stands to argue that investors will be happy to invest in countries where the rate of return on investment, that the interest rate is not volatile as this will give them substantial returns.

The rate of inflation was used a measure of macroeconomic stability. The results prior to the study were inconclusive. Literature says that a stable economy will attract foreign direct investment, this is because as explained earlier in relation to inflation volatility, an unstable economy will invariable discourage the flow of external investment. The results of our study are in line with those studies that confirmed a positive relationship between inflation and foreign direct investment. Inflation is positively related to FDI at a level of 5%, however, the

effect is negligible. On a comparison basis, our result contradicts that Haliu (2010) and Nnadozie and Osili, (2004), who found that inflation rate, has a negative effect on FDI inflows to Africa, but less robust. Another study though not in relation to Africa, by Brahmasrene and Jiranyakul, (2001) also concluded on insignificant effect of inflation on FDI in Thailand. However in Pakistan Khair-UZ-Zaman et al, (2006) shows there exist significant relationship between the two variables.

The last macroeconomic variable is the growth of GDP. The effect of growth rate of the economy on FDI flow is positive and significant. This is statistically significant at 1%. Thus from our study, a unit change GDP growth will lead to a 0.019 unit increase in foreign direct investment. The above relationship goes to buttress the fact that increasing the rate of economic growth on the continent would invariably serve as incentive for FDI inflow. Our results support that of Nnadozie and Osili, (2004) on the flow of FDI from the USA to Africa, where they it was reported that GDP growth was found to have significant impact on the flow of FDI and also corroborates the findings of Chakrabarti (2001); Zhang (2001); Ramirez (2000)

The degree of openness of the economy which is a measure of the ratio of the sum of exports and imports as a percentage of GDP was found to have a positive relationship with inflow of FDI as expected. The relationship was significant at 1% and thus statistically significant. From the study, the specific effect is that a unit rise in trade openness on the continent will increase FDI flow by 0.032 units. This could to be due to the liberalisation of most African economies during the early 1980s, where most subscribed to the economic recovery and structural adjustment programmes introduced by the World Bank and IMF. Some of the

policies include financial sector reforms and divestiture programmes. This has enhanced FDI inflow. The findings also corroborate that of Edwards (1990), Hauseman and Fernandez (2000) and Asiedu (2002) who found that significant positive relationship exist between trade openness and FDI. However, Kyereboah-Coleman and Agyire-Tettey(2008) found a positive but insignificant relationship between the two variables.

Human capital was found to be positive and significant at 1%. The human capital measures the level of education of the work force and it's important for those foreign direct investments where labour cannot be exported. An educated work for will increase efficiency and productivity. From our study, a unit change in human capital will lead to a 0.858 increase in the flow of FDI on the continent. The results corroborate previous study by, Borenzstein et al (1998) in which they concluded that FDI promotes growth only when the stock of human capital in the host country exceeds a minimum threshold. The results are also not different from conclusions drawn by Kucera (2002), Aseidu (2002), Noorbakhsh (2001) and Schneider and Frey (1985), as to the positive relationship between foreign direct investment and the human capital of host countries.

The lag of FDI was found to be positively related to the flow of FDI in Africa. The result shows that it statistically very significant at the 1%. According to Kyereboah-Coleman and Agyire-Tettey (2008), the reason to include the lag of the FDI variable is to investigate the long-term effect of FDI. Is it the case that when an investment is made today it will continue to receives assistance from the mother firm, leading to the inflow of further investments into the host country? The result obtained shows that foreign investor's turn to increase their level of investment in a country over time.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The last chapter on this study presents in brief summary and conclusion drawn from the entire work. This entails explanations of the models and approaches used in meeting the expectation of the study. Here, also recommendations are made for policy implementation and well as recommendations for future possible research. This study examined the impact of macroeconomic volatility on the flow of foreign direct investment into Africa. The study estimated the volatility of the macro economic variables using time series analysis. And a panel data set was then used to achieve our objectives.

6.2 Summary

This study has primarily sort to examine the effect of macroeconomic volatility on foreign direct investment in Africa. The investigation covers the period between 1980 and 2010 for twenty-nine countries. The variable used included Exchange rate volatility and inflation volatility, GDP Growth volatility and Real interest rate volatility; however other variables such as openness and human capital were used as control variables. The volatilities of the macroeconomic variables were estimated using the ARCH and GARCH family model. The study accessed whether the theoretical pronouncement that volatility of all kind is inversely related to FDI is true or not, thus buttressing of refuting earlier studies in this line of argument.

There is no doubt that foreign direct investment is an important element in the growth model of many economies. However Africa has over the years received the least flow of foreign direct investment. In this regard many researchers have sought to look at the factors

influencing foreign direct investment into Africa. Some of the main factors/determinants studied include the resource based and infrastructure , where emphasis is placed on natural resources, infrastructure and human capital as determinants of FDI to Africa (Nnadozie and Osili, 2004; Aseidu, 2002; Noorbakhsh et al, 2001); Political factors such as coups and military interventions (Dupasquier and Osakwe, 2005; Kyereboah-Coleman and Agyire-Tettey, 2008); The regulatory framework of the host country such as governance systems, intellectual property and to a large extent the incidence of corruption; Global and other factors such as return on investment, the gdp and interest rates of the source country (Asiedu 2002; Cavallari, L and D'Addona, S. 2011); and lastly economic factors such as exchange rate and its volatility, interest rate and GDP of the host country, openness of the host economy (Kyereboah-Coleman and Agyire-Tettey, 2008; Nnadozie and Osili, 2004; Aseidu, 2002; Udoh E. and Egwaikhide F. O. 2008),). Following from the last factor, the import of our study was to determine the effect of macroeconmic volatility of FDI flow focusing on Exchange rate volatility and inflation volatility, GDP Growth volatility and Real interest rate volatility.

Following from other studies foreign direct invest investment is taken as a percentage of GDP. The ARCH and GARCH Models introduced Engle (1982) and Bollerslev (1986) was used to model the volatility of the variables. The volatile variables generated were then used in the FDI determinant function. In the panel analysis the study employed the Arellano and Bond (1991) dynamic panel data estimation method to estimate and analyze the relationship between foreign direct investment and the volatility of the macroeconomic variables.

The findings of the study was not different from expectations. More importantly the results of the panel data estimation show that exchange rate volatility, interest rate volatility and inflation volatility are inversely related to the flow of FDI to Africa. This meant that an increase in the volatility of any of the three variables will invariably reduce the flow of FDI

to Africa. The results obtained were not statistically different from most previous studies. However, the study found out that in GDP Volatility was negatively related to FDI but it was not statistically significant.

Finally, the study also confirmed that other variables were significant in determining the flow of FDI to Africa. These variables were openness of the economy and human capital. The results show that an open economy stands a high chance of attracting foreign direct investment. And also an economy with an educated labour force will influence the attraction of FDI into Africa. Also, the study shows that inflation, interest rate and GDP growth are also positively correlate with FDI flow. Exchange rate was found to be statistically insignificant in the attraction of FDI.

6.3 Conclusion

From our estimation results, the conclusion drawn was that exchange rate volatility, inflation volatility and interest rate volatility exerted significant negative effect on foreign direct investment during the period. GDP Growth Volatility was found to have a negative relationship with foreign direct investment but it was insignificant. In addition, the results show that inflation, real interest rate, and GDP Growth were found to be positively related to the attraction of FDI to Africa. Human capital and openness of the economy were also found to relate positively with foreign direct investment.

The implications are that, price instability which results from higher inflation will make investors uncomfortable as this will affect their pricing decisions. Volatility is interest rate will invariably lead to uncertainty in the expected future profits of investors. It will also lead to a loss in the value of assets especially where the FDI is a Greenfield investment. Exchange rate volatility will also lead to a fall in the purchasing power of all monies earned form

investment. The volatility in exchange rate means that the value of money earned in one country is significantly low when repatriated to the source country.

It thus implies that the instability of exchange rate, interest rate and inflation will reduce the amount of FDI that will flow to the continent. To reduce the volatility of these variables, measures should be taken to ensure a stable economy.

6.4 Recommendation

This research ascertained the impact of macroeconomic volatility on foreign direct investment flow to Africa.

The findings show that inflation, interest rate and exchange rates volatility increased uncertainty and risk element facing foreign investors and thus adversely affected foreign investment on the continent. Volatility in the exchange rate, interest rate and inflation therefore undermines the amount of foreign capital that flows on the continent.

As recommendations for policy implementation, the study suggests that policy makers in Africa should target macroeconomic stability. In that case there will be stability in the exchange rate, interest and inflation.

In relation to exchange rate, policies that would enhance the purchasing power of the local currency should not be undermined. With exchange rate, it is recommended that policy makers' aim at increasing the rate of exports whiles reducing the amounts of imports. This is because; a lot of foreign currencies are needed to import goods into a country. When this practice is high, there will be pressure for the demanded of the foreign currency which will lead to depreciation of the local currency. However when it comes to exports, the local currency is projected on the world market. This means those who desire the local goods will

need local currency. This will strengthen the local currency. Again, if exports are to be increased, then it also becomes imperative that policy makers need to strength the local industry so as to boost production. When the local production industry is strengthened, it will also reduce the quantity of imports. There should be subsidies and grants to the local industry as well as to boost exports. The repelling effect is that exchange rate volatility will be reduced which will then attract foreign investment.

Again, to control for exchange rate, governments in their spending should engage local consultants and contractors. The ideas where by local firms pay and receive payments for services in foreign currencies should be discouraged, as much as possible, all payments in the economy should be the local currency.

The study suggests that policy makers should focus on measures that will reduce that uncertainty in inflation whiles making frantic efforts to increase the rate of interest since most investors view the interest rate as the rate of return on their investment. It implies that polices that will promote invest confident should be undertaken. The inverse relationship between the rate of inflation and the real interest rate should be noted. For the two indicators, the central banks should consider issues such as controlling the amount of money supply; excessive money in the hands of the populace will lead to price hikes especially where there are few good in the economy and thus inflation volatility, efforts at regulating the prime rate, which is the rate at which the central banks lend to the commercial banks will have and direct effect on the cost of capital which is the interest rate, prudent regulations will lead to a stable interest rate regime. Again, another measure could be to control of the reserve rate. All these, if well regulated will avoid inflation and interest rate volatility, and encourage private inward investment in the continent.

As a means of reducing inflation volatility, excessive government expenditures should be discouraged; excessive spending will result in an increase aggregate demand. When the rise in demand is not supported by the require demand, inflation rises. Thus prudent government can be used as a toll to control inflation volatility.

A stable macroeconomic environment is therefore important for FDI because investors require as much certainty as possible about the direction of the economy. It should be noted that a high rate of inflation results from uncontrolled monetary and fiscal policies, such as excessive money supply, budget deficits, and a poorly managed exchange rate regime.

The results obtained in relation to human capital means that in order to attract more FDI and also benefit from the growth enhancing effect of FDI, Africa leaders must invest heavily in the education of their populace. This has become necessary as most of the FDI that come into the continent requires labour with technical knowledge but not all the labour can be exported from the source to the host countries.

The significance of the lag of FDI implies and supports various arguments that the investment climate in a country is very important in the determination of high levels of future investment. A conducive and welcoming investment climate coupled with the achievement of the expected return will foster FDI growth. Looking at from another point of view, the issues of wars and tribal conflict as well as high incidence of insecurity will discourage foreign investment.

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