IMPACT OF FOREIGN DIRECT INVESTMENT VOLATILITY ON ECONOMIC GROWTH IN KENYA

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DECLARATION

This research proposal is my original work and has not been presented for academic purposes in any other University.

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DEDICATION

I dedicate this project report to my family and friends who have been a source of inspiration and support all through my life. To you all-you are truly cherished for without you, I would not have accomplished this feat.

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I wish to acknowledge the enormous contribution made by several individuals in the course of this research work. I wish to recognize the work done by my supervisors- Mr, Jasper Okelo and Dr, Bethuel Kinyanjui for their constant and analytical criticisms, corrections, guidance and encouragement, all through I admired their dedication. Special thanks go to my parents who have always been my model, and my colleagues who were handy in my research work. My thanks also go to University of Nairobi staff. Last but not least, to God almighty for giving me continued good health as I pursued my academic goals.

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ABBREVIATIONS AND ACRONYMS

ASEAN-Association of south East Asian Nations

ARCH- autoregressive conditional heteroskedasticity

ARDL-Autoregressive distributed lag.

EGARCH- Exponential Generalized Autoregressive conditional   Heteroskedasticity

EPZ-Export   Processing   Zone.

FDI- Foreign Direct investment

GARCH -generalized autoregressive conditional heteroskedasticity.

GDP- Gross Domestic Product

GMM- Generalized Methods of Moments.

IMF – International   Monetary   Fund

IFS- International   Financial Statistics

KNBS- Kenya Bureau of Statistics

LDC- Less Developed Countries

MNC-Multinational corporations

OLS- Ordinary Least Square.

R&D-Research and Development

UNCTAD- United Nations Centre for Trade and Development

UNCTADSTAT- United   Nations Centre for Trade and Development Statistics

US-United States

SSA-Sub Saharan Africa

ABSTRACT

Several empirical studies have confirmed that FDI spur economic growth while FDI volatility negatively affects economic growth. Most Sub Saharan African countries endeavor to attract foreign direct investment (FDI) because of its known importance as an instrument of economic growth and development. The formation of New Partnership for Africa's Development (NEPAD) is evidence enough for Africa's quest for FDI; this is viewed as the means of attracting of foreign direct investment to Africa.

This study investigated empirical the impact foreign direct investment volatility in Kenya. Secondary data were used and sourced from the United Nation Centre on Trade and development (UNCTAD), World Bank database and Kenya National Bureau of Statistics. The period of study was 1970– 2011. An endogenous growth model was estimated using the ordinary least squares to determine the relationship between the FDI volatility and economic growth. Using bounds testing approach, it shows that FDI volatility retards long-run economic growth in Kenya. Results suggest that FDI has a positive result on growth whereas FDI volatility has a negative impact on growth. Trade openness is not FDI inducing, thus affecting growth negatively. Labour force has a positive impact on growth. Foreign Direct Investment in Kenya contributes positively to economic growth, although its overall effect on economic growth may not be significant.

The volatility of capital flows may make it harder for the stable and predictable macroeconomic policies to be followed. Therefore unstable inflows may dampen investment, hence affecting economic growth.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Globalisation is the most salient feature of today's quest for encouraging cross border investment by multinational corporation (MNC's) and firms. Most countries especially the less developed countries endeavour to attract foreign direct investment due to its importance as a tool of economic growth and development (Asiedu, 2007). Most Africa countries Kenya included strive to seek Foreign Direct Investments as evidenced by being a signatory to New Partnership for Africa's development (NEPAD), which is seen as the vehicle for attracting foreign direct investment to Africa as a major component (Asiedu, 2007). Inadequate resources are a challenge to most African countries, thus the difficult of to finance long term investment. This poses a greater challenge to economic growth and development, hence hindering the attainment of Millennium Development goals (UNCTAD, 2005).

Foreign Direct Investment (FDI) consists of flow of capital, knowledge, and technology into the host country (IMF, 1993). FDI may also be defined as an investment carried out by a foreign nationals for the purpose of production of goods and services, which are to be sold either in the domestic market or exported (UNCTAD, 2005). 0n the other hand, volatility is the deviation around a trend, such that the measure is interpreted as a percentage of mean, which is the year on year variability of the inflows (Lensink & Morrissey, 2002).

FDI has an important role to play in developing countries, which are characterized by lack of skilled manpower, infrastructure and capital among other problems (Bengoa, 2003; Blomstorm,

1996). It is believed that an inflow of FDI improves economic growth by increasing the capital stock, but recent literature emphases the importance of FDI as a medium of international technology transfer. They argue that technological change plays a crucial part in economic growth. FDI by multinational corporations is one of the major channels through which less developed countries (LDCs) will access advanced technology from developed countries. The knowledge spillovers may through imitation, competition, linkages and training (Grossman & Chauvet, 1991; Lensink & Morrissey, 2001).

Since independence, Kenya has put great efforts to boost the levels of FDI to spur economic growth by offering various investment incentive packages. During the period 1970 to 1980 the average growth rate of real GDP was 6.6 per cent per year, this compared favourably with the East African states, whereas the average FDI inflows was 30.5 million US Dollars . This remarkable performance was attributed to consistency of economic policy, promotion of small holder agriculture, high domestic demand, and expansion of market of domestic output within East Africa region. The period 1981 to 1990 saw powerful external shocks with inappropriate fiscal and monetary policy, thus the decline in the growth of real Gross Domestic Product (GDP) to 5.2 percent over the period, while the FDI inflows averaged 30.4 million US Dollars. In the period 1991 to 2000, average GDP fell further to 2.21 percent due to increased budget deficit, declining export and political events resulted in the worst economic performance (UNCTAD, 2005).

In the last decade, that is 2001 to 2010 the GDP growth rate averaged 3.7 per cent, while FDI inflows increased to 128.5 million US Dollars. The increase in the GDP inflows may be

attributed to the change in governance, for instance; in 2003 the government developed and implemented the Economic Recovery and Strategy Paper (ERSP) in order to accelerate the economic recovery. In 2008, Kenya launched its long term economic blue print the vision 2030 where it envisages to achieve global competitiveness and prosperity of the nation. This initiative was seen as a country's renewed commitment to attract Foreign Direct Investment to finance the industrialisation process (UNCTAD, 2005).

FDI flows to Kenya have not only been highly volatile, but they generally declined in the 1980s and 1990s despite the economic transformations that took place and the improvement made in improving the business environment. The investment wave of the 1980s declined in the 1990s as the institutions that had protected both the economy and the body politic from arbitrary interventions were eroded (Phillips, 2001; Mwega & Ngugi 2006). The main aim of Foreign Direct Investment is to finance investment. Planning is crucial for Investment decisions making and availability of funds, therefore predictability of FDI inflows is imperative. Low predictability is an indication of High volatility, and this may discourage investment. Similarly, political and economic instability in a country may discourage FDI inflows, and therefore associated with volatility. As a result, volatility is a useful indicator of; disincentives to investment and economic instability in the economy (Morrissey, 2003).

Most of the studies on FDI volatility and growth in sub Saharan Africa are cross-country evidences, while the effects of FDI volatility on economic growth can be country specific. The studies assert that relationship between FDI and growth depends on the macroeconomic conditions of the host country that is economic, social and environmental condition. Therefore

the impact of FDI volatility on growth of any economy may be country and period specific, and as such therefore, there is the need for country specific studies. A number of studies in Kenya have analysed the relationship between FDI and economic growth, most of these studies were focused on determinant of foreign direct investment and impact of FDI on economic growth. They found out that FDI has a positive impact on economic growth in Kenya. However, the effect of FDI volatility on economic growth has not been addressed. While volatility is expected to adversely affect GDP growth rate, it has not been empirically established in the Kenyan case. This study will fill this gap by analysing the effect of FDI volatility on economic growth in Kenya.

The methodology adapted by most studies done in Kenya is ordinary least squares (OLS) to model the relationship between FDI and economic growth, and determinant of FDI in Kenya. This study deviates from previous studies by taking into account the effects of FDI volatility on economic growth. The study will model FDI volatility using EGARCH model and ARDL bound test approach to test whether FDI volatility has positive or negative effects on economic growth.

1.2 Foreign Direct Investment Volatility; why it matters for growth.

Capital flows do contribute to growth and as a result may help reduce poverty. However, volatility of inflows has a negative impact on growth, and especially private flows shows greater volatility than official flows. Therefore FDI volatility is expected to have adverse impact on economic growth for the following reasons: First possibility is that volatility itself has a negative effect on growth, . Through uncertainity in FDI inflows, and uncertain in costs of research and development. . It may then be the case that volatility of FDI undermines investment by

discouraging innovation and technology which is detrimental to economic growth. (Lensink & Morrissey, 2000)

Second, volatility of FDI inflows is a proxy for country specific economic risk uncertainty, Which is an important determinant of both growth and the productivity of investment.. Sudden Changes in the volume of FDI inflows can have a destabilizing impact on the economy. Foreign investors when confronted with risks may postpone or even withdraw the investments. Therefore, FDI volatility has a destabilizing effect on the economic performance, hence economic growth (Guillaumont & Chauvet, 1999; Lensink & Morrissey, 2000;).

1.3 Overview of Foreign Direct Investment and economic growth in Kenya

Kenya has had mixed fortunes in terms of FDI inflows and economic trends in growth, which have shown great fluctuation. Figure 1.1 and 1.2 demonstrate the trend in Kenya's FDI and economic growth respectively for the period 1970 to 2011.

Figure 1:1. FDI net inflows (% of GDP) and real GDP growth rates
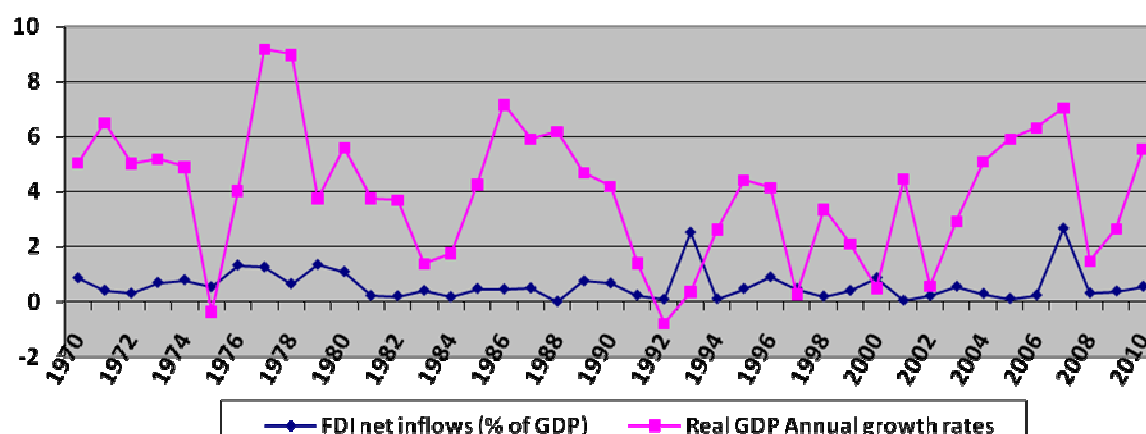
Source: own composition data on UNCTADSTAT (2013).

Figure 1:2. Trend of FDI inflow in Kenya (1970-2011).
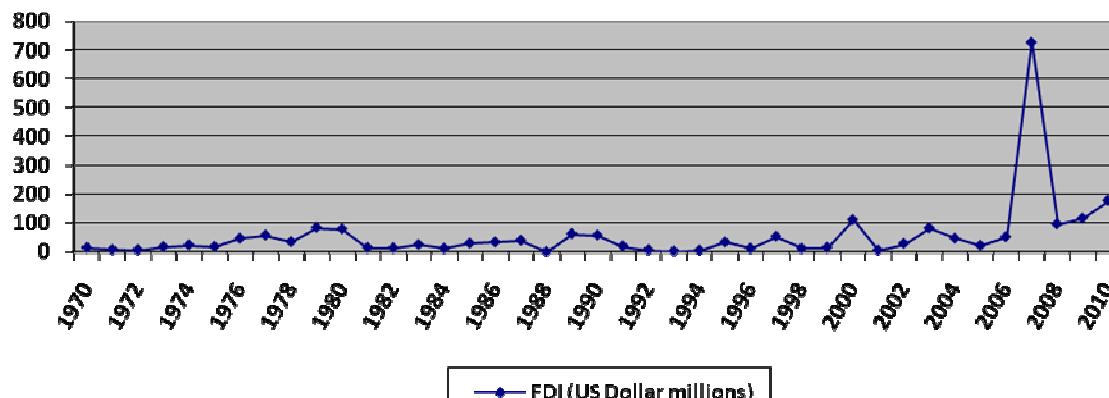
Source: own composition, data from UNCTADSTAT (2013).

In the1970's Kenya's FDI was about $10 million a year rising to approximately $80 million in 1979-80. In 2011 the value of Foreign direct investment, net inflows (current US$) in Kenya was $178. Over the last 40 years, Foreign Direct Investment has fluctuated between $729 in 2007 and $394,431 in 1988. On the other hand, Gross Domestic Product growth rates for the same period were 5.55% in 2010, 7.05% in 2007 and 6.2% in 1988. The ration of foreign direct investment, net inflows to GDP in Kenya was 0.58 as of 2010. Its highest value in the last 40 years was 2.68 in 2007, while its lowest value was 0.00 in 1988. However, during the early 1980's FDI declined to a number of factors namely; worsening in economic performance; stop-go nature of economic reforms; political instability; rising costs of doing business; pedestrian growth performance; corruption; poor governance; and worsening of public services and infrastructure. Theoretically increase in FDI to the host country should result into an increase in GDP growth rates, but from the graph it's evident that this is not so.

A remarkable recent trend in FDI composition targets the sectors such as horticulture, floriculture, textile, and tourism. The interest in horticulture and floriculture has been accelerated

by favourable climatic and transport infrastructure, while textile investment has been in response to African Growth and Opportunities Act (AGOA) under the U.S and Africa preferential arrangement. Most FDI dealing with manufacturing has focused on the production consumer goods, for example food and beverage industry. However since 2001 most foreign direct investment in manufacturing in Kenya has been in the Export Processing Zone (EPZs), majority being in AGOA-related textiles industry. Currently EPZs status has expanded from their initial focus on textiles to production of other goods. In the services FDI has focused on a wide-range of sectors, for instance tourism, financial, business services and telecommunications (UNCTAD, 2005; Kinuthia, 2010).

1.4 Policies by the government to enhance and attract Foreign Direct Investments

The focus by the Government towards making the private sector a new engine of growth and promoting FDI has been a consequence of this and has brought rewards in the growth of GDP. As a result therefore, KenInvest was established in 2004 and given independence in 2007 to market the country's opportunities, facilitate investors and ensure aftercare. Several reform bills were also lined up, which include; public private partnerships (PPPs) bill, Privatization Commission was established to overlook the privatization programme in a transparent and competitive way. In addition, the Government has published its Vision 2030, which stipulates clear benchmarks on how it wishes to develop and bring investment.

In terms of governance, a new Constitution was approved with much optimism and with far-reaching changes. At the heart of Vision 2030, is the Government's desire to significantly improve the country's infrastructure, including road and rail. This has already begun with some

major road upgrading. However, private sector investment will be engage in the development of a new transport corridor to South Sudan including port, road and rail, upgrade roads and railways between Mombasa and the Ugandan border, enlarge Mombasa port and expand Jomo Kenyatta International Airport (UNCTAD, 2012)

1.5 Statement of the Problem

Attracting FDI is a key aspect of development strategy for many developing countries, Kenya included, as investment is considered a crucial element for output growth and employment creation (Blomstrom, 1983; Kayonga, 2008).

The Kenyan government has expended enormous resources and put great efforts to attract foreign investors (FDI) to spur economic growth. However, FDI inflows in Kenya have been volatile and low despite the economic reforms that took place and the progress made in improving the business environment (Mwega & Ngugi 2006; Phillips, 2001). The government is currently focusing more on the private sector through public private partnership in promoting economic growth.

The volatility of capital flows may make it harder for the stable and predictable macroeconomic policies to be followed. Therefore unstable inflows may dampen investment, hence affecting economic growth. This begs the question as to what has been the effect of FDI volatility on economic growth in Kenya paving way for research on the effects of FDI volatility on economic growth.

A number of studies in Kenya have analysed the relationship between FDI and economic growth[1]. However, the effect of FDI volatility has not been adequately addressed and while volatility is expected to adversely affect GDP growth rate, it has not been empirically established in the Kenyan case. This study will fill this gap by analysing the impact of FDI volatility on economic growth in Kenya.

1.6   Research Questions

The study seeks to answer the following questions:

(i)   What has been the magnitude of FDI volatility in Kenya?

(ii)   To what extent has the volatility of FDI impacted on economic growth in Kenya?

(iii)   What policy implications can be drawn from the study findings?

1.7   Research Objectives

The overall objective of the study was to analyze the effect of FDI volatility on economic growth. The specific objectives were:

(a)   To determine the magnitude of FDI volatility in Kenya.

(b)   To establish the effects of volatility on economic growth in Kenya

(c)   To draw policy implications from the study findings.

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[1] see Kinuthia, 2010; Musau, 2009; Mwega & Ngugi, 2006; Nyamwenga, 2009

1.8 Significance of the Study

The study will contribute to knowledge on the impact of foreign direct investment volatility on economic growth in Kenya. Furthermore opens up ways for others to conduct further studies on the issues related to foreign direct investment volatility in Kenya. From the findings of the study, policy makers may be able to design future policies to mitigate the effects of an adverse shock and uncertainty of FDI flows, which may produce an uncertainty to reduce the effectiveness of FDI on economic growth.

1.9 Scope and Limitations of the Study

The study analysed the available data for the period 1970-2011. During this period Kenya witnessed tremendous changes and has had four regimes which imply a possible divergence in policy stance in the economy. The anticipated challenges lie in the accuracy of the data because the study will use data from different sources. The major limitation of the study was that it focused on selected variables only.

CHAPTER TWO

LITERATURE REVIEW

2.1   Introduction

This chapter present a review to the body of economic literature on FDI volatility and economic growth and provides a summary of the same.

2.2   Theoretical Literature

Neoclassical and endogenous growth theories provide the basis for most of the empirical work on the FDI and Economic growth.

Neoclassical growth theory as per Solow (1956)

Solow (1956) developed neoclassical growth model. The theory outlines how a steady economic growth rate will be accomplished with the proper amounts of the three driving forces: labour, capital and technology. It states that by varying the amounts of labour and capital in the production function, an equilibrium position can be achieved. This theory emphasizes that technological change has a major influence on economic growth. It further argues that economic growth will not continue unless there are continuous advances in technology. The neoclassical theory proposes that long-run economic growth arises from two exogenous factors namely: technological progress and labour force growth.

According to the neoclassical theory, FDI inflows provide a solution in filling: the saving-investment gap; the foreign exchange gap; and the fiscal gap in less developed countries. FDI may act as an engine of the economic growth of the host economies through increasing capital

formation, augmenting employment, promoting manufacturing growth, bringing management expertise and establishing brand name, and providing the skilled labour with an access to the international production network. Neoclassical theory considered the role of uncertainty in investment decisions. It stipulates that if investors are uncertain of the future returns they may reduce the investments or completely fail to invest. The theory states that there is a negative link between uncertainty and investment thus FDI volatility has impacts on economic growth (Boreinstain et al, 1998)

Endogenous growth theory

These are equilibrium models of endogenous growth where technological change is the primary driver of long run growth through accumulation of knowledge by forward looking, profit maximizing agents (Romer. 1986). The endogenous growth theory points out that FDI have a long-run effect on the growth of output. In order to explain the role of FDI in the long term growth of host countries, Barro and Sala-i-Martin,(1995) Lucas,(1990); Mankiw,(1992); and Romer,(1987); amended the neoclassical growth model by Solow by including the growth-driving factors of human capital as well as physical capital to explain the importance of FDI in developing countries.

They made it possible to model FDI as stimulating economic growth in the long run through the permanent knowledge transfer that accompanies FDI. Since knowledge is considered an externality, it will account for the non-diminishing returns that result in long run growth. Therefore, making growth determinants, including FDI endogenous in the model, long run effects of FDI will follow. A particular channel through which technology spills over from advanced to less developed countries is through the flow of FDI. Thus FDI not only contributes

to economic growth through capital formation and technology transfers but also does so through the augmentation of the level of knowledge through labor training and skill acquisition.

According to endogenous growth theory, FDI affects economic growth through three main channels. First, FDI increases capital accumulation by introducing new inputs and technologies; Second, it advances the level of knowledge and skills through labor and manager training; and thirdly, it increases competition in the host country industry by overcoming entry barriers and reducing the autonomy of existing firms.

The theory postulates that FDI has a positive effect on economic growth, whereas the volatility in FDI inflows has a negative effect on economic growth. It that states FDI positively affects growth by decreasing the costs of research and development (R&D) through stimulating innovation. Therefore if FDI inflows are uncertain, costs of research are uncertain, which negatively affects incentives to innovate. Thus, FDI volatility dampens investment and negatively affects real GDP growth. (Boreinstain et al, 1998)

2.3   Empirical Literature

Alpaslan (2011) study explores the impact of FDI volatility and economic growth for the Czech Republic and Hungary for the period 1990-2007using time series data. The study used exponential generalized autoregressive conditional heteroskedasticity (EGARCH) model to estimate the volatility of FDI and autoregressive distributed lag (ARDL) co integration procedure to test for the existence of short run or long run relationship between economic growth and volatility of FDI. The study found out that FDI volatility has a negative and statistically

significant impact on economic growth. However, the empirical results based on ARDL approach indicate that there exists a cointegration or long-run equilibrium relationship between FDI volatility and real GDP growth in the cases of the Czech Republic and Hungary.

Chee-keong and Liew (2011) examined the empirical relationship between the FDI volatility and economic growth in ASEAN-Five countries for the period 1974-2005. The objective of the study was to determine whether FDI volatility is harmful or beneficial for long-run growth. The variable to be estimated were real GDP growth rate (*RGDPGR*) and gross FDI as a percentage of GDP (*FDIGDP*). The study measured FDI volatility in two different ways, that is; FDI standard deviations is calculated by taking the standard deviation of error from the autoregressive equation for FDI with one-year lagged value and a time trend, and *FDIEGARCH* the alternative measure generated EGARCH model. The study examine the long-run relationship between FDI volatility and economic growth using ARDL cointegration testing procedure proposed by Pesaran, Renelt, and Smith (2001). The study found out that countries with higher FDI volatility have lower growth and it is significantly harmful for long-run growth in Association of south East Asian Nations (ASEAN) developing countries. The estimated bound test results indicate existence of long-run relationship between FDI volatility and economic growth. The policy implication is that policy-makers should mitigate the effect of an adverse shock to FDI flows, which may produce an uncertainty to reduce the effectiveness of FDI and economic growth.

Duasa (2007) study on FDI volatility and economic growth in Malaysia for the period of 1990-2002 uses ARCH model to test the effect of FDI volatility on economic growth. The findings of

the study were FDI volatility have negative impacts on economic growth. This implies that the stability of FDI inflows   improves economic growth. . The study recommended that a dynamic package internally will definitely attract FDI into the country and will ensure its stability hence ensuring efficiency of FDI. Policy on attracting FDI is important for improved economic growth.

Morrissey (2003) examines the trend, capital inflows and volatility of such inflows, for a sample of 26 countries of sub-Saharan African (SSA) over the period 1970 - 1997. The data consisted of FDI and other private flows, foreign aid and debt flows. For each of the capital inflows, measures of volatility for each country are calculated and discussed. The three alternative measures include; standard deviation around a simple trend; standard deviation around a forecast value; and coefficient of variation. The study found out that private inflows to SSA are very low, and accounted for less than two per cent of GDP on average over the whole period. Foreign aid remains the most significant inflow, averaging 12 per cent of GDP over the entire period. The study provides evidence that volatility has increased in the 1990s, the official flows therefore are less volatile than private flows, and the FDI volatility is much less compared to other private flows. While private inflows, especially of short-term capital, pose problems in macroeconomic management, such flows have been too small to pose such problems in SSA prior to the late 1990's.

Osei, Morrissey and Lensink (2002) examine the trends, levels of capital inflows, and the volatility of such inflows, to a sample of 60 developing countries over the period from 1970-1997. The data consisted of foreign aid (official development finance) as the main forms of official flows, FDI and other private flows, and debt as a relative aggregate inflow measure. The

data consisted of FDI and other private flows, foreign aid and debt flows. For each of the capital inflows, measures of volatility for each country are calculated and discussed. The three alternative measures include; standard deviation around a simple trend; standard deviation around a forecast value; and coefficient of variation. For analysis and summary of the results, the countries were grouped into low income, lower middle and upper middle income. The findings of the study were that; volatility has increased in the 1990s comparative to the 1980s, but not to the 1970's; official flows are less volatile than private flows; volatility in FDI is lower than in other private flows; the less developed countries have become increasingly dependent on aid and debt finance, while attracting less private capital and minute FDI; total private capital inflows declined by more than 80% between the peak of the late 1970s and trough of the early 1990's; and that only the richer developing countries attract significant volumes of FDI and private capital but both are quite volatile.

Lensink and Morrissey (2001, 2002) studied FDI flows volatility and growth, but deviated from previous studies by introducing measures of the volatility of FDI inflows. FDI inflow volatility in the model is predicted to have a negative effect on growth. The study estimated the model using: cross-section; panel data; and instrumental variable methods. They found out that the all the results were not entirely robust; FDI has a positive effect on growth; and volatility of FDI has a negative impact. Though FDI had a positive effect of FDI, it was not sensitive to other explanatory variables are included. For instance, it was not conditional on the level of human capital. The study found out that it was not the volatility of FDI per se that retards growth but that such volatility captures the growth-retarding effects of unobserved variables. This is consistent with Lensink and Morrissey (2000) who found out that the volatility of aid flow is negatively related with growth, whereas the level of aid has a positive impact.

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In their earlier study Lensink and Morrissey (2000) conducted a study on FDI inflow, volatility and growth in less developed countries (LDC) for the period 1975-1997. They estimated the relationship between FDI volatility and economic growth in LDC using a simple OLS growth regression. The study estimated a standard growth model using cross-section; panel data; and instrumental variable methods. The study found that FDI had a positive effect on growth whereas volatility of FDI has a negative impact. They argued that FDI inflow instability, measured as a residual of an autoregressive trend estimate of FDI receipts, can proxy for two forms of uncertainty that may be growth reducing. First, the uncertainty regarding future FDI inflows, which may have adverse effects on investment; secondly, economic uncertainty, the economics shocks will which increases instability of FDI flows. They found out that the coefficient on the FDI instability measure is negative and significant and infer that economic uncertainty is growth-retarding. This result was robust for the sample of African countries and the full sample of developing countries.

Serven (1998) conducted a study on the impact of uncertainty in FDI inflow on investment in less developed countries for the period 1970-1995. He used a large cross country data set, comprising of 94 developing countries and used generalized autoregressive conditional heteroskedasticity (GARCH)   to model FDI uncertainty. The study   found out that FDI uncertainty negatively impacted on levels of investment for Developing countries. This was due to the fact that FDI uncertainty tends to increase the cost of research and development and lower expected returns thus reducing the level of investment.

Borensztein, Gregorio and Lee (1998) examined empirically the effects of FDI on economic growth and the channels through which FDI can be beneficial to growth. In the growth model they developed the variety of capital goods available is represented through technical progress. Therefore FDI determines technical progress since multinational companies encourages the adoption of new technology, thus increasing the production of capital goods, therefore increasing variety. The authors found that FDI has positive impact on growth although the magnitude of this effect depended on stock of human capital available in the host country. They found that for a country with very low level of human capital, FDI effects on growth was actually negative. In addition they found that FDI has positive impact on domestic investment.

2.4   Overview of Literature Review

The relationship between FDI and economic growth has motivated voluminous empirical and theoretical literature focusing on both developed and developing countries. From the literature reviewed, it is clear that the use of GARCH based measures of volatility have increasingly been preferred. This is because they are likely to produce consistent estimates of parameters of interest and also they are less likely to breach the non-negative constraint. The study drew much relevance in the use of ARDL and GARCH as a measure of volatility. These methods were therefore adapted in the study.

The shortcomings of the literature reviewed are that most of the studies are not country specific and instead, they are cross-country meaning they might fail to bring on board unique characteristics in these countries. Lack of such a study may imply that local policy may be being formulated based on foreign ideas. This poses the risk of not addressing the Kenyan economic situation adequately. It was therefore imperative to conduct further study to try and close these

gaps especially doing a country specific study which was to bring out the actual issues in the specified countries especially on the impact of FDI volatility on growth.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Theoretical Framework

The study makes use of simple endogenous growth model where FDI has a positive effect on growth, while volatility in FDI flows has a negative effect. In the model both FDI and volatility in FDI will affects growth through the cost of research and development (innovation). It adapted an endogenous growth model borrowed from Barro and Sala-i-Martin. (2004) and following Borensztein *et al* (1998). This is because of its advantages over neoclassical growth model, for instance it consider the long run effects of FDI on economic growth and also the effect of FDI volatility on economic growth in the long run.

The model assumes that technical progress is achieved through the variety of capital goods available. In the model there are three types of agents: the producers of final goods; innovators of capital goods, and consumers. The production function of the producers of final goods and services are assumed to be:

$$Y_i = A L_i^{1-\alpha} \sum_{j=1}^{N} K_{ij}^{\alpha} \tag{1}$$

Where $0<\alpha<1$, α is marginal productivity of capital, and A is the exogenous state of the environment, Y is output, L is labour input and Kj stands for service flows from each capital good j. For each final good, producer i rent N varieties of capital goods from innovators. For easiness, the study assumes that capital goods depreciate fully in each period, so that they behave like non-durable intermediate goods.

$$Y_i = A L_i^{1-\alpha} N K_i^{\alpha} \tag{2}$$

From equation (2), an increase in the amount of varieties N increases growth Y. As a result, the demand for capital goods by the final good producers will be determined by equating the marginal productivity of capital good to its price P_j.

$$\partial Yi/ \partial K\, ij = A\alpha L_i^{1-\alpha} K_{ij}^{\alpha-1} = P_j \tag{3}$$

Making K the subject of the equation 3, the demand for capital good j by firm i will be:

$$K_{ij} = L_i \left(\frac{A\alpha}{P_j} \right) 1/(1-\alpha) \tag{4}$$

Assuming that the producer has monopoly rights over the production and sale of the capital goods; the production costs of K after it has been invented equal to 1 in each period; and the rate of return (r) is constant between times v and t.

The present value of the returns from inventing and producing in several periods, $V(t)$, for the capital good j equals (where Kj is the total quantity produced at each date):

$$V(t) = \int_t^{\infty} (Pj - 1) K_{je}^{-r(v-t)} \; dv \tag{5}$$

To optimize $V(t)$, the innovator sets p_j, Since k_j is independent of time, this is equivalent to optimizing (p_j -1)k_j, where k_j is the total quantity demanded by different producers i ($Kj.=\Sigma_i$ K_{ij}). The optimization process result can be shown to be $Pj = P = 1/\alpha > 1$ (where $1/\alpha$ is the mark-up). From this result, the quantity demanded for each variety K can be written as:

$$K_i = K = LA^{1/(1-\alpha)} \alpha^{2/(1-\alpha)} \tag{6}$$

Substituting for the value for Pj in equation (6), and (5) gives:

$$V(t) = LA^{(1/(1-\alpha))} \left(\frac{1-\alpha}{\alpha} \right) \alpha^{2/(1-\alpha)} \int_t^{\infty} \ell^{-r(v-t)} \; dv \tag{7}$$

At equilibrium with positive R&D (at cost η) and increasing *N*, then *V(t)* = η, therefore equation (7) can be solved to:

$$r = (\tfrac{1}{n}) L A^{1/(1-\alpha)} \left(\frac{1-\alpha}{\alpha} \right) \alpha^{2/(1-\alpha)} \tag{8}$$

The study now introduces FDI. The costs of production comprise two parts. In each period there are fixed maintenance costs which are equal to 1. Furthermore there are fixed set up costs (R&D costs, η). The costs of Innovation are assumed to be the same for all goods. In addition, assume that the costs of innovations depend on the ratio of goods produced in other countries to those produced domestically. This is the ratio that will represent FDI. A higher ratio of goods produced in other countries, means more FDI, thus reduces the costs of Innovation. This reflects the thought that it is cheaper to copy than to innovate, and the possibility to copy increases if more goods are produced in other countries (i.e. when FDI is higher) (Borensztein *et al*, 1998). The costs of innovation can be modeled as (using FDI = *F*): η = *f(F)*, where ∂η/∂*F* < 0

Taking into account uncertainty with respect to *F*, and assuming that *F* is stochastic, the model will be;

F = μ*(F)*+ε, where μ*(F)* is the mean of FDI and ε is an error term with ε~N(0, ε^2). The certainty equal to the expected value of FDIs:

E(F)= μ*(F)*-0.5Bσ^2*(F)*

Where *B* is the coefficient of absolute risk aversion (*B* is positive for risk-averse innovators) and σ^2*(F))* refers to the variance in FDI inflows.

Considering the certainty equivalent value of FDI, and from the assumption that the rate of return on assets (*r*) is constant and there is free entry, equation (8) can be written as:

$$r = \left(\frac{L}{F\left[U(F) - 0.5B\sigma^2(F)\right]}\right) A^{1/(1-\alpha)} \left(\frac{1-\alpha}{\alpha}\right) \alpha^{2/(1-\alpha)} \tag{9}$$

From equation (9) it can be shown that an increase in FDI leads to an increase in r while an increase in the variance of FDI leads to a decrease in r. To introduce the link to economic growth the study closes the model by considering behavior of households. Households would strive to maximize a standard inter-temporal utility function:

$$U = \int_t^\infty \left(\frac{C^{1-\theta} - 1}{1-\theta}\right) \ell^{-pt} \, dt \tag{10}$$

Where c is consumption and ρ is the discount rate. It can be shown that the optimization process, subject to the budget constraint for households, gives the well-known result for the growth rate of consumption, $gC = (1/\theta)(r - \rho)$, where $-\theta$ is the elasticity of marginal utility. Therefore in a steady state the growth rate of consumption equals the growth rate of output, g. substituting the expression for r from (9), economic growth can be expressed as follows:

$$g = (1-\theta)\left(\left\{\frac{L}{f\left[U(F) - 0.5B\sigma^2(F)\right]}\right\} A^{1/(1-\alpha)} \left(\frac{1-\alpha}{\alpha}\right) \alpha^{2/(1-\alpha)} - P\right) \tag{11}$$

Equation (11) evidently shows that an increase in FDI leads to an increase in the growth rate of output (g). An increase in FDI lowers set-up costs and raises the return on assets (r). Therefore an increase in saving leads to higher growth rate in consumption and output. On the other hand, an increase in the volatility of FDI negatively affects growth as it decreases the certainty equivalent value of FDI and as a result increases set-up costs and decreases the rate of return on invested foreign capital.

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3.2 Model specification

This study adopted EGARCH methodology to model FDI volatility. EGARCH model is an improvement of autoregressive conditional heteroskedasticity (ARCH) model proposed by Engle (1982) and generalized autoregressive conditional heteroskedasticity (GARCH) by Bollersley (1986) and Taylor (1986).

The economic growth rate variable was represented by real GDP growth rates (RGDPGR). The measures of FDI volatility was constructed in two ways as an indication of macroeconomic uncertainty. First volatility measure (FDISD) was obtained by regressing FDIGDP on its one year lagged values, with an intercept and linear time Trend.

$$FDIGDP_t = \beta_0 + \beta_1 FDIGDP_{t-1} + \beta_2 Trend + \mu_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (12)$$

Where μ_t is the error term and from which standard deviation will be calculated.

Secondly volatility measure was generated using exponential generalized autoregressive conditional heteroskedasticity (EGARCH) that is FDIEGARCH. Therefore the model was specified as;

$$FDIGDP_t = \mu + \delta FDIGDP_{t-1} + \varepsilon_t + \phi \varepsilon_{t-1} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (13)$$

Where ε_t has a mean and a conditional variance of zero and δ^2_t respectively, μ is the intercept term, δ and ϕ represent the magnitude of the autoregressive term and moving average terms respectively and;

$$Log\sigma^2_t = \omega + \alpha \left| \frac{\varepsilon t - 1}{\sqrt{\delta t - 1}} \right| + \gamma \frac{\varepsilon t - 1}{\sqrt{\delta t - 1}} + \beta_0 log\delta^2_{t-1} \dots\dots\dots\dots\dots\dots\dots\dots\dots (14)$$

Where δ^2_{t-1} represents conditional variance of ε_t, α, β and γ are the parameters of ARCH, GARCH and leverage parameters respectively. Thus the log transformation of the variance rules out the negative variances. Therefore no restriction is required on the variance equation to ensure a positive volatility process as in the GARCH model. (Lensink &Morrisey, 2003)

Once the study identifies the magnitude of volatility, the study was to establish the effects of FDI volatility on economic growth using ARDL approach to cointegration also known as bounds testing approach. The ARDL has the following advantage; once the order of ARDL has been identified, the estimation can be done by OLS; it does not require a specific identification of the order of the data and it is suitable for small sample size. The ARDL was developed by Pesaran et al. (2001) as an alternative procedure to the standard cointegration analysis. The equation to be estimated was specified as:

$$\Delta GDP_t = \beta_0 + \alpha_1 GDP_{t-1} + \infty_2 FDI_{t-1} + \lambda_3 POP_{t-1} + \gamma_4 OPENNESS_{t-1} + \chi_5 FDIV_{t-1} + \sum_{t=i}^{P} \beta_i \Delta GDP_{t-i} +$$
$$+ \sum_{t=i}^{P} \beta_i \Delta FDI_{t-i} + \sum_{t=i}^{P} \beta_i \Delta POP_{t-i} + \sum_{t=i}^{P} \beta_i \Delta OPENNESS_{t-i} + \sum_{t=i}^{P} \beta_i \Delta FDIV_{t-i} + \varepsilon_{t.}$$

(15)

Where GDP is the gross domestic output, FDI- Foreign direct investment inflow, t -time trend, Δ is difference operator, *FDIVOL*- FDI volatility, ε_t is the error term. p is lag structure to be included to eliminate autocorrelation in ε_t.

3.4 Definition and measurement of variables

Variable	Definition	Measurement	Expected signs
GDP growth rate (GDP_t)	The average annual growth rate of real GDP.	Change in GDP at current prices.	
Foreign direct investment inflow(FDI)	Annual FDI flows from other countries in the world to Kenya.	FDI inflows in millions of US dollars.	positive
Foreign direct investment volatility(FDIV)	Fluctuation of annual FDI inflow.	Measured by taking standard deviation of error from the autoregressive equation of FDI with lagged values over the years.	negative
Trade (openness)	The degree to which Kenya export and imports. It measures the volume of trade between Kenya and the rest of the world.	measured as the ratio of total of exports and imports to GDP	positive
Labour force (POP)	This will measure the level of skills and training of a country's labour force.	This will be captured by a proxy as the ratio of secondary and tertiary institution enrolment in the population.	Positive.

3.5 Data Type and Source

To achieve the objectives of these study secondary annual time series data was used. Data on GDP growth, FDI, Labour force, openness for the year 1970-2011 will be obtained from United Nations Centre for Trade and Development (UNCTAD), world data bank on world development indicators and Kenya National Bureau of Statistics (KNBS)

3.6 Estimation techniques

The study seeks to respond to three objectives. The first objective was to determine the magnitude of FDI volatility in Kenya from 1970-2011, this was achieved by modelling volatility using EGARCH methodology. The second objective which was to establish the effects of FDI volatility on economic growth was achieved by first running unit root test which will test for data stationarity using ADF tests to test for stationarity, then autoregressive distributed lag (ARDL) cointegration test was done to test whether FDI volatility positively or negatively effects economic growth and whether the effects are short run or long run. Objective three which was the policy implications of the findings, was achieved by making appropriate recommendations based on the empirical findings of the study. The model was analyzed using STATA version 12 package.

CHAPTER FOUR

EMPIRICAL ESTIMATION AND RESULTS

4.0 Introduction

This chapter presents the empirical estimation and results of the study. The first section gives the

descriptive statistics and estimation while the next section discusses the results.

4. 1 Descriptive statistics

Analyses of the descriptive statistics enable us to determine whether the data is normally

distributed. The most common measures are mean, median, skeweness and kurtosis. In normally

distributed data, the mean and the median should be equal, for the variables in this study the

mean and the medians of lngdpgr, lnfdi, lntot, and lnpop are almost equal hence normally

distributed. Whereas the mean and the median of ehat2 (FDI volatility) are not the same thus are

not normally distributed. The standard deviation of foreign direct investment (FDI) is given by

1.203536, which will represent FDI volatility in this study. This can be seen in table 4.1 below.

Table 4.1 Summary Statistics

Variables	Mean	Median	Standard Deviation	Max	Min
lngdpgr	1.158595	1.481605	.8662637	-1.609438	2.217027
lnfdi	17.18966	17.18281	1.203536	14.50866	20.40718
lntot	-.6398196	-.6122882	.2602134	-1.091721	-.0482069
lnpop	-3.65507	-3.640854	.3209816	-4.439301	-3.012428
ehat2	1.417793	.5430126	2.169245	.0006784	10.79462

Skewedness is the tilt in the distribution and should be within the -2 and +2 range for normally distributed series. In a positively skewed distribution the mean is typically higher than the median, whereas in negatively skewed distribution the mean is lower than the median. Skewedness for a normal distribution is zero. In this study the variable lngdpgr and ehat2 are normally distributed since their skeweness are close to zero, while lnfdi, lntot and lnpop are within the above stated range thus also normally distributed. Kurtosis on the other hand is the peakedness of a distribution and should be within -3 and +3 range when the data is normally distributed. It is a measure of whether the distribution is peaked or flat relative to normal distribution. Data set with high kurtosis have distinct peak around the mean and have heavy tails. Data set with low kurtosis tend to have a flat top near the mean rather than a sharp peak. Kurtosis is also a measure of how outlier-prone a distribution is. For a normal distribution Kurtosis should be equal to 3 and outlier prone Distributions have kurtosis less than 3. None of the variable has a kurtosis of 3 meaning that the data is not normally distributed.

Table 4.2 Skewness/Kurtosis tests for Normality

variable	Pr(skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
lngdpgr	0.0002	0.0249	14.51	0.0007
lnfdi	0.4707	0.4354	1.19	0.5523
lntot	0.9170	0.4477	0.61	0.7384
lnpop	0.2654	0.2700	2.62	0.2697
ehat2	0.0000	0.0000	30.52	0.0000

The Jarque-Bera (JB) statistics test on the other hand is used to test for normality of the series. It utilizes the mean based coefficients of skewness and kurtosis to check normality of variables used. It measures the difference of the skewness and kurtosis of a series from those of a normal distribution. The null hypothesis (H_0) is that residuals are normally distributed, therefore reject H_0 if $JB > \chi 2$ (2) or if $p < 0.05$.

4.2 The magnitude of FDI volatility

The magnitude of FDI was determined by the standard deviation of Foreign Direct Invest volatility in this case the standard deviation of lnfdi. Therefore the magnitude is 1.204 as indicated in table 4.1. Secondly volatility measure was generated using exponential generalized autoregressive conditional heteroskedasticity (EGARCH) that is FDIEGARCH. Therefore the model was specified as;

$$FDIGDP_t = \mu + \delta FDIGDP_{t-1} + \varepsilon_t + \varepsilon_{t-1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (13)$$

Where ε_t has a mean and a conditional variance of zero and δ^2_t respectively, μ is the intercept term, δ and γ represent the magnitude of the autoregressive term and moving average terms respectively and;

$$Log\sigma^2_t = \omega + \alpha \left| \frac{\varepsilon t - 1}{\sqrt{\delta t} - 1} \right| + \gamma \frac{\varepsilon t - 1}{\sqrt{\delta t} - 1} + \beta_0 log\delta^2_{t-1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (14)$$

Where δ^2_{t-1} represents conditional variance of ε_t, α, β and γ are the parameters of ARCH, GARCH and leverage parameters respectively.

Since $\text{Log}\sigma^2_t$ is modelled, then the significant advantage of EGARCH modelled is that even if the parameters are negative, $\sigma^2 t$ will be positive. The α parameter represents a magnitude effect or the symmetric effect of the model. β Measures the persistence in conditional volatility irrespective of what is happening in the market. When β is relatively large, then volatility takes a long time to clear out following a crisis in the market (Alexander, 2009). The parameter γ measures the leverage effect, its important in testing asymmetries in the model. If $\gamma < 0$, then positive shocks (good news) generate less volatility than negative shocks (bad news). When $\gamma > 0$, then positive innovation generate more destabilizing effects than the negative news. And if $\gamma = 0$, then the model is symmetric.

Table 4.3 ARCH family regression

lnfdi	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
lnfdi cons	17.12167	.2333147	73.38	0.000	16.66438	17.57896
egarch	-.5215932	2.635906	-0.20	0.843	-5.687873	4.644687
arch	.2094297	.1739045	1.20	0.228	-.1314168	.5502762
garch	.1297414	.8318228	0.16	0.876	-1.500601	1.760084
cons	-.0464819	.6240079	-0.07	0.941	-1.269515	1.176551

From the above results the coefficients 0.2094297, 0.1297414, -0.5215932 are the arch, garch, and the egarch parameters respectively. Thus the estimated equation will be given by;

$$\text{Log}\sigma^2{}_t = -0.046 + 0.209 \left| \frac{\varepsilon t - 1}{\sqrt{\delta t - 1}} \right| + -0.522 \frac{\varepsilon t - 1}{\sqrt{\delta t - 1}} + 0.1297\text{log}\delta^2{}_{t-1} \ldots\ldots\ldots\ldots\ldots \text{ (14)}$$

The $\alpha = 0.209$ parameter represents a magnitude effect or the symmetric effect of the model. $\beta = 0.1297$ Measures the persistence in conditional volatility and it is relatively large, then volatility takes a long time to clear out following a crisis in the market. Since it is relatively small, it implies that conditional volatility does not take a long time to clear. Therefore FDI volatility does not take a long time to clear, because it is not ease to rectify the problem once established). The parameter $\gamma = -0.522$ measures the leverage effect, and since its $\gamma < 0$, it implies that positive shocks generate less volatility than negative shocks

4.3 Unit root test results

In order to investigate the stationary properties of the time series, the presence of unit root was tested. That is, whether the variables are integrated of order 1, I (1), implying that they are stationary. This was achieved by applying augment Dickey-Fuller (ADF) test. The null hypothesis of the unit root implies non-stationarity, such that if the null hypothesis is rejected then the series is stationary. Therefore no differencing in the series is necessary to induce stationarity. The ADF test is widely used due to the stability of its critical values as well as its power over different sampling experiments. Unit root test results at levels are reported in table 4.4 below.

Table 4.4 Unit root test: levels

Variable	ADF		1%	5%	10%	Remarks
Lngdpgr	No trend	-4.142	-3.655	-2.961	-2.613	Stationary
	With trend	-4.219	-4.251	-3.544	-3.206	Stationary
Lnfdi	No trend	-2.384	-3.668	-2.966	-2.616	non stationary
	With trend	-2.772	-4.270	-3.552	-3.211	non stationary
Lntot	No trend	-1.759	-3.648	-2.958	-2.612	non stationary
	With trend	-2.675	-4.242	-3.540	-3.204	non stationary
Lnpop	No trend	-1.503	-3.648	-2.958	-2.612	non stationary
	With trend	-2.568	-4.242	-3.540	-3.204	non stationary
ehat2	No trend	-4.504	-3.655	-2.961	-2.613	Stationary
	With trend	-5.159	-4.251	-3.544	-3.206	Stationary

From the above results lngdpgr and ehat2 are stationary at levels, while lnfdi, lntot and lnpop are not stationary at levels. Therefore we test their stationarity at first difference. The unit root test results for the first difference are reported in table 4.5 below

Table 4.5 Unit root test: First difference.

Variable	ADF		1%	5%	10%	Remarks
Lnfdi	no trend	-4.537	-3.696	-2.978	-2.620	stationary
	with trend	-4.490	-4.306	-3.568	-3.221	stationary
Lntot	no trend	-5.933	-3.648	-2.958	-2.612	stationary
	with trend	-.6.998	-4.242	-3.540	-3.204	stationary
Lnpop	no trend	-7.482	-3.648	-2.958	-2.612	stationary
	with trend	-7.409	-4.242	-3.540	-3.204	stationary

After the first difference the entire variable i.e. lnfdi, lntot and lnpop are stationary.

4.4 Cointegration test results.

After establishing the order of integration of time series, cointegration test has to be done. Cointegration techniques are used to establish valid long-run relationship between variables. The Autoregressive Distributed Lag Bound test for cointegration was adopted in this study. Before conducting the bounds test, the order of integration for each variable was ascertained by Augmented Dickey-Fuller (ADF), as shown above. This was to ensure that the variables are not I (2) stationary, to avoid spurious results because the bounds test is based on the assumption that the variables are I (0) or I (1). The results indicate from table 4.3 and 4.4 that all our variables are either I (0) or I (1). Since we have established that the order of integration of the variables is zero or one, the ARDL bound test methodology can be applied in our model.

To implement the bound test procedure, Equation (15) is modelled as a conditional ARDL- error correction model (ECM):

$$\Delta GDP_t = \beta_0 + \alpha_1 GDP_{t-1} + \infty_2 FDI_{t-1} + \lambda_3 POP_{t-1} + \gamma_4 OPENNESS_{t-1} + \chi_5 FDIV_{t-1} + \sum_{t=i}^{P} \beta_i \Delta GDP_{t-i} +$$

$$+ \sum_{t=i}^{P} \beta_i \Delta FDI_{t-i} + \sum_{t=i}^{P} \beta_i \Delta POP_{t-i} + \sum_{t=i}^{P} \beta_i \Delta OPENNESS_{t-i} + \sum_{t=i}^{P} \beta_i \Delta FDIV_{t-i} + \varepsilon_t.$$

Where β_0 is a drift component and ε_t is white noise. The first step in the ARDL approach is to estimate Equation (15) using ordinary least square (OLS). The second step is to trace the presence of cointegration by restricting all estimated coefficients of lagged level variables equal to zero. That is, the null hypothesis of no cointegration (H0: $\alpha_1=\infty_2=\lambda_3=\gamma_4=\chi_5=0$) is tested against the alternative (H0: $\alpha_1\neq\infty_2\neq\lambda_3\neq\gamma_4\neq\chi_5\neq0$) by the mean of F-test with an asymptotic non-standard distribution. Two asymptotic critical value bounds provide a test for cointegration when the independent variables are $I(d)$ with $0 < d < 1$. The lower bound assumes that all the variables are I (0), and the upper bound assumes that they are I (1). If the computed F-statistics lies above the upper level of the bound, the null is rejected, indicating cointegration. If the computed F-statistics lies below the lower level bound, the null cannot be rejected, supporting the absence of cointegration. If the statistics fall within the band, inference would be inconclusive. After confirmation of the existence of a long run relationship between the variables in the model, the long run and short run models can be derived using information criteria such as the Schwartz Bayesian or the Akaike information criteria.

The ARDL approach to cointegration does not require the pre-testing of the variables, included in the model, for unit root unlike other techniques such as the Johansen approach (Pesaran *et al.*, 2001). However, as remarked by Ouattara (2004), if the order of integration of any of the variables is greater than one, for example a I(2) variable, then the critical bounds provided by Pesaran *et al*. (2001) are not valid. They are computed on the basis that the variables are I(0) or I(1). Therefore, it is necessary to test for unit root to ensure that all the variables satisfy the underlying assumption of the ARDL methodology before proceeding to the estimation stage. This has been established by the unit root test conducted earlier, which shows that the variables are integrated of order one I(1) and zero I(0). Therefore ARDL methodology is applied.

4.5 Estimation results

4.5.1 Long run relationship

Equation (15) is estimated for Kenya using annual data covering the period of 1970- 2011. Before testing the existence of a long run relationship among our variables it is important to decide the order of the lag of the ARDL. Results based on information criteria (Akaike, Schwartz and Bayesian) suggest that the process is an AR (1).

Table 4.6 reports results of the bound test for the existence of a long run relationship. The F-statistics is above the 5 per cent critical bounds computed by Pesaran *et al*. (2001), thus implying that the null hypothesis of no cointegration can be rejected. Put differently, there exists a long relationship among the variables of our model.

Table 4.6: Bounds Tests for the Existence of Cointegration

F-statistics	5% Critical values	
	I (0)	I (1)
4.902	2.476	3.646

Table 4.7 shows results of the long run estimate based on the Schwartz Bayesian criteria. The selected ARDL (0, 1, 1, 1, and 0) passes the standard diagnostic tests. The results show that foreign direct investment affects positively (0.144) but insignificantly, the real GDP growth rate. This implies that FDI flows to Kenya have a positive stimulating effect on economic growth, though not statistically significant. The estimate of the human capital variable, proxied by secondary school and tertiary institution enrolment, bears a positive sign (1.786) but statistically insignificant. This confirms the predictions of the endogenous growth theory on the importance of human capital for economic growth as proposed by Borensztien et al (1998). Finally, trade openness, measured as the sum of exports and imports as a ratio of GDP, have the estimated coefficient of negative (-0.05) and statistically insignificant. Therefore it does not have a significant effect on real GDP growth rate. Whereas foreign direct investment volatility (ehat2) have an estimated coefficient of negative (-0.026), which is statistically insignificant. Therefore foreign direct investment volatility has negative impact on economic growth.

Table 4.7: Estimates of the Long Run Coefficients- ARDL (0, 1, 1, 1, 0)

Dependent variable: real GDP growth rate.

Variables	Coefficients	t-ratios	p-values
constant	0.743	2.69	0.012
Llngdpgr	0.313	1.74	0.094
LD1lnfdi	0.144	-1.09	0.285
D1lntot	-1.311	-0.68	0.501
D1lnpop	2.24	1.64	0.112
ehat2	-0.026	-0.36	0.718

4.5.2 Short run Dynamics

The fact that the variables in our model are cointegrated provides support for the use of an error correction model mechanism (ECM) representation in order to investigate the short run dynamics. Estimation results, still based on the Schwartz Bayesian information criteria, are presented in Table 4.8. The R^2 is 0.38 suggesting that such error correction model fits the data reasonably well. More importantly, the error correction coefficient has the expected negative sign (-0.938) and is highly significant. The negative parameter of the error correction term helps strengthen the finding of a long run equilibrium relationship among the variables in the model.

Table 4.8: Estimates of the Error Correction Model

Variables	Coefficients	t-ratios	p-values
constant	-0.0115	-0.03	0.977
lngdpgr	1.007	3.09	0.005
lnfdi	0.133	-1.08	0.289
lntot	-1.593	-0.88	0.385
lnpop	1.786	1.28	0.212
ehat2	-0.018	-0.27	0.790
ECM (-1)	-0.936	-2.52	0.018

The results in Table 4.8 suggest that foreign direct investment has a positive and statistically insignificant effect on the real GDP growth rate. The impact of trade openness is negative and statistically insignificant, therefore does not have a significant impact on growth. Labour force appears to have positive but statistically insignificant impact on growth, in the short run. The size of the coefficient of the error correction term (-0.936) suggests a relatively higher speed of adjustment from the short run deviation to the long run equilibrium. This implies that, 94 per cent of the deviation from long run growth is corrected every year.

4.6 Post-Estimation Diagnostics

4.6.1 Breusch-Godfrey Test for Autocorrelation

This test was adopted to test for serial correlation because it is applicable in both situations where lagged dependent variable is included, unlike Durbin Watson which is used to test for first order serial correlation. The null hypothesis of no serial correlation is tested against the alternative of autocorrelation presence and you reject null if P value is less than or equal to 0.05. From the table the P-value is 0.432 which is less than 0.05 and therefore we do not reject the null hypothesis of no serial correlation meaning the residuals of the model adopted for the study has no problem of autocorrelation.

4.6.2 Breusch —Pagan/Cook-Weisberg Test Results for Heteroscedasticity

Heteroscedasticity is a situation of unequal or non stationary variance and its presence renders the usual t-test and F-test invalid. The null hypothesis of constant variance is tested against the alternative of no constant variance and the null hypothesis is rejected if the P value is less than or equal to 0.05 and from the table the P value is 0.0108 meaning that we do not reject the null hypothesis. Since 0.0108 is less than 0.05.

4.6.3 Ramsey RESET test

The study adopted Ramsey RESET test as the regression specification error test which is a general test for two main types of misspecifications namely inclusion of irrelevant variables as well as exclusion of relevant variables in the regression model. The null hypothesis of the model has no specification errors i.e. the equation is correctly specified is tested against the alternative hypothesis of the model has specification errors omitted and you reject the null if p value is less

than or equal to 0.05. From the table above P-value is 0.3964 which is greater than 0.05 and therefore we do not reject the null hypothesis meaning that the model that was adopted by the study had no omitted variables.

4.7 Discussion of the Results.

The residuals ECM (-1) was generated and tested for Stationarity at levels and turned out to be stationary and therefore said to be cointegrated. The value of R^2 is 0.3787 implying that approximately 37.87% of all the changes in the dependent variable are brought about by the changes in the explanatory variables (the explanatory power is about 37.87%). The value of Durbin Watson test is 1.72139 which can be approximated to 2 meaning that there is no problem of serial correlation of the residuals.

From the results presented in table 4.8 the coefficient of the error term ECM (-l) is negative and significant and this confirms the expected results from economic theory. The ECM (l) coefficient of -0.936 is interpreted as speed of adjustment to the long run equilibrium. Therefore, this implies that approximately 94% of all the deviations in the past will be corrected (adjusted to the equilibrium) during the present period. The high value of the error term indicates that the economic agents remove a large percentage of disequilibrium in each period.

The coefficient of foreign direct investment was positive but statistically insignificant; both in the long run and short run, thus confirming our a priori expectation of the study. This means foreign direct investment is a crucial determinant of growth in GDP in Kenya. The coefficient of 0.133 indicates that a 1% increase in foreign direct investment will lead to an increase in real

GDP growth rate by approximately 0.133% holding all other factors constant in the short run. These findings were in agreement with the findings of a study by Lensink and Morrissey (2002). Therefore foreign direct investment should be attracted as it is a critical ingredient for stimulating investment and economic growth.

The coefficient of labour force is positive but statistically insignificant both in the long run and short run, implying that labour force does not have any significant impact on real GDP growth rate for the period under study. These finding was in agreement Borensztein et al (1998) who argued that an educated labor force (human capital) is necessary for absorption of new technology and management skills.

The coefficient for trade openness was negative both in the short run and long run, against the a priori expectation of the study of positive however it was not significant at any level meaning that trade openness does not have any impact and therefore could not explain real GDP growth rate in Kenya during the study period. This scenario could have been brought about by trade imbalance, in that there are more imports than exports in Kenya.

The coefficient of foreign direct investment volatility was negative but statistically insignificant both in the short run and in the long run, thus confirming our a priori expectation of the study. Under the theoretical framework volatility increases the cost of innovation; therefore have negative effects on growth. This conforms to the findings of other studies (Alpasla 2011, chee-Keong & Liew 2011, Dausa, 2007, Lensink & Morrisey 2002). The coefficient of -0.018 in the short run indicates that a 1% increase in foreign direct investment volatility will lead to decrease in real GDP growth rate by approximately 0.018% holding all other factors constant. These

findings were in agreement with the findings of a study by Lensink and Morrissey (2002). Therefore foreign direct investment volatility has a negative effect on growth though not significant.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter deals with summary of the findings, conclusions, policy implication and recommendation, limitation of the study and recommendation for further study.

5.2 Summary of the Study

The purpose of the study was to establish the effect of FDI volatility on economic growth in Kenya. Real GDP growth rates were used as the dependent variable while foreign direct investment, foreign direct investment volatility, trade openness and labour force were used as the independent variables. The descriptive analysis indicates that all series are normally distributed. The ADF test was used to check for unit root. The ADF test revealed that foreign direct investment and foreign direct investment volatility were stationary at levels, while foreign direct investment, trade openness and labour force were stationary at first differences. The SBIC information criterion was used to identify the optimal lags of various series. The ARDL bound test for cointegration was used to establish the long run relationship of the variables. The results show that the variables have a long run relationship.

An error correction model (ECM) was used to estimate the empirical model. The findings show that foreign direct investment and labour force have a positive impact on economic growth though not statistically significant. While foreign direct investment volatility and trade openness have a negative impact on growth. The variables were statistically insignificant and had the expected signs except for trade openness. Post-estimation results explain that the choice of model

was accurate. The Ramsey RESET test shows that the model was correctly specified. The Breusch-Godfrey test shows there is no serial correlation in the variables. The Durbin Watson test also indicates absence of serial correlation. There is no problem of heteroskedasticity as revealed by Breusch-Pagan test results.

5.3 Conclusion

This study has investigated the impact of foreign direct investment volatility on economic growth in Kenya over the period of 1970-2011, using endogenous growth model borrowed from Barro and Sala-i-Martin. (1995) and following Borensztein *et al* (1998), and the bounds approach to cointegration developed by Pesaran *et al*. (2001). A number of findings were presented in this study. Firstly, the econometric evidence suggested that the variables included in the underlying model are bound together in the long run. Secondly, results based on the long run and short run estimates showed that foreign direct investment and labour force (POP) have a positive and statistically insignificant effect on GDP growth rate. While, foreign direct investment volatility and trade openness had a negative and statistically insignificant effect on economic growth. Thirdly, the error correction estimates (short run) indicated that changes in foreign direct investment and labour force have a positive and statistically insignificant effect on the GDP growth rate while the other variables in the model appear to have an insignificant impact.

Therefore, this study contributes to literature by not only establishing the effects of foreign direct investment on economic growth, but also by incorporating the effects of foreign direct investment volatility on economic growth. Since foreign direct investment has a positive effect

on growth but statistically insignificant. It confirms the findings of Lensink and Morrissey (2003), which they argued that foreign direct investment has a positive effect on growth, though it is weaker for developing countries. While foreign direct investment volatility has a negative effect on growth, though not significant.

5.4 Policy implication and recommendation

What are the policy implications of these results for Kenya? First the government will have to continue to attract FDI given its role in the growth process and the government should continue to promote private investments. Given the complementarity between private domestic investment and FDI, in terms of promoting growth, joint ventures should be encouraged. Foreign Direct Investment should be encouraged in sectors with potential competitive advantages and where complementarity with domestic investments is likely to be high. Also, the government will have to promote effectively the development of technological and human capital capabilities in order to attract FDIs in higher-value added activities, as well as to ensure Kenya can assimilate these technologies effectively. Also FDI volatility may capture the growth retarding effects of the unobserved variables. As a result economies with high economic uncertainty tend to have variable economic growth rates and may not attract foreign investors. The uncertainty associated with FDI reduces the expected return on investment, therefore reduces growth.

5.5 Limitation of the study

In this study we limited our study to a regression analysis of the effect of FDI volatility on growth, and it can be argued that given its negative impact of FDI on economic growth, Kenya should ensure it remains an attractive spot for foreign investors. However more in depth analysis

of the process in which small amounts of FDI inflows have succeeded in promoting growth would help in understanding the condition for effective FDI in Kenya and help in building effective investment promotion policies. In considering FDI volatility it may be useful to look at the country's share of FDI in global flows. The data used in the study did not address this issue.

5.6 Areas of further study.

Further research could be done to investigate empirically the effects of FDI on capital accumulation, and the role played by export orientation strategies in allowing effective FDI inflows in Kenya.

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Appendix 1: Real GDP growth rate and FDI inflows (in million US Dollars)

Year	Real GDP growth rate	FDI inflows (million US Dollars)	Year	Real GDP growth rate	FDI inflows (million US Dollars)
1970	-5.07	14	1991	1.41	19
1971	6.5	7	1992	-0.79	6
1972	5.03	6	1993	0.36	2
1973	5.2	17	1994	2.63	4
1974	4.9	23	1995	4.41	33
1975	-0.37	17	1996	4.14	11
1976	4.03	46	1997	0.27	53
1977	9.18	57	1998	3.36	11
1978	8.99	34	1999	2.1	14
1979	3.76	84	2000	0.5	111
1980	5.59	79	2001	4.47	5
1981	3.76	14	2002	0.57	28
1982	3.69	13	2003	2.91	82
1983	1.37	24	2004	5.1	46
1984	1.77	11	2005	5.91	21
1985	4.27	29	2006	6.32	51
1986	7.17	33	2007	7.05	729
1987	5.92	39	2008	1.48	96
1988	6.2	0	2009	2.64	116
1989	4.7	62	2010	5.55	178
1990	4.21	57	2011	4.38	335