

**DETERMINANTS OF FOREIGN DIRECT INVESTMENT IN SUB-SAHARAN AFRICAN
COUNTRIES; CHALLENGES AND PROSPECTS
USING PANEL DATA**

By

Ambaye Adugna Ameha

THESIS

Submitted to
KDI School of Public Policy and Management
In partial fulfillment of the requirements
For the degree of

MASTER OF DEVELOPMENT POLICY

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Professor Chrysostomos TABAKIS, Supervisor



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Approval as of August, 2016

ABSTRACT

DETERMINANTS OF FOREIGN DIRECT INVESTMENT IN SUB-SAHARAN AFRICAN COUNTRIES;CHALLENGES AND PROSPECTS USING PANEL DATA

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The main objective of this thesis is to examine factors that determine FDI inflows to go or not to go in to Sub-Saharan Africa countries. Forty four Sub-Saharan African countries were sampled over the period of 1990 up to 2013. A balanced panel data analysis employed and estimated via pool ordinary least square (OLS), random effects (RE) and Fixed effect (FE). Among the three model based on husman test and an F-test fixed effect (FE) was found the appropriate model. To determine factors that affect FDI inflow, I used Trade openness, Natural Resource, Inflation, FDI lag, Return on investment, Corruption, Urban Population, Infrastructure, and Contract Enforcement as explanatory variables. The finding show that ;Trade openness, Natural Resources, FDI_1, Return on Investment (ROI), Urban Population, and Corruption are the most important determinants of FDI inflow at less than 5% level of significance . Whereas Infrastructure and Contract Enforcement, not statistically significance in determine FDI, but their sign of coefficient is as anticipated.

Key words: Determinants of FDI, FDI Inflow, fixed effect (FE), Panel data, Sub-Saharan Africa Countries.

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ACKNOWLEDGMENTS

Above all, May the Almighty God with his mother Saint Marry who made my dream to be praised forever.

Next, I would like to extend my sincere gratitude to my Advisors Professor Tabakis, Chrysostomos and Professor Wang, Shun for their enthusiasm, support and much friendly approach and genuine advising by providing guidance, frequent follow up, valuable comments, and constructive suggestions of this thesis from its inception up to completion.

I also would like to send my appreciation to the Staffs of KDI school public Policy for their unreserved effort in providing the necessary information. I am very much indebted to Biniyam Kahsay for his unlimited support and valuable comments. I also would like to specially thank my beloved friend Mekdes Endale and my fellow and friends, Araya Mebrahtu, Semere Ameha, and Ajibola Soara, with whom I have enjoyed unforgettable friendships and have impressive roles in my thesis.

Finally, I would like to express my respectful gratitude to my family members, for their moral and financial support essential for my thesis work.

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Chapter One

1 INTRODUCTION

1.1Background of the study

These days, sustainable economic growth is highly determined by the national saving which in turn leads to investment. Nevertheless, national income and domestic savings level of countries in Sub- Saharan Africa is very low and their capacity to invest is limited unless it is supported by other external source. There are two main sources of external capital to narrow the gap between national saving and investment. Those are FDI and foreign loan. In this thesis, I am going to focus mainly on Foreign Direct Investment (FDI). FDI is one of the means that brings capital from outside to fill the gap between savings and the required capital thereby to promote growth and development. (Asiedu 2002).

Over the past two decades foreign direct investments have been one of the core features of globalization that strengthen the interaction between states, firms and regions. The continuous inflow FDI to the developing countries is expected to bring positive contribute to the economic development and to further growth opportunities to the host country such as transferring technological and knowledge, reducing unemployment rate, increase managerial skills, increase productivity and therefore accelerate development and growth (Sufian and Moise 2010).

Due to the bad image of Africa such as civil war, deadly disease, instability, starvation, political and economic instability African's was unfavorable place for foreign direct

investment (UNCTAD, 2009). Despite some African countries are at stable political and economic growth, many of the multinational enterprise believe that Africa as a whole continent is not good place for investment. Thus Africa has been troubling in attracting of FDI inwards and lags behind compared with other region of the world.

1.2. Statement of the Problem

The share of Africa's in the global FDI inflow in 1970 was 9.5% (US \$ 1.3 billion total foreign investment) and declined to 4.4% (US \$ 52.6 billion total investment) in 2009and further declined to 3.9 % (57 billion total foreign investment) in 2013. On the other side Asian percentage share FDI inflow in the world during the same period of time was 6.4% (0.9 billion total investment inflow) ; increase to 26.2% (US \$ 315.3 billion total investment); and 29.4% (US \$ 426 billion total investment) (UNCTAD 2012,2014). Though, it can be argued that the inflow of FDI increased from US \$ 1.3 billion total foreign investment in 1970 to US \$ 52.6 billion total investment in 2009 and further increased to US \$ 57 billion in 2013. However, Africa's share of the world FDI inflow was dropped from 9.5 % in 1970 to 4.4% in 2009 and further declined to 3.9% in 2013. On the other side Asian's share of world FDI inflow during the same period was sharply increasing from 6.4% to 26.2% and further increased to 29.4%. In this thesis, I would therefore like to examine why SSA share of global FDI inflow declining and low compared with other region. Identifying the determinant of foreign direct investment in Sub- Saharan Africa is the main key step to know factors that cause for the poor performance in attracting Foreign Direct Investment in Sub- Saharan Africa.

1.3 Objectives of the Study

The Ultimate objective of this paper is to identify why Sub- Saharan Africa relatively poor in attracting FDI and the causes that affect FDI to go or not to go to the Sub-Saharan Africa using panel data methods on sample of 46 countries. Also, the outcome of the study can be used as input for policy makers in Sub- Saharan Africa countries, for students and teachers who may wish to do research in the future on this topic.

1.4 Research questions

What are the main determinants of FDI inflows in Sub-Saharan Africa?

1.5 Delimitations

The study of this thesis covers from 1990 up to 2013. Due to limited availability, data countries are selected based on data they have.

1.6 Contents of the thesis

This thesis report is divided into six sections; Section one discuss the introduction, statement of the problem, objective of the study, research question, delimitations. Section two provides FDI inflow and trends. Section three discusses recent empirical literature review and Section four Data and Methodology. Section five deals with results and discussions, and the last section provide conclusion and recommendation based on the research findings.

Chapter Two

2 FDI inflow and Trends

Over the past two decades the global FDI has shown a rapid increase. In 1980, global inward FDI was US\$54.1 billion. However, after 1990 the global inward FDI sharply increased to US\$208 billion and reached a peak of US\$1.415 trillion in 2000. Nevertheless, in 2003 global FDI flow declined to US\$565.7 billion before raised again to US\$2.1 trillion in 2007. UNCTAD estimates for 2010 the inward FDI declined to US\$1.422 trillion due to global financial crisis in 2008-2009. In 2011, the global FDI short lived recovery to US\$1.700 trillion before shirked by 22 % in 2012, to US\$1.330. However, from 2012 slump, global inward FDI steadily rose by 9 % in 2013, to \$1.452 trillion.

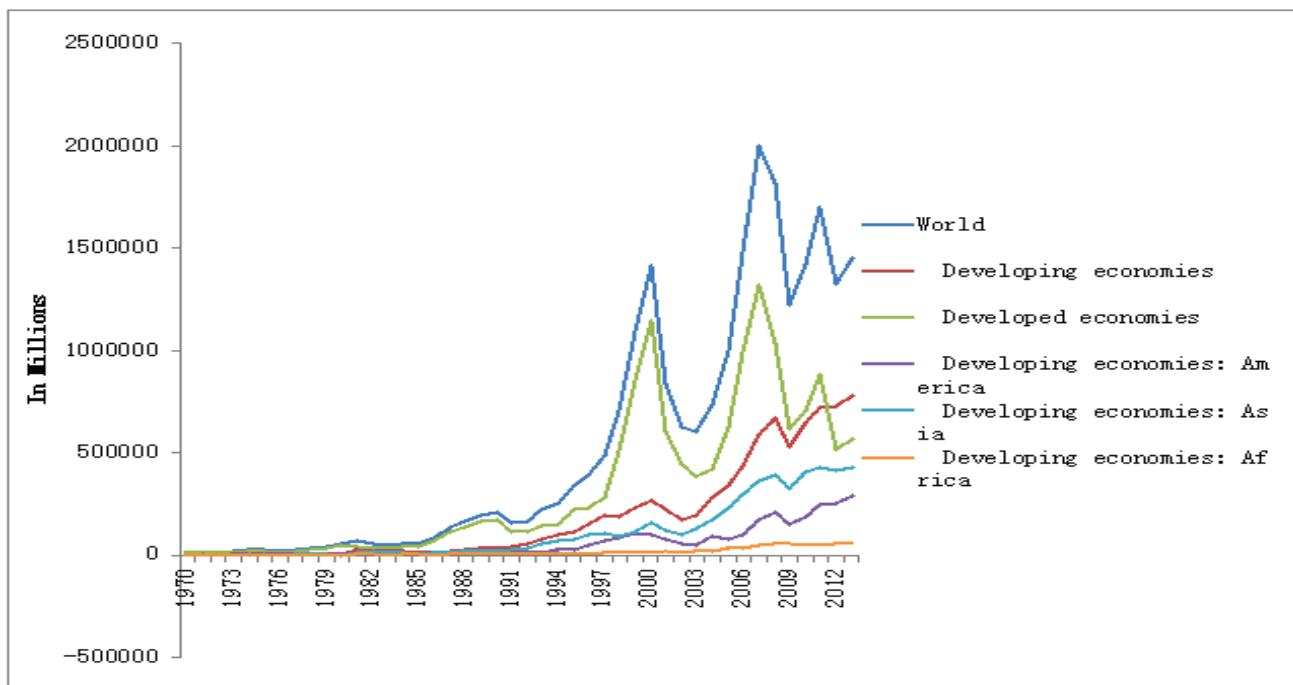


Figure 2.1 share of FDI inflow by region 1 form 1970-2013 (in Millions dollar)

Source: UNCTAD

On the other side, Africa's FDI inflow has been increased from US\$ 400 million in 1980 to US\$ 2.8 billion. Though from the period 2000 up to 2007 FDI inflows to Africa steadily increased before it falls by 19% from a peak of US\$72 billion to \$59 billion in 2008 and 2009 respectively due to the financial crises. Moreover, the inflow of FDI further declined to US\$47 billion in 2010. From 2011 there was a gradual recovery as FDI inflows to Africa increased from US\$55 billion in 2012 to US\$57 billion in 2013 grew by 3.6%. However Africa's percentage of global FDI inflow was sharply declined from 9.5 in 1970 to 1.10 % in 1999. By 2009 it registered 4.59% before declined to 3.94% in 2013. On the other hand Asia's percentage of global inflow has shown very significant and dramatic change from 6.4% in 1970 to 10.56% in 1999 and further increased to 29.36% recently in 2013.

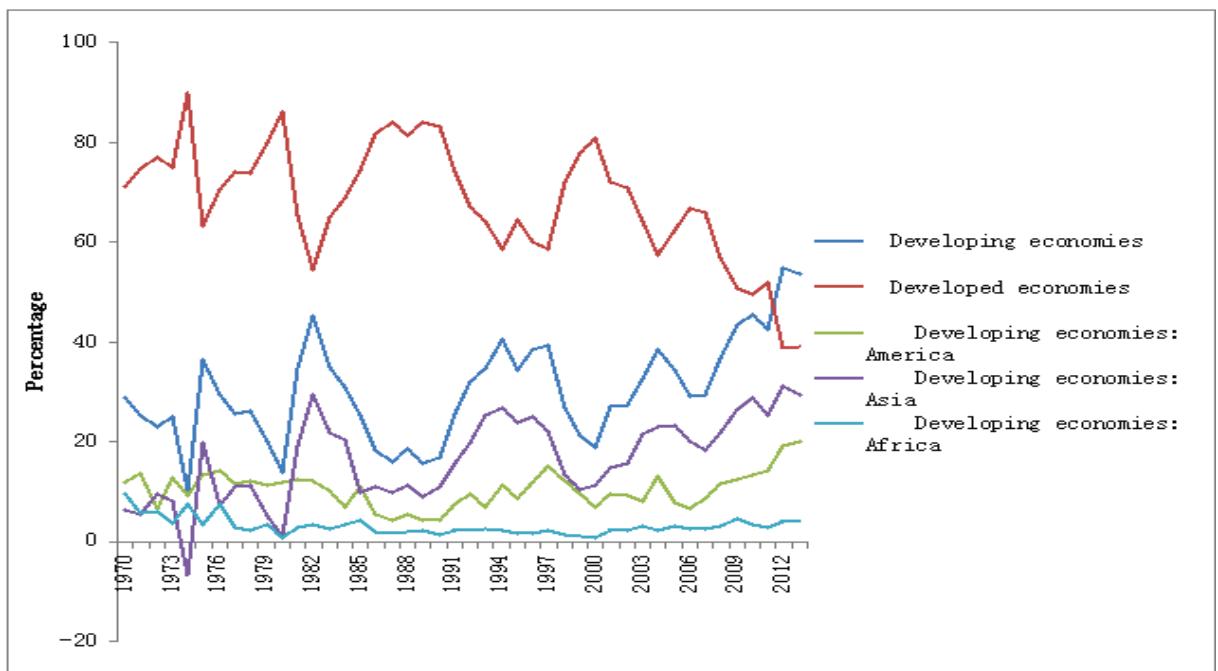


Figure 2.2 Global inflow of FDI by regions from 1970 - 2013 (in Percentages)

Source: UNCTAD

FDI refers to investment made by investors in one country by acquiring 10 percent and above ownership stock in another country and have direct and significant control over the management of the companies. Krugman (n.d). Under foreign direct investment there are three main motives for companies to invest across national border (UNCTAD, 1998)

Market-Seeking FDI is where investors access new market and produced goods and service domestically to serve the local market. Market-Seeking FDI is driven by market growth, per capital income, market size, access to regional and global market, market structure.

Asset - Seeking FDI (resource seeking) states that investors set their companies where a resource is available. The purpose of asset -seeking FDI is to access, extract natural resource, raw material, low cost of unskilled labor and physical infrastructure in the host country which is not available in home country.

Efficiency-Seeking FDI is motivated by creating new source of competitiveness for firms and it goes where the productivity of labor resource, costs of inputs are lower. For instance, countries like Bangladesh and Vietnam has cheaper input of production for light manufacturing such as textile hence, FDI prefers establishment in such market if it is efficiency -seeking FDI to get competitive edge in the global market and maximize profit.

Arango (2008) made important contribution to the theory of FDI when they introduced the concept active policy and passive policy to attract foreign direct investment.

Active policy refers to when the government design good institutional frame work policy to attract vast foreign investors such as market regulation, corporate tax rate, good infrastructure, trade liberalization, and property right.

Passive policy refers to when countries take the advantage of comparative advantage to attract foreign direct investment such as existent of natural resource, market size, low cost of labor.

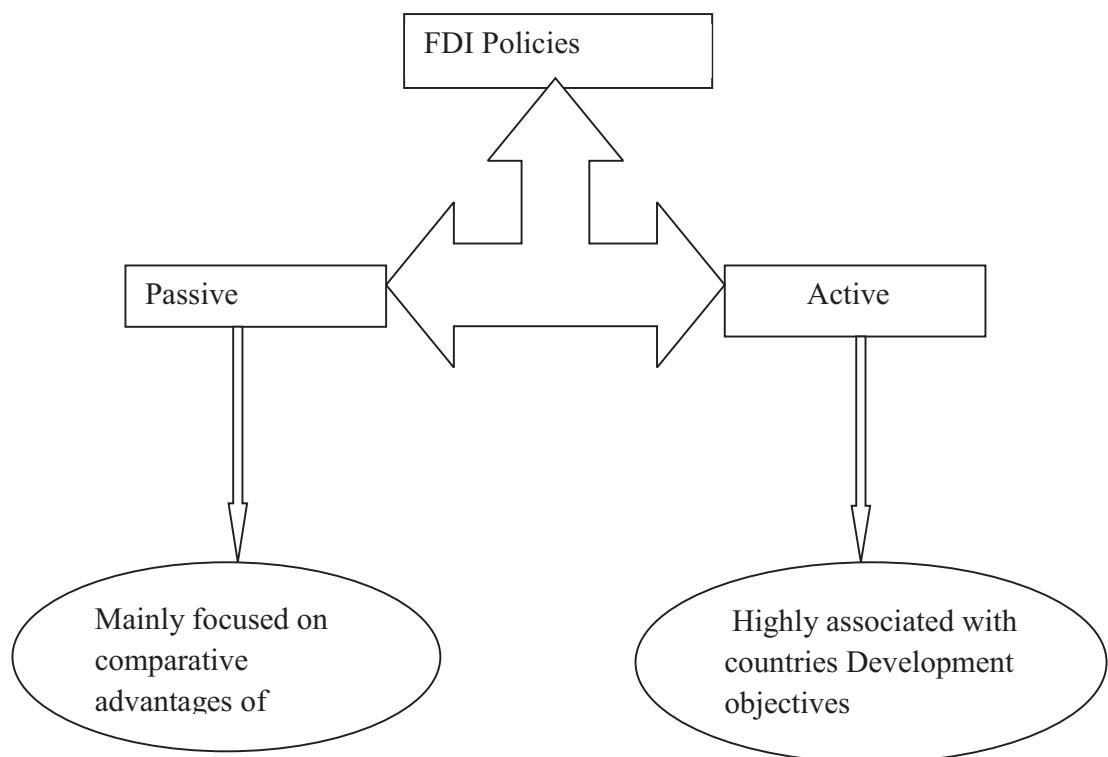


Figure 2.3, FDI policies, source: Arango (2008) and author

Chapter Three

3 Literature Review

The review of empirical literature deals with factors that promote or hinder FDI in Africa, particularly in Sub-Saharan Africa (SSA), based on recent articles. Key factors as shown below and results revolved around multiple factors.

Study by Asiedu (2002) examines the determinants of FDI in developing countries using cross-sectional data analysis on 32 Sub-Saharan African countries and 39 non Sub-Saharan African countries. The main purpose of the study was to identify if the determinant of FDI in SSA is different from non-SSA countries. The result showed that higher return on investment and good infrastructure not statistically significant on attracting FDI inflow to SSA, whereas for Non SSA have positive and statistically significant; Openness to trade have positive impact on attracting FDI in both countries. However, the extra openness of trade is less beneficial for SSA. The paper also finds that policy adapted in other region cannot be effective in Africa. The study covers the period from 1989 to 1997.

Using an empirical panel investigation data for 53 African countries from the period 1970 -2009, Mijiyawa (2015) seeks what drives foreign direct investment in Africa. System-GMM technique and other five factors such us, market size, political instability, Trade openness, lagged FDI inflow, and return on investment were used to analyze. The paper finds that all the five variables positively and statistically significant affect FDI in Africa's. In addition to this countries that attract FDI today expected to have more FDI in the future.

The study by Anyanwu (2011) identified the main determinants FDI inflow in Africa from 1980 to 2007. Using Panel data analysis with Robust GLM and ordinary least squares (OLS) estimations techniques were used. The dependent variable was FDI and market size (urban population and GDP per capital used as proxy); trade liberalization, government expenditure, remittance, macroeconomic stability, political right, regional dummies, infrastructure, agglomeration, natural resource, and higher financial development were used as independent variables. Indeed, the paper finds that market size, trade liberalization, government expenditure, remittance, agglomeration, natural resource (especially for oil) has a promote FDI inflows to Sub-Saharan. On the other hand, higher financial development has hinder FDI inflows to the region.

Sufian and Moise (2010) investigated the determinants of FDI in Middle East and North Africa (MENA). Cross-sectional were used with data from 36 countries (12 countries were from MENA and 24 were from the major recipients of FDI in their respective regions in developing countries over the period 1975 to 2006. Fixed effect method was employed to analyze the data.

The results showed that size of the host economy, the government size, natural resources and the institutional variables are key determinants of FDI inflows in MENA. According to the authors, they conclude that MENA countries that are receiving less foreign direct investment can also be successful in attracting FDI by remove all barriers to trade, develop their financial system and build good institutional framework.

In a study by Getinet & Hirut (2006) time-series analyses were used to examine factors that affect foreign direct investment in Ethiopia from 1974 up to 2001. Their result disclosed that real GDP, export orientation, and trade openness have a positive impact on attracting FDI inflow. However, poor infrastructure and macroeconomic instability hinder FDI inflow.

Demirhan and Masca (2008) provide an empirical assessment of the factors that determine FDI inflows in developing countries. In this study 38 developing countries were sampled. Cross-sectional econometric model were employed to analyze the data that covers from 2000 to 2004. The factors that were included in the model are inflation rate, labor cost, trade openness, market size (GDP growth rate), risk, tax, Infrastructure (telephone subscriber per 1000).The paper investigated that trade openness, infrastructure, market size(GDP growth) has positive effect on FDI inflow. However, inflation and tax has a negative effect on FDI.

Asiedu (2005) empirically investigates determinants of FDI in Africa using Panel data and 22 African countries were sampled. The result revealed that market size, natural resource endowments, infrastructure, and good institutional framework positive factor for FDI inflow to Africa. In contrast, high inflation, corruption and political instability have a negative effect. Finally, the paper suggests that countries with that lack natural resources in the region can also attract FDI by improving their institutions and policy environment. The Study covers the period from 1984 up to 2000.

Ajide (2014) examined the roles of governance and human capital on determination of FDI Economic Community for West Africa States (ECOWAS) covers from 2002 until 2010. The author found out that, secondary school enrolment, the interaction of

secondary school enrollment and governance with FDI, GDP per capital promote FDI into the region. However, inflation was found to reduce flows of FDI to the region. Contrary to majority of studies, the paper also shows that trade openness and infrastructural are found as having negative correlation with FDI.

Similarly, Kudaisi, B.V (2014) using panel data with fixed effect techniques provides an empirical assessment of the factors that determine FDI inflows in West Africa for sample of sixteen countries. The author found out that natural resource, market size, labor force availability and exchange rate ,while trade openness, inflation, infrastructure, government policy not statistically significant to the region.

Kariuki (2015) used a panel data regression data fixed effect model to examine the determinants of foreign direct investment (FDI) for a large sample of 35 African countries from 1984 until 2010. The variable FDI was used as dependent variable and economic risk, political risk financial risk, price index, stock market, infrastructure development, openness to trade, lag FDI used as explanatory variables. The results disclosed that commodity price index, stock market, trade openness, the lagged value of FDI; infrastructure has promoted FDI to Africa countries. In contrast political risk and financial risk have no effect on FDI to Africa.

In a study by Ezeoha and Cattaneo (2011) the impact of natural resource endowment, finance and institution on FDI in Sub-Saharan Africa were assessed. Panel analysis data was used based on sample 30 Sub-Saharan Africa (SSA) countries from 1995 until 2008. The variables that are used in this study were FDI as dependent variable and there other independent variables such as , financial(measured as the size of money supply to GDP), macroeconomic (as a proxy of rate of inflation, foreign exchange rates, natural resource

endowment, and market growth and institutional determinants(infrastructures, trade liberalization , corruption, and agglomeration) used as explanatory variables. The study result shows that development of financial development, market growth, good infrastructural, agglomeration ,inflation, corruption, trade liberalization openness have positive and statistically significant impact on determination FDI inflows in the SSA countries. However, resource endowment is positively correlated but it does vary across our forecasting models.

Gichamo (2012) conducted a study using panel data analysis for 14 Sub-Saharan Africa countries analysis covers from 1986 to 2010 on determinants of FDI inflow in Sub-Saharan countries. The result showed that trade liberalization, lag of FDI, market size has positive relationship and statistically significant effect FDI inflow to Sub-Saharan. In addition infrastructure, gross domestic product per capita positively determines FDI to Sub-Saharan, but it is not statistically significant. On contrary, inflation which is indicator of economic stability has negatively correlated and statistically significant reduces FDI to Sub-Saharan.

In a study by Zakaria et. al. (2014) the impact of trade liberalization on foreign direct investment (FDI) in Pakistan was assessed. GMM estimation techniques were used to analyze the relationship between trade liberalization variables and FDI inflow based on annual data from 1972- 2005. FDI was a dependent variables and infrastructure development, human capital, physical capital; terms of trade, inflation rate, urbanization, trade openness, foreign debt were used as independent variable. Their result shows that infrastructure development, human capital, physical capital, terms of trade, urbanization,

trade openness have positive impact on FDI while, debt , economic instability (inflation rate) and he has found that a negative and statistically significant relationship to FDI.

Wadhwa and S, S. R. (2011) using panel regression model with fixed effect assessed the role of market seeking, efficiency seeking and resource seeking, on determinant of FDI on developing countries covers from 1991 to 2008. In this study 10 developing countries were sampled.

The variables that are used in this study broadly divided in to three under the market seeking the variables are (Log GDP, annual population growth, Exports of goods and services as a percentage of GDP), under efficiency seeking (annual inflation) and the third category resource seeking (imports, Internet users per 100 people, Mobile subscriptions, roads as percentage of total roads). The results disclosed that GDP, imports, mobile subscribers positive and statistically significant affect FDI, while internet users, inflation negative relationship with FDI. However, the relationship between export, roads and annual population growth with FDI are not statistically significant.

Alsan et. al. (2004) examines the effect of health population on FDI inflows using panel data for 74 developing countries from 1980 until 2000. The study result shows that health population, life expectancy promotes FDI inflow to Low and Middle income countries.

Alfaro (2003) using cross-country data for the period between 1981 and 1999 examine the effect of FDI across different economic sectors (primary, manufacturing and service sector) The result revealed that as follows (a); the relationship between FDI and primary sectors on economic growth is negative (b); the relationship between FDI and manufacturing industry positive on economic growth, while, the relationship between service and FDI on economic growth is ambiguous.

As per empirical investigating of 17 West African countries from 1970 until 2010 by Anyanwn and Yameogo (2015) they argue that domestic investment, natural resources (oil and metals), trade liberalization, GDP per capital, one year lag of FDI, monetary integration have statistically significant and positively correlated with FDI inflow to West Africa while, level of economic development, two year lag FDI, life expectancy, GDP growth reduce the inflow of FDI.

Wafure and Nurudeen (2010) provides an empirical assessment of the factors that affects FDI in Nigeria for the period between 1970 and 2006 using multiple regression model to analysis the data. The results disclosed that political instability, market size, deregulation, exchange rate (depreciation) positively and statistically significant affect FDI to Nigeria, while trade liberalization, infrastructural development, inflation not statistically significant in attracting FDI.

Hailu (2010) analyze inflow of Foreign Direct Investment to Sub-Saharan African determined by demand side factors and concluded that natural resource has a positive and statistically significant in attract FDI inflow in to Sub- Saharan. Moreover, infrastructure development, labor availability, trade openness, market accession promote FDI, while availability of stock market has not statistically significant.

Determinant of FDI	Positive and statistically significant	Negative and statistically significant	Not statistically significant
Trade Openness	Asiedu (2002&2005) Anyanwu (2011), Zakaria .et.al (2014), Gichamo (2012), Demirhan and Masca (2008),Mijiyawa (2015) Kariuki (2015), Anyanawu & Yameogo (2015), Ezeoha &Cattaneo (2011), Hailue (2010)	Ajide (2014)	Kudaisi, B.V (2014), Wafure & Nurudeen (2010)
Infrastructural	Demirhan, Masca (2008), Asiedu (2005), Kariuki (2015), Ezeoha &Cattaneo (2011), Zakaria .et.al (2014),Wadhwa & S, S. R. (2011)	Ajide (2014)	Asiedu (2002), Kudaisi, B.V (2014),Wafure & Nurudeen (2010)
Market Size	Mijiyawa (2015),Anyanwu (2011), Sufian and Moise (2010), Demirhan and Masca (2008), Asiedu (2005), Ajide (2014), Kudaisi, B.V (2014), Ezeoha &Cattaneo (2011), Wadhwa & S, S. R. (2011), Wafure & Nurudeen (2010)		
Natural Resource	Anyanwu (2011), Sufian and Moise (2010), Asiedu (2005), Kudaisi, B.V (2014)		

Inflation	Ezeoha &Cattaneo (2011),	Asiedu (2005), Ajide (2014), Gichamo (2012), Zakaria .et.al (2014), Wadhwa & S, S. R. (2011)	Kudaisi, B.V (2014), Wafure & Nurudeen (2010)
Corruption	Ezeoha &Cattaneo (2011)	Asiedu (2005),	
Return on Investment	Mijiyawa (2015)		Asiedu (2002)
Lag FDI	Anyanwu (2011), Mijiyawa (2015),Kariuki (2015), Ezeoha &Cattaneo (2011),		

Table 3.1 summary and their effect of selected independent variables on Foreign Direct Investment

Chapter Four

4. Data and Model specification

The empirical analysis in this study is based on a sample of Panel Data on 46 Sub-Saharan African countries during the time frame of 1990 up to 2013. For the purpose of this study I used secondary data collected from World Development indicators, online country data, International Trade Indicators from United Nations Conference on Trade and Development (UNCTAD). Due to limited availability data countries are selected based on data they have.

Table 4.1 List of Sub-Saharan African countries incorporated in this study.

Angola	Liberia
Benin	Madagascar MDG
Botswana BWA	Malawi
Burkina Faso	Mali MLI
Burundi	Mauritania
Cabo Verde	Mauritius MUS
Cameroon CMR	Mozambique MOZ
Central African Republic	Namibia
Chad	Niger
Comoros	Nigeria
Congo, Dem. Rep.	Rwanda
Congo, Rep.	Sao Tome and Principe
Cote d'Ivoire CIV	Senegal SEN
Equatorial Guinea	Seychelles
Eritrea	Sierra Leone
Ethiopia ETH	South Africa ZAF
Gabon	Sudan
Gambia, The GMB	Swaziland SWZ
Ghana	Tanzania
Guinea	Togo
Guinea-Bissau	Uganda UGA
Kenya KEN	Zambia
Lesotho	Zimbabwe

In order to determine factors that affect FDI inflow I used nine independent variables.

Variables that included in this paper are; Trade openness, Natural Resource, Inflation, FDI lag, Return on investment, Corruption, Urban Population, Infrastructure, Contract Enforcement.

4.1 Regression model specification

The following regression model estimates the relationship between FDI inflow and its determinants.

$$\begin{aligned} \text{FDI}_t = & \beta_0 + \beta_1 (\text{Trade Openness}_t) + \beta_2 (\text{Natural Resource}_t) + \beta_3 (\text{Inflation}_t) + \beta_4 \\ & (\text{FDI}_{-1,t}) + \beta_5 (\text{Return on Investment})_t + \beta_6 (\text{Corruption}_t) + \beta_7 (\text{Urban Population}_t) \\ & + \beta_8 (\text{Infrastructure}_t) + \beta_9 (\text{Contract enforcement}_t) + \mu_t \end{aligned}$$

Where,

FDI_t denotes the Foreign Direct Investment inflow as percentage of Gross Domestic Product in time "t" and it is the dependent variable for the purpose of this study.

β_0 stand for an intercept.

β_1 Openness t : Stands for trade openness calculated by the sum of exports and imports of goods and services measured as a percentage of gross domestic products in time "t"

β_2 Natural Resource t : refers the sum of natural resources as percentage of GDP in time "t"

β_3 Inflation t : stand for annual inflation rate in time "t"

β_4 $\text{FDI}_{-1,t}$: refers to first year lag of FDI as percentage of gross domestic product in time "t"

β_5 Return on Investment t : represents the log of inverse GDP per capita in time “ t ”

β_6 Corruption t : index of corruption in time “ t ” (ranges from one up to six ,one=corrupted, six=free).

β_7 Urban Population t : denotes as a ratio of the total population living in urban areas in time “ t ”

β_8 Infrastructure t : represents fixed telephone subscriptions per 100 people in time “ t ”

β_9 Contract enforcement t : implies time required enforcing a contract as measured by the number of calendar days, and

μ_t is the error term.

4.2 Definition of explanatory variables

1. **Trade openness:** its effect on FDI inflows much depends on the various types of FDI. Countries that receives market-seeking FDI, whereby FDI activities focus on serving particularly the local market, trade openness may lead to diminishing FDI inflows to the region. The theory behind this specific argument is the “tariff jumping” theory, which argues that multinational firms that intend to serve local markets of given countries may decide to set up subsidiaries in the host country if it is difficult to quickly import their merchandize in that country. In contrast, if FDI activities that are export- oriented may prefer to locate in a more open economy, given that trade protectionism may in most instances increase transaction costs; ending up reducing economic competitiveness and overall exports, I use natural logarithm the sum of exports and imports of goods and services measured as a share of gross domestic product as a proxy for trade

openness; this is widely used by many literature as a proxy for trade openness, I expect positive and statistically significant affect FDI inflow to the region.

2. **Inflation:** Inflation means rising the price of goods and services. Countries with high inflation rate indicate economic instability. This lead to diminishing FDI inflows by increasing cost of input or raw materials, reducing the expected return on the investment and creating uncertainty in the economic. In contrast countries with stable macroeconomic policy have better chance in promoting more FDI inflow. In this thesis, I use consumer price annual percentage as indicator for inflation. I expect that there is negative coefficient sign and reduced FDI inflow to the region.
3. **Natural Resource:** refers to sum of oil rent, natural gas rents, coal rents, mineral rents, and forest rents. The availability of natural resource one of the driving forces that can attract more FDI inflow to the region. This implies that countries that are rich in natural resources can have a better chance in attracting more FDI than countries with no natural resource. Most of the multinational companies looking for countries with abundant natural resource at lower cost in order to make higher return and becoming more competitive. For this particular study, I employ sum of natural resources as percentage of GDP as an indicator for natural resource with expected positive coefficient.
4. **Infrastructure:** this refers to good infrastructure could explained by accessibility of road, electricity, telephone, water and other services that needed for the operation of day to day activities for the society or multinational firms. In today's countries with high quality infrastructural development can attract more

FDI than countries with poor infrastructural. Having a good infrastructure development not only have on achieving positive economic growth but also, promote FDI to the region by increasing productivity, reducing high transaction cost and reducing barriers for new firms to enter. In this study I employ telephone line per 100 people as a proxy for infrastructure with expected positive coefficient.

5. **Urban Population:** is one of an indicator for domestic market size. When the FDI inflow mainly emphasizes on serving the domestic market countries with large population has a significant effect on attracting FDI to the region. For this particular study, I use ratio of the total population living in urban areas as an indicator for market size and with expected positive coefficient.
6. **FDI_1 (agglomeration effect):** another independent variable is one-year lagged FDI inflows taken as a percentage of total GDP. The reason behind this is to deal with the agglomeration effect; my prior expectation is a positive coefficient and a statistically significant impact from the lagged FDI inflows to the current FDI inflows. The intuition behind this causality is the advantage of knowledge and information sharing.
7. **Return on investment.** For FDI activities to be economically viable, they should be profitable in the first place; therefore, no doubt that FDI activities will be attracted to countries that shows higher return to capital investment. However with most of the developing counties those in Africa in particular this is usually not the reality given the weak functionality of the capital market and therefore testing this argument may not usually be an easy task. For this particular study I

employ the natural logarithm of inverse real GDP per capita as a proxy for return on investment. To get around my proxy for return on investment, I assumed that marginal product of capital gives an information for return on investment. Since capital scarce countries tend to be poor. This implies that investment in capital scarce countries (lower per capita income) will yield a higher return on investment. On the other hand, other things remain constant, investment in higher per capita income would yield a lower return and therefore inverse of real GDP per capita should be positively related with FDI. The inverse of GDP per capita as proxy for return on investment has also been used by Mijiyawa (2015), Asiedu (2002), and Jaspersen et al. (2000). My prior expectation is return on investment has positive coefficient and a statically significant affect FDI inflow in Sub-Saharan Africa countries.

8. **Corruption;** corruption can be referred as misuse of power in unintended way for personal advantage. It consists using authority to manipulate public property or finance for individual benefit. Corruption affects the overall activities in regard to the economic developments and financial environment by affecting the smooth flow of foreign investment, for it reduces the efficiency and effectiveness of a government. Moreover corruption hinders the economic and any other related benefits for a country; it can be manifested by different ways like excessive use of power, preferential treatment, job reservations, embezzlement and favoring. For the purpose of this study, I utilize Corruption Perceptions Index (CPI) as a proxy for corruption ranges from 0 up to 6 where; 0 equals the higher

corruption perceived, while 6 the lowest level of corruption perceived. and I expect negative coefficient of corruption on foreign direct investment inflow.

9. Contract Enforcement: Time and days it takes to perform a contract. Countries with fewer days to perform a contact are likely to promote FDI. In contrast countries with more days to perform a contract would reduce FDI. My prior expectation contract enforcement negative coefficient on inflow of FDI.

Table 4.2 illustrate the summary of expected coefficient sign

The following independent variables determine the foreign direct investment inflow in to Sub-Saharan Africa.

Independent Variables	Expected Coefficient sign
Trade openness	Positive
Natural Resource	Positive
Inflation	Negative
FDI_1	Positive
Return on Investment (ROI)	Positive
Corruption	Negative
Urban Population	Positive
Infrastructure	Positive
Contract Enforcement	Positive/Negative

Table 4.3 definition of variables and their sources

Acronyms and Abbreviation	Definition of variables	Source of data
FDI	Foreign Direct Investment inflow as percentage of GDP	International Trade Indicators from UNCTAD
TRDO	Trade openness (Sum of Export and import divided by GDP)	International Trade Indicators from UNCTAD
NR	Natural Resource refers to sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. as percentage of GDP	World Bank
Inf.	consumer prices (annual percentage)	World Bank
FDI _1	One-year lagged Foreign Direct Investment inflows taken as a percentage of total GDP.	Author's transformation
ROI	Return on Investment refers to natural logarithm inverse of real GDP per capita	This study
Corr.	Corruption Perceptions Index (0 highest Corruption perceived to 6 lowest perceived)	Online country data
UP	Ratio of the total population living in urban areas	World bank
TEL.	Fixed telephone subscriptions (per 100 people) used as a proxy for infrastructure	World Bank
CE	Contract Enforcement refers to days it takes to perform a contract	World Bank

Chapter Five

5 .Data Analysis and Discussion

This Chapter deals with data analysis and Discussion. It has four sections. Section one provides summary of statistics. Section two presents multicollinearity test. Section three addresses pair wise correlation matrix among the determinants of FDI inflow. Section four presents' results of liner regression model and the final section, results will be presented.

To empirically analyze on the determinants of FDI inflow in Sub-Saharan African countries and to achieve the broad research objectives stated in chapter one. Forty six Sub-Saharan Africa countries were included in this study based on the availability of data from 1990 up to 2013. Therefore, 1047 observation were used to analyze the determinants of FDI inflow.

Moreover, to analyze the collected panel data, first I used summary of statistics. The mean value and standard deviation were employed to examine the general trends of data. Pair wise correlation matrix was also used to make sure about the relationship between independent variables and dependent variable. Finally, after applying various tests, multiple liner regression model and t-statics were conducted in order to determine the relative importance of independent variables in explaining/ influencing FDI inflow/ the regressed variables.

Table 5.1 summary of Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
Trade	4.18625	.5184	2.3748	6.2762
Natural Res	14.14397	15.9607	0	86.1680
FDI_1	4.3828	10.4819	-82.8921	161.8238
ROI	-1.863	.1593	-2.2665	-1.4417
Corruption	1.56	1.36	0	5
Urban Population	35.18	15.03	5.4	86.658
TEL.	2.5115	5.09997	0	31.5035
Inflation	50.7568	747.8521	-11.6861	23773.13
Contract Enforcement	370.6072	398.5126	0	1715

Source: Author's Construction

Table 5.1 shows the summary and descriptive statistics of the variables used for this study. Therefore, this table shows the independent variables used in this study with their mean, standard deviation, minimum and maximum. Trade openness ranges from 2.375 minimum values up to 6.276 maximum values with mean value and standard deviation 4.186 and 0.5184 respectively. The mean value of natural resource is 14.14 with its ranges from the minimum value of zero up to maximum value 86.17 and its standard deviation 15.96. FDI_1 ranges from negative value of 82.89 up to the maximum value of 161.824. This implies that there was a big variation with mean value 4.383 and its standard deviation of 10.48. Return on investment with negative mean total average value of negative 1.86 and it has ranges from negative -2.27 minimum values up maximum of negative value 1.44. Corruption has a mean value of 1.56 with ranges of from the lowest value 0 up to the highest value 5 and standard deviation of 1.36. This indicates that

corruption expanded highly in Africa. Urbanization ranges from the lowest value 5.416 up to highest value of 86.66 and its mean value and standard deviation 35.18 and 15.03 respectively. Fixed telephone ranges from the lowest value of 0 up to the highest value of 31.5 and its average mean value of 2.5, which implies that infrastructure development in Sub-Saharan Africa was not developed well. The mean value of Inflation is 50.757 and its value ranges from the lowest amount of negative 11.686 up to the highest value amount of 23,773.13. This indicating that inflation in Sub-Saharan Africa highly varies though out the year and it has 747.852 % far from the mean. The average total mean of Contract enforcement is 370.607 and its ranges from the lowest value of zero up to the highest value of 1715 days.

5.1 Multicollinearity Test

Multicollinearity refers to when two or more independent variables are highly correlated to each other in a multiple regression. According to Cameron and Trivedi (2009) the problem of multicollinearity arises when the independent variables are highly associated with each other. If this problem happened, it makes the significant variable insignificant by reducing t- statistics and increasing its P- value. One way to solve the multicollinearity problem we have to drop a variable which is highly correlated to each other. However, there is not clearly stated about how much correlation causes multicollinearity. In a study by Hair et al (2006) recommend that correlation coefficient above 0.9 could cause a serious problem of multicollinearity. Malhotra (2007) suggests that multicollinearity problem exists when the correlation coefficient above 0.75. Kennedy (2008) argue that any correlation coefficient greater than 0.7 may cause a serious multicollinearity. This

shows that there is inconsistent argument on the level of correlation that causes multicollinearity problem.

Thus, by considering the importance of multicollinearity test, the pair wise correlation matrix is applied to test the correlation between the dependent variable FDI inflow and other nine explanatory variables such as Trade openness, Natural Resource, Inflation, FDI_1, Return on Investment (ROI), Corruption, Urban Population, Fixed telephone, Contract Enforcement.

5.2 Correlation analysis among variables

Correlation coefficient measures the degree of association between two variables ranges from -1 up to +1. Coefficient +1 shows that there is perfectly positive association. Coefficient -1 indicate that perfectly inverse association. As could be seen in table 5.2 below, Trade openness, Natural Resource, FDI_1, Urban Population, Fixed telephone have occurred a positively associated with FDI. This clearly indicates that, as the market size, trade openness, natural resource, infrastructure, FDI_1 increases, FDI also moves the same way. While, inflation seems to be inversely associated with FDI inflow, this shows that, when there is high inflation rate, FDI inflow moves to the opposite direction.

Table 5.2 Correlation between FDI inflows with other nine explanatory variables that are used in this study from 1990 up to 2013

	FDI	Trade	NR	FDI_1	ROI	Corr.	UP	TEL	Inf.	CE
FDI	1									
Trade	0.40	1								
NR	0.21	0.19	1							
FDI_1	0.45	0.36	0.14	1						
ROI	0.08	-0.55	0.05	-0.09	1					
Corr.	-0.09	-0.15	-0.003	-0.09	0.06	1				
UP	0.12	0.34	0.20	0.12	-0.62	0.03	1			
TEL	0.03	0.33	-0.28	0.03	-0.59	-0.17	0.34	1		
Inf.	-0.02	-0.03	0.04	-0.01	0.03	-0.02	-0.01	-0.02	1	
CE	0.07	0.11	0.003	0.08	-0.09	-0.15	0.08	0.13	-0.06	1

Source: Author's Construction

So, in Table 5.2, the pair wise correlation check showed that none of the independent variables is correlated greater than 0.7. Therefore, this approved the nonexistence of multicollinearity.

5.3 Regression Analysis

This section presents the empirical findings after the correlation matrix and other tests above approved that multicollinearity does not jeopardize the validity of the model. In order to predicate the level of each independent variable's impact on dependent variable and to address the first object of this thesis, I employ balanced panel data (namely; Pooled ordinary least square (OLS), fixed effect (FE) and random effect(RE)) whilst controlling for country and time invariant variables. More specifically, I use twenty three years panel data from forty six Sub Saharan African countries for the period 1990 - 2013. By controlling for country and time fixed effect, the panel estimation model represented

in the equation above has an advantage of allowing us to reduce omitted variables bias (Sun et al., 2002). FDI used as dependent variable and other ten explanatory variables.

Table 5.3 below displays estimation result of the Pooled OLS panel regression analysis.

Table 5.3 Shows result of Pooled OLS regression

FDI	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Trade Openness	6.630986	.6558296	10.11	0.000	5.344061	7.917912
Natural Resource	1.007987	.2531265	3.98	0.000	.5112802	1.504693
Lagged FDI_1	.2834611	.0285038	9.94	0.000	.2275284	.3393937
ROI	2.384537	.3984024	5.99	0.000	1.602758	3.166316
Corruption	-.0220096	.0133235	-1.65	0.099	-.0481541	.0041348
Market Size	2.291273	.6864691	3.34	0.001	.9442246	3.638321
Infrastructure	.306748	.092947	3.30	0.001	.1243593	.4891366
Inflation	-.0001712	.0003397	-0.50	0.614	-.0008377	.0004953
Contract Enforcement	-.0109359	.0100883	-1.08	0.279	-.0307321	.0088603
_cons	-19.50337	2.718206	-7.18	0.000	-24.83727	-14.16947
	Number of Obs.	1047				
	F(10,1023)	54.49				
	Prob> F	0.0000				
	R-Squared	0.3475				
	Adjusted R-Squared	0.3412				

F- Test

An F test has been carried on to determine the appropriate model between OLS and Fixed effect. The null hypothesis is that there is not significance difference in the intercepts and the alternative hypothesis is at least one of the intercept is difference. Since the F value of

5.32 (for 45 numerator degree of freedom and 992 denominator degree of freedom) is highly significant, we reject the null hypothesis. Therefore, the F- test favored the fixed effects over the Pooled OLS.

Table 5.4 Results of Fixed Effect and Random Effect

Variables	(1) Fixed Effect (FE)	(2) Random effect (RE)
Trade Openness	6.838*** (6.24)	6.766*** (10.17)
Natural Resources	0.128*** (3.89)	0.0914*** (4.85)
Lagged FDI_1inflow	0.167*** (6.04)	0.332*** (12.32)
ROI= log(1/GDPPC)	46.15*** (6.43)	18.46*** (6.50)
Corruption	-0.0511* (-2.03)	-0.0180 (-1.37)
Market Size =(urban population)	0.277** (2.94)	0.0735** (3.17)
Infrastructure	0.249 (1.61)	0.149* (2.15)
Inflation	0.000107 (0.33)	-0.000216 (-0.65)
Contract enforcement	-0.139 (-0.76)	-0.0630 (-0.44)
_cons	50.50*** (3.69)	5.523 (1.28)
<i>No of Countries</i>	46	46
<i>Observations</i>	1047	1047
<i>R-Squared</i>	.177	-

t statistics reported in parentheses

* ,** , and *** denote that coefficients are statistically significance at the, 5 percent ,1 percent and 0.1 percent levels respectively.

Hausman Specification test

Based on the above results, the panel data analysis requires determining the appropriate specification between fixed effect and random effects models. In order to determine which of the two alternative models appropriate I employ hausman's specification test. Hausman specification test helps us to choose a more efficient and consistent model. Based on hausman test result the estimated chi- square value highly statistically significance, we reject the hypothesis that there is not significance difference in the estimated coefficients of the random effect and the fixed effect. And therefore, the Hausman test in which the level of statistical significance favors the fixed effects over the random effects estimations.

5.4 Discussion of Results

According to the results of regression in table 5.4 wide ranges of factors that determine FDI inflow in to Sub-Saharan African countries have been estimated using fixed effect regression analysis technique. The results and interpretations are presented as follows ; trade openness, natural resource, one year lagged FDI , return on investment , urban population and corruption are statistically significant determinants of FDI inflow in to Sub-Saharan African countries at less than 5% level of significance.

Trade openness was equally found to be positively influencing FDI growth and was statistically significant at 0.1% level of significance, one percentage increase in Trade openness would lead to 0.068 unit increase in the FDI inflows. This simply means when countries liberalize their trade it would attract more FDI inflow into the region holding other factors constant.

Natural resource endowment from the results turned out to be positively influencing the FDI growth in the region and equally statistically significant at 0.1% level of significant, from the coefficient of 0.128 it would be interpreted as one presentence increase in natural resource endowment, would lead to 12.8%growth in FDI, resources like oil, gold, copper, among other would attract FDI in those specific or related industries.

FDI lag not surprisingly had the expected positive coefficient of 0.167 and was found to be statistically significant at 0.1% level of significance and the result shows that one percent increase in the FDI inflow into Sub-Saharan African countries in the previous year will lead to an increase current FDI inflow by 16.7%, this is very common in most African countries. For instance most of the Indian investors tend to encourage more of their counterparts to join them for business after carefully studying the economic environment of the host countries.

Return on investment is significant and has a positive relationship with FDI as anticipated. It has a positive coefficient of 46.15 indicating that one percent change in return on investment will lead to 0.46 unit change in FDI. This means that high return on investment one of the main catalyst factors for attracting FDI inflow.

The coefficient associated with the urban population is positive and significant at1% level of significance with its p-value of 0.003 is significant. It is indicating that with one

percent change in market size, FDI will also change by 0.277% in the same direction. The economic intuition behind this result is that increase in the urban population would mean expansion in the market opportunities which would act as an incentive to increased FDI inflow.

The coefficient associated with the corruption is negative at 0.0511 and the p-value of 0.043 is statistically significant at the 5% level. This implies that one percent increase in corruption index leads to about 5.11% decrease in FDI inflow into the region. Therefore, the presence of excess regulation, weak enforcement rules and government bureaucracy, bribery hinder FDI inflow.

Finally, the result revealed that the coefficient sign of contract enforcement and infrastructure are as anticipated, but it is not statistically significant. The result is consistent with earlier findings by Kudaisi, B.V (2014), Walfure and Nurudeen (2010).

Chapter Six

6. Conclusion and recommendations

6.1 Conclusion

The main objective of this thesis is to examine factors that determine FDI inflows in to Sub-Saharan Africa. I use twenty three years balanced panel data over the period 1990 - 2013. The panel data sampled forty six Sub-Saharan African countries. Pooled OLS and fixed effects and random effects model employ in our model. Among the three model based on husman speciation test and an F- test fixed effect was found to be the appropriate model. The results showed that among the nine explanatory variables six of them are most important determinant of FDI inflows at less than 5% significance level. These variables are: trade openness, natural resources, FDI_1, and return on Investment (ROI), Urban Population, and corruption. However, the other variables such that infrastructure and contract enforcement are their sign of coefficient as anticipated but, it is not statistically significant in determining FDI inflow in to the region.

6.2 Recommendations

Based on the above result, the researcher recommends that in order to enhance the inflow of FDI in to Sub-Saharan African countries the following important polices has to undertake. Firstly, FDI lag has a positive coefficient of 0.167 and was found to be statistically significant at 0.1% level of significance in promoting FDI inflow in to the Sub-Saharan African countries. This implies that the existence of several foreign companies has a significant impact in insisting many other new companies to come and invest in to the region, so that governments in the region by eliminating unnecessary and

tedious bureaucratic procedure, mistreating and creating better environment for investors through working together hand in hand with former foreign investors in order to attract new investors.

Secondly, since, trade openness, urban population has a positive and significance outcome on attracting FDI inflow in to the region. This shows us countries with free trade and large market size better encourage FDI inflow than other with closed economic (autarky) and small size. This imply that ,countries that implementing good trade policies agreement within the region in particular and within worldwide in general could enhance FDI inflow to go to Sub-Saharan African countries through increasing trade and market size holding other factors remain constant. Therefore, African governments in order to attract more FDI inflow there should give more concern on implementing good trade policies and has to increase their market size, this in turn promote FDI inflow in to the region.

Thirdly, Return on investment is significant and has a positive relationship with FDI. It is known that return on investment in developing countries higher than in developed countries. This implies that foreign investors want to invest in the place where the return on investment is higher. Therefore, government in Africa has to improve their quality of skills of labor force as well as minimize corruption in order to have more foreign investors because; unskilled labor force and high corruption can reduce the inflow of FDI in to the region.

Finally, Natural resource endowment from the results turned out to be positively influencing the FDI growth in the region and equally statistically significant at 0.1% level

of significant. This indicates that countries with rich in natural resource better attract FDI inflow than countries with no natural resource. Therefore, African government has to implement a policy regarding proper utilizing of the natural resource and ensure equal distribution of wealthy in order to promote FDI inflow in to the Sub-Saharan Africa countries.

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