ANALYSIS OF CORRUPTION AND FOREIGN DIRECT INVESTMENT IN AFRICA

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ABSTRACT

Title of Dissertation	Analysis of Corruption and Foreign Direct Investment in Africa
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This research seeks to formulate a theory relating FDI and corruption and empirically assess the aptness of this theory. This research seeks not only to establish that in general corruption has a negative impact on FDI inflow to Africa but also to show that there is a threshold referred to as the Corruption Tolerable Level of Investment (CTLI), below which corruption is expected to have a positive impact on FDI inflow to Africa. This research also seeks to deploy data on actual corruption to establish that corruption has a negative impact on foreign ownership of firms in Africa. Secondary data from the World Development Indicators (WDI DATABANK) 2012 was used to assess the impact of corruption on FDI in Africa. The source of data for analyzing the effects of corruption on foreign ownership of firms in Africa is the World Business Environment Survey (WBES) conducted by the World Bank. In order to meet the objectives of the study, the dynamic panel data estimation technique as well as the Tobit and probit estimation techniques were deployed. The estimated Corruption Tolerable Level of Investment (CTLI) in Africa is -0.27 on the control of corruption scale which ranges from approximately -2.5 (weak) to 2.5 (strong). The findings also indicate that the percentage of total annual sales of the firm paid as informal payments to the public officials has a negative and highly significant impact on foreign ownership of firms in Africa. Therefore African governments should institute policies to control corruption in the public sector in order to enhance the country's performance on the control of corruption index. This will boost foreign investors' confidence in their economies.

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TABLE OF CONTENT

LIST OF TABLES

Tables **Page**

LIST OF FIGURES

ABBREVIATIONS AND SYMBOLS

Abbreviations	Equivalence
CEECS	Central And Eastern European Countries
CPI	Corruption Perception Index
CTLI	Corruption Tolerable Level Of Investment
D-GMM	Difference Generalized Method Of Moments
EBRD	European Bank For Reconstruction And Development
EKC	Environmental Kuznets Curve
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
ICRG	International Country Risk Guide
IEA	International Energy Agency
ILO	International Labour Organization
LDCS	Least Developed Countries
LDV	Limited Dependent Variables
MCMC	Markov Chain Monte Carlo
MLE	Maximum Likelihood Estimation
MNE	Multinational Enterprises
NWC	National Whistleblowers Center
OIR	Over-Identifying Restrictions
OLS	Ordinary Least Square
RBV	Resource-Based View
RECS	Regional Economic Communities
S-GMM	System Generalized Method Of Moments
SSA	Sub-Saharan Africa
TCT	Transaction Cost Theory

TNCS	Transnational Companies
UNCTAD	United Nations Conference On Trade And Development
WBES	World Business Environment Survey
WEO	World Economic Outlook
WGI	Worldwide Governance Indicators

CHAPTER 1

INTRODUCTION

1.1 Background to the study

Literature on the development of Africa has accounted for the continent's generally stagnant development trend (McArthur and Teal, 2002). Factors attributed to this trend include the respective roles of human capital (Barro, 1991), ethnic diversity (Easterly and Levine, 1997), geography and natural resources (Sachs and Warner, 1995), health (Gallup and Sachs, 2001), risk (Collier and Gunning, 1999) and social capital and institutions (Acemoglu, Johnson and Robinson, 2001; Hall and Jones, 1999; Knack and Keefer, 1995) among others. In as far as institutions are concerned, Gaviria (2002) is of the view that the growing interest in governance issues has incited a growing scholarly literature about the causes and consequences of corruption. Healy and Serafeim (2011) posit that corruption is increasingly being viewed as a significant obstacle to economic development. A recent World Bank survey of more than 150 leading public officials and citizens from 60 developing nations as cited by Healy and Serafeim (2011) indicated corruption as the number one factor hampering their countries' economic development and growth. It is therefore important to scrutinize the consequences of corruption. Doing so will enable the implementation of appropriate measures to reduce its levels and enhance economic development and growth. In order to influence political leaders to have the political will to fight corruption, researching into the consequences of corruption and its devastating effect on the development of the economy has become very crucial in recent times.

In 2013, global economic growth slowed down to 2.9 per cent and this happens to be the lowest rate since 2009. Apart from two regions where growth did not slow between 2012 and 2013 (South Asia and East Asia), all other regions lost momentum in growth with Central and South-Eastern Europe growing at a rate of

2.5 per cent, Latin America and the Caribbean at 2.7 per cent and Sub-Saharan Africa at 4.8 per cent in 2013 and this represent between 0.3 and 0.5 percentage points lower than in 2012. Labour markets have been affected by the slowed down in economic growth. Reports by ILO indicates that in North Africa, the economic growth rate in 2013 proved too low to generate sufficient employment opportunities for a fast growing population, and unemployment (12.2 per cent in 2013) remained the highest in the world. The report also indicated that in Sub-Saharan Africa, paid employment opportunities are scarce and the vulnerable employment rate, at 77.4 per cent in 2013, remained the highest of all regions (ILO, 2014). Economic growth has traditionally been attributed to the accumulation of human and physical capital, and increased productivity arising from technological innovation. The primary driving force of economic growth is the growth of productivity, which is the ratio of economic output to inputs (capital, labour, energy, materials, and business services among others). It must be emphasized that economic growth, even when it is accompanied by high degree of mechanisation, generates employment opportunities at least indirectly if not directly. Literature abounds on the theory of employment - GDP relationship (the so-called Okun's Law) and the employment elasticity of growth (Kapsos, 2005; Piacentini and Pini, 2000; Seyfried, 2006). Economies with positive GDP growth (elasticities greater than 0) correspond with positive employment growth and higher elasticities correspond to more employment-intensive growth. Generally economists agree that foreign direct investment (FDI) inflows lead to an increased rate of economic growth (Blonigen, 2005 as cited in Wijeweera, Villano and Dollery, 2004).

Particularly in developing countries, FDI inflows should exert positive effects on economic growth since these countries suffer from low productivity and capital stock deficiencies (Johnson, 2006b). This is because FDI inflows generate positive externalities through technology spillovers. For example, domestic investors can adopt advanced technology brought in through foreign direct investment. This will also narrow the gap between the domestic savings ratio and the desired level of investment ratio (Wijeweera et al., 2004). Both economic theory and empirical studies support the notion that FDI inflow leads to future profits. Beyond the profit motive are a variety of other factors that encourage potential foreign investors to invest in certain countries. Some of these factors include market demand conditions, trade

restrictions, investment regulations, labour cost and transportation cost. More specifically, it has been argued that a strong policy and regulatory regime, appropriate institutions, good infrastructure, and political and economic stability are important in attracting FDI inflow (Mwilima, 2003). According to United Nations Conference on Trade and Development (UNCTAD) Annual Report (2001), different determinants have been indicated by businesses with regards to decisions to invest abroad. Some of these determinants include: the policy framework for FDI inflows such as political and social stability, rules about treating operations of affiliates of foreign companies, and international FDI inflow agreements. The economic determinants include: size of the market and per capita income, natural resources, cheaper costs of infrastructure or intermediate products.

African countries still agonize from various levels of a negative image from the outside world in spite of all the pro FDI inflow policies implemented. Factors contributing to these include political instability due to internal conflict, external conflict, military in politics, corruption, and religious tensions. On the economic front, exchange rate stability, inflation, interest rate, GDP growth among others poses risk factors to potential investors. Over the years the majority of African countries scored either 3.0 or below on the corruption perception index rating by Transparency International. For example, 87% of the countries in Africa scored either 3.0 or below in the years 2011, 2009 and 2008, 83% in 2010 and 77% in 2012 and these percentages are alarming. The findings of Treisman (2000) suggest that fighting corruption in many countries has proved so difficult since it greatly varies between countries. Different theories associate this phenomenon with particular historical and cultural traditions, levels of economic development, political institutions, and government policies (Treisman, 2000). Most research on the effect of institutional quality on FDI inflow reveal that countries that have weak institutions, in particular, high corruption and an unreliable legal system tend to receive less FDI (Gastanaga, Nugent and Pashamiova, 1998; Wei, 2000b). Because of the difficulty in eradicating corruption, reducing its prevalence to a tolerable level must be the aspiration of all political leaders and stakeholders.

The importance of the study of the effect of corruption on firms cannot be overemphasized since the decision of potential investors to invest in an economy will

largely depend on how their firms are likely to perform in that economy. Likewise, since firms are the engines through which the growth objectives of developing countries can be achieved (Abotsi, Dake and Agyepong, 2014), governments and all stakeholders must be concerned of the effect of corruption on entrepreneurial activities. Firms are potential sources of employment and income in many developing countries. Therefore when the growth of the firm is impeded it will culminate in hindering the growth of the economy. Globally bribes paid by individuals and firms to the public sector as estimated by the World Bank amount to $1 trillion per year. In addition, the cost of corruption equals more than 5% of global GDP ($2.5 trillion) (Healy and Serafeim, 2011). Research has also shown that the negative impact of bribes on firm activity is higher than the corresponding impacts of taxation; however, they both have a substantially large magnitudes (Fisman and Svensson, 2007). Gaviria (2002) found that corruption and crime decrease sales growth substantially, and that the reported levels of corruption and bureaucratic interferences are positively correlated at the firm level. Tebaldi and Elmslie (2008) make the argument that poor institutions such as high corruption preclude the use of technologies that are available to firms (Tebaldi and Elmslie, 2008). Also, Matthews (1986) show that this situation limits the efficiency gains from current innovation.

Neoclassical theory predicts higher marginal returns to the factor that is relatively scarce. Thus capital should flow from rich countries to Africa where capital is relatively scarce. For example, the rates of return on FDI were 7 percent globally and higher in both developing (8 percent) and transition economies (13 percent) than in developed ones (5 percent) in 2012 (World Investment Report, 2013). Notwithstanding this, World Investment Report (2010) indicates that FDI flows to Africa decreased by 19 percent in 2009, 9 percent in 2010 and saw a third year of decline in 2011. However in 2012, Africa upturned the trend with a 5 percent increase in FDI inflows to $50 billion, and in the same the year the number of countries that scored either 3.0 or below on the corruption perception index reduced to 77%. This gives an indication that there is a level of corruption which is tolerable by investors. Notwithstanding these perceptions of corruption levels, FDI still flows to some countries which also seem to support the suggestion that there is a level of corruption which is tolerable by investors. This level of corruption will likely not deter potential

investors from investing in Africa. Beyond this level of corruption potential investors are no longer motivated to invest in those countries. Since corruption cannot be completely eradicated, reducing it to a threshold that can be accommodated by investors is a realistic goal for African leaders. This threshold is referred to as the Corruption Tolerable Level of Investment (CTLI) in this study. It is in this light that this study tries not only to estimate this Corruption Tolerable Level of Investment in Africa but also to find the effect of actual corruption on the foreign ownership of firms in Africa. This is because the malfunctioning of government institutions affects the adoption of technologies which are available to firms and the productivity of physical capital and labour and hence the returns to the firm's investments.

1.2 Specific Objectives

The specific objectives of the study are to;

1) develop a theoretical model relating corruption and FDI inflows

2) do a cross-country analysis of the effects of corruption on FDI inflows in Africa

3) estimate the Corruption Tolerable Level of Investment in Africa

4) do cross-country analysis of the effects of corruption on foreign ownership of firms in Africa

1.3 Knowledge Gap and Relevance of the Study

Many empirical studies have examined the effect of corruption on the economic growth at the country level but only few have looked at the effect of the levels of corruption on FDI inflow as well as the general impact of corruption on the foreign ownership of firms. Also, none of these studies have considered the fact that corruption cannot be completely eradicated since corruption has become endemic in most developing countries and therefore reducing corruption to an appreciable level must be a realistic goal for all leaders and stakeholders in developing countries.

This research therefore seeks to formulate a theory relating FDI and corruption and empirically assess the aptness of this theory. This research seeks not only to

establish that in general corruption has a negative impact on FDI inflow to Africa but also to show that there is a threshold referred to as the Corruption Tolerable Level of Investment (CTLI), below which corruption is expected to have a positive impact on FDI inflow to Africa. The Corruption Tolerable Level of Investment will motivate leaders in Africa to try and control corruption in their countries to levels that will not deter FDI inflows since corruption is difficult if not impossible to eradicate completely. The Corruption Tolerable Level of Investment will also serve as a guide to potential investors in the choice of countries in Africa to invest. This research also seeks to deploy data on actual corruption to establish that corruption has a negative impact on foreign ownership of firms in Africa. This is because corruption prevents firms from adopting available technologies and hence the productivity of physical capital and labour and as a result, the returns to the firm's investments will dwindle due to inefficiency. This renders the country not attractive for foreign investment and therefore foreign investors do not find the country attractive. It is the opinion of the researcher that the findings of this investigation will inform political leaders, governments and all stakeholders on the importance of corruption and the need to strengthen measures put in place in improving governance in Africa. If true, these measures will lead to an increase in economic growth and reduce unemployment and poverty on the African continent. The study further makes a modest contribution to the empirical literature on corruption and the relationship between corruption and FDI inflow and also between corruption and firm ownership by foreigners in Africa.

1.4 Organization of the Study

The rest of the chapters are organized as follows. Chapter two presents the literature review on the theory of corruption as well as its causes and consequences. Chapter three presents the theoretical framework with a simple theoretical model depicting the relationship between corruption and foreign direct investment. Chapter three also presents a literature review on corruption and foreign direct investment as well as firm ownership by foreigners. Chapter four mainly describes the details of the methodology used in the study. Chapter five presents the results obtained from the data analyses and they are discussed. Finally chapter six presents the conclusions and recommendations.

CHAPTER 2

LITERATURE REVIEW ON CORRUPTION

In this chapter, the various definitions of corruption are discussed. This is followed by the discussion of the theories of corruption, the determinants of corruption and then the consequences of corruption. The concluding part of this chapter looks at the measurement of corruption and the corruption situation in Africa.

2.1 The Meaning of Corruption

Various definitions of corruptions have been given. For example; "Government, or 'political', corruption occurs when an office-holder or other governmental employee acts in an official capacity for personal gain" (Wikipedia). "Corruption is the abuse of public resources to enrich or give unfair advantage to individuals, their family or their friends" (Corruption Watch). Public corruption according to Svensson (2005) is "the misuse of public office for private gain" which includes bribery and embezzlement of government funds and kickbacks in public procurement.

All these definitions simply express the use of a position of trust for dishonest gain. Rose-Ackerman (2006) explains that corruption occurs where there is overlapping between private wealth and public power and this epitomizes the illegitimate use of the willingness to pay by the private individual or firm as a decision making criterion. The private individual or firm pays money to a public official in anticipation for some reward and the public officials accept this payment which may induce them to take actions that are against the ethics of their office. Rose-Ackerman (2006) explicates that the public official or those competing for positions in public office sometimes also pay cash to private individuals or firms to get rewards. Therefore the illegitimate payments may sometimes flow in the opposite direction. Rose-Ackerman (2006) distinguishes between low-level opportunistic payoffs and systemic corruption. With low-level corruption, the implementing official exploit

existing institutional framework for personal benefit and this can motivate officials to create red tape which increase the cost of doing business and this limit firm entry in an economy. On the other hand systemic or 'Grand' corruption consist of three types and involves either an entire bureaucratic hierarchy, electoral system or overall governmental structure (Rose-Ackerman, 2006). The first type is when a branch of the public sector is set up as a rent-extraction machine, the second is a corrupt electoral system where money determines the outcome of a nominal democracy and the third is when governments takes on large projects and allocate assets in ways that tend to have undesirable implications on the wealth of business organizations.

2.2 Theory of Corruption

Economic theory of corruption sees corruption as a way of allocating scarce resources, where the outcomes of corruption is explained by the rational behaviour of market actors in respect to incentives and rents (Mishra, 2005). This view was broadened by new institutional economics to include the analysis of economic agency in order to identify the role of institutions in producing corrupt transactions, opportunism and transactional costs (Lambsdorff, Taube and Schramm, 2004). de Graaf (2007) distinguished six groups of theories concerning corruption. These include public choice theory, bad apple theories, organizational culture theories, clashing moral values theories, the ethos of public administration theories and correlation 'theories'.

2.2.1 The Public Choice Theory

The public choice theory primarily looks at the level of the individual involved in the corruption. The central to the public choice literature according to de Graaf (2007) is the utility maximization of the individual corrupt official. The private individual will indulge in corruption once the expected advantages outweigh the expected disadvantages. It is purely an individual decision since the actions of the corrupt officials are triggered by a rational, conscious and deliberate weighing process of an individual. The solution to this nature of corruption is to enact policies that will reverse the motivation by making the expected disadvantages outweigh the expected advantages.

2.2.2 Bad Apple Theories

This theory attributes the cause of corruption to the character of the individual. The causal chain commences from the bad character of an individual to corrupt acts. The bad apple theory attributes the root cause of corruption to a defective human character and the predisposition toward illegal activity. Therefore using policy in controlling this type of corruption is very difficult since it has to do with morality. According to Naim (1995) when the root cause of corruption is due to human weaknesses, designing a policy to combat corruption seems improbable since 'strong moral values' are the most efficient remedy.

2.2.3 Organizational Culture Theories

The focus of these theories is the culture and structure of the organization within which the agent works. This theory explains that the cause of corruption by the individual is influenced by the environment in which the individual finds him/herself. de Graaf (2007) posits that the interest of these types of theories is not in the corrupt official exactly, but in the contextual features that allow for the setting of corruption. These type of theories view corruption as 'contagious' since every person who comes in contact with an organizational culture (or country) that is corrupt runs a big risk of becoming corrupt (Caiden and Dwivedi, 2001; Klitgaard, 1988).

2.2.4 Clashing Moral Values Theories

The causal chain in these theories as explained by de Graaf (2007) commence with certain values and norms of society that affect the values and norms of individuals directly and making them corrupt. Example is a situation where the society value gift giving and also deem it natural to offer jobs and contracts to one's friends and relation (Rose-Ackerman, 1999). Therefore a public official in such a society who kicks against these values is seen very odd even though the practice may be corrupt. Out of obligations to friends or family, officials take bribes (de Graaf, 2007).

2.2.5 The Ethos of Public Administration Theories

These set of theories deal with the culture within public management and society in general. These theories look at corruption mainly from a societal level just like clashing moral values theories. Also the organizational level plays an important role here where instead of the individual, the macro factors work through the level of organizations (de Graaf, 2007). At the societal level the control of corruption should be a holistic approach. An example is by influencing the culture of emerging democracies (de Graaf, 2007) through various means such as creating corruption awareness campaign.

2.2.6 Correlation 'Theories'

Correlation theories start from specific factors unlike the other theories mentioned earlier which start from either an implicit or explicit theoretical explanation model. A quantitative comparison of registered cases of corruption in the fifty American states see (de Graaf, 2007) identified several factors to correlate with the level of corruption. Among these factors include; the historical and cultural variables explanations where urbanization and education are considered as important influences on corruption, the political explanations where voter turnout and party competition are considered as relevant influences and the bureaucratic explanations of corruption where the size of the public sector and gambling arrests are deemed important. de Graaf (2007) concluded that the theoretical model of corruption chosen determines the direction of solutions to the control of corruption. These theories and their causal chains is summarized by de Graaf (2007) and presented in Table 2.1.

Examining the six groups of theories concerning corruption reveals that the causes of corruption actually varies from country to country due to some specific characteristics of countries in terms of culture values and institutions. It is expected that these theories are considered in enacting policies which are aimed at the control of corruption. Also worth mentioning is the impact of the nature of corruption on foreign investment. Depending on the cause of corruption, its impact on foreign investment will vary from country to country. Some countries are more likely to attract foreign investment whiles others are less likely. Corruption based on public choice theory, bad apple theories and perhaps organizational culture theories increases the uncertainty associated with corruption.

Table 2.1 Theories of Corruption

	Causal chain	**Level of analysis of causes (independent variables)**	**Level of analysis of corruption (dependent variables)**	**The context**	**Most common research methods**
1. Public choice theory	A 'free' official making a (bounded) rational decision that leads to a more or less predetermined outcome.	Individual	Micro and Macro	Situational aspects mostly ignored; they cannot account for triggering causes. Starts from the moment the actor makes a calculation	Mostly theoretical
2. Bad apple theories	A causal chain from bad character to corrupt acts.	Individual	Individual	Attention to individual background.	Theoretical
3. Organizational Culture theories	A causal path from a certain culture – a certain group culture – leads to a mental state, which leads to corrupt Organizational behavior. Facilitating factors are described which, in some cases, strengthen a causal chain.	Organizational	Organizational	Organizational structure and culture; correlates to number of corruption cases. Situational aspects and contingencies mostly ignored.	Mostly Theoretical

Table 2.1 (continued)

	Causal chain	**Level of analysis of causes (independent variables)**	**Level of analysis of corruption (dependent variables)**	**The context**	**Most common research methods**
4. Clashing moral values theories	The causal chain starts with certain values and norms of society, which directly influence the values and norms of individuals. These values and norms influence the behavior of individual officials, making them corrupt.	Societal	Societal	Situational aspects reduced to moral conflicts of individuals	Mostly theoretical; some case studies
5. The ethos of public administration theories	A causal path from societal pressure –often though the level of organizations on officials to perform and lack of attention to integrity issues – leads to a focus of the official on effectiveness, making him or her corrupt.	Societal and organizational	Societal and Organizational	Situational aspects mostly ignored; no explanation of why some officials become corrupt and others do not.	Theoretical

Table 2.1 (continued)

	Causal chain	**Level of analysis of causes (independent variables)**	**Level of analysis of corruption (dependent variables)**	**The context**	**Most common research methods**
6. Correlation 'theories'	No causal model, only correlations.	All levels	All levels	Situational aspects and contingencies ignored; focus is on variables.	Surveys, Expert panels

Source: de Graaf, 2007.

2.3 The Broken Windows Theory and Corruption

Wilson and Kelling (1982) postulate a correlation between broken windows and social order. In their article, they argue that if a window in a building is broken and this window is left unrepaired there is the tendency that all the rest of the windows will soon be broken. It can be induced from this theory that if a corrupt public official is not removed, the likelihood of the rest of the public officials emulating the behaviour of this corrupt public official is high since it implies that no one cares. Alford (2012) explains the relevant of the broken windows theory for international corruption with respect to the payment of bribes to government officials. Alford (2012) argues that there is an observed connection between bribing a government official which is relatively a minor offence and the effect of that corruption on general public welfare. Payment of bribes to government officials is a corrupt practice and corruption is a strong signal of social disorder.

2.3.1 Broken Windows Theory of Corruption and Trust

There are empirical studies that have established connection between corruption and social trust (Alford, 2012). For example people's evaluations of their

political system's performance and the trustworthiness of civil servants is found to be significantly affected by corruption (Anderson and Tverdova, 2003). Another study by Uslaner (2005) found that corrupt leaders breed distrust throughout society. In spite of some empirical studies establishing flows from distrust to corruption, others suggest a flow from corruption to distrust, thus suggesting a reverse causality (Bjørnskov and Paldam, 2007). In all these postulations, it can be concluded that the link between corruption and distrust cannot be doubted (Alford, 2012). Building trust in the public institutions is very important because once the citizens of a country loose trust in these institutions, law and order breaks down in the society. According to Alford (2012), it is erroneous to assume that petty corruption is less serious than grand corruption with respect to trust in public institutions. This is because with respect to the broken windows theory, social costs of unpredictable corruption which is usually associated with petty bribes can be very enormous and worrying. Literature differentiates two types of corruption (Cuervo-Cazurra, 2008) which are pervasive corruption that is certain and arbitrary corruption that is uncertain (Rodriguez, Uhlenbruck and Eden, 2005). Studies indicate that foreign investors would rather pay large, predictable bribes than petty, unpredictable ones (Lambsdorff, 2005). Pervasive corruption is perceived as known cost of corruption because it is expected that bribes will be demanded from an investor going to a country with pervasive corruption (Cuervo-Cazurra, 2008) and in the case of arbitrary corruption, the foreign investors may or may not be asked for bribes when it enters a country and this represent the uncertainty associated with corruption. Literature shows that bribes do not "grease the wheels," but rather throw sand in them (Méon and Sekkat, 2005) and this discourage entrepreneurial activities.

2.4 The Determinants of Corruption

According to Rose-Ackerman (2006) nine possible causes of corruption have been prominent in recent research and these include the size of the public sector, the degree of economic competition, the structure of government, the quality of regulation, the amount of decentralization, the impact of culture, values and gender, and the role of invariant features such as geography and history. Due to country

heterogeneity with respect to theory and the determinants of corruption, levels of corruption varies across countries. According to Alford (2012), pragmatic evidence exist in support of a positive correlation between anti-corruption and other public goods like global competitiveness, human development and civil liberties. The determinants of corruption are discussed below.

2.4.1 The Size of the Public Sector

No consensus on the theoretical relationship between government size and corruption has been established (Seldadyo and Haan, 2006) though the size of government could be an important source of corruption. Earlier studies has shown little correlation between corruption and the size of the public sector (LaPalombara, 1994) however studies elsewhere (Elliott, 1997; Montinola and Jackma, 2002) did find the size of the government budget relative to GDP to decrease as levels of corruption rises. Some other studies have also established the negative impact of government spending on corruption (Fisman and Gatti, 2002). Also findings by Graeff and Mehlkop (2003) shows that corruption in high-income countries significantly decreases with government size. Contrarily to earlier reports, Ali and Isse (2003) found a positive impact of government spending on corruption. In relation to the size of government, some analysts believe that if corruption involves an egocentric government whose members attempt to selfishly enrich themselves then in order to control this type of corruption, the power of government must be limited. However little empirical findings is found in support of this proposition that if the size of the public sector is minimized, then corruption can be contained (Rose-Ackerman, 2006).

Another angle to the story is that government's budget corruption with respect to GDP also has the possibility of being affected by reverse causality because corrupt governments find it difficult in obtaining funding and this forces government to operate on small budget as a result of inadequate resources (Rose-Ackerman, 2006). Also Husted (1999) argues that in societies where authority is greatly accepted, governments are larger and this acceptance of authority would be a cultural determinant of both corruption and the size of the government budget. By way of remedies to the size of government, Boyko, Shleifer and Vishny (1996) opined that

privatization will not only be a means of reducing corruption but also increase efficiency at the same time. But other scholars also argued that corruption might be shifted from the public sector to the private sector by privatization (Rose-Ackerman, 2006) where the private firms will now be demanding bribes and this renders the impact of privatization on corruption uncertain.

2.4.2 Regulatory Quality

Rose-Ackerman (2006) submits that several economists point to bad regulation as one major determinant of corruption based on the premise that ill-designed policies create corrupt incentives for policy makers, bureaucrats and the public in general. Seldadyo and Haan (2006) persuasively conclude that 'regulatory capacity' is the most robust determinant of corruption. There are also situations where corruption too induces bad regulations (Rose-Ackerman, 2006) but the most obvious is the case of bad regulations influencing corruption which has been shown empirically. For example, Broadman and Recanatini (1999) finds higher corruption to be induced by higher barriers to market entry, Djankov, La Porta, Lopez-De-Silanes and Shleifer (2002) finds the time and official cost of a new business start-up as well as the number of procedures involved to be strongly correlated with a country's level of corruption. This seems to be supported by Svensson (2005) who also finds a positive correlation between the number of business days needed to obtain a legal status and corruption. Excessive barriers to market entry increase the cost due to red tape to firms and this clearly support the argument that entry regulation does not often correct market failure (Rose-Ackerman, 2006) but rather fuel corruption.

The issue is not only about regulation but its quality as well since quality of regulation plays an important role in controlling corruption. This assertion is supported by Gerring and Thacker (2005) who reported a positive association between regulatory quality and absence of corruption. Elbahnasawy and Revier (2012) also found rule of law to be strongly correlated with reduced corruption and this suggests that a better quality of law enforcement reduces corruption. In Africa, Lambsdorff and Cornelius (2000) found corruption to be positively correlated with the extent to which 'government regulations are vague and lax'. Therefore countries with strong institutions are more likely to attract FDI since law and order in a country

is among the most important elements necessary for investor confidence required for capital inflows. Sung (2004) suggests that there is high reward to countries that are able to realize and maintain the strongest and healthiest democratic institutions. Findings by Méon and Weill (2008) and Méon and Sekkat (2005) also show that in countries with deficient political institutions or policies, the marginal effect of corruption on growth is positive but negative elsewhere.

2.4.3 Lack of Economic Competition

It is the assertion by some researchers that the lack of economic competition leads to corruption. This is because competition drives down prices and therefore reduces the payoff of bribery activity which discourages corruption but when competition is restricted, profits increase which actually fuel corruption (Rose-Ackerman, 2006). The inverse relationship between competition and corruption is supported by several studies (Ades and Di Tella, 1995; Henderson, 1999). Since competition is found to decrease corruption it is therefore expected that an increased in trade openness and investment should lead to less corruption (Rose-Ackerman, 2006) and this assertion is supported by empirical findings (Ades and Di Tella, 1995, 1997, 1999; Gerring and Thacker, 2005; Sandholtz and Gray, 2003). A very strong correlation between corruption and competition has also been established by Emerson (2006) who found that countries which are less corrupt have more competitive industrial markets. There is competition for foreign direct investment by host countries and corruption is found to negatively impact their global competitiveness and foreign direct investment (Lambsdorff, 2003; Wei, 2000). Therefore countries which will want to attract more foreign investment should encourage competition and this will intend reduce corruption. Research report on import share shows that a higher import share leads to less corruption (Herzfeld and Weiss, 2003; Treisman, 2000).

2.4.4 Government Structure

Democracy has been postulated to limits corruption through increased competition for political power. Self-seeking governments are voted out of office and the opposition can win elections by promising improvements (Rose-Ackerman, 1978)

especially in countries where the administration of the incumbent government is suspected of being corrupt. Thus political liberty enforces transparency and provides checks and balances within the political system which tends to reduce corruption (Seldadyo and Haan, 2006). Empirical studies show that democracy has negative impact on corruption (Gerring and Thacker, 2004, 2005; Goldsmith, 1999; Paldam, 2002; Persson, Tabellini, and Trebbi, 2003; Sandholtz and Koetzle, 2000). Montinola and Jackman (2002) found corruption to be slightly lower in dictatorship countries than in countries that are partially democratized. Empirical evidence is mixed on the impact of decentralization or federalism on corruption (Seldadyo and Haan, 2006). Whereas some studies show that decentralization reduces corruption significantly (Ali and Isse, 2003; Fisman and Gatti, 2002; Gurgur and Shah, 2005; Lederman, Loayza, and Soares, 2005) studies elsewhere argue that federalism rather increases corruption (Damania, Fredriksson and Mani, 2004; Goldsmith, 1999; Kunicova and Rose-Ackerman, 2005; Treisman, 2000).

2.4.5 Income of the Country

There is a distinction made in literature between the causes of corruption in lower income countries and in higher income countries (Fijnaut and Huberts, 2002). Whereas literature (Akcay, 2006; de Graaf and Huberts, 2008; Shleifer and Vishny, 1993) suggest that the nature of corruption in low income countries might be different from the nature of corruption in high income countries, Roman and Miller, (2012) suggest the contrary. Low income countries are characterized by low salaries and poor working conditions which immensely enhances corruption. Recent research shows that rich countries have lower corruption (Elbahnasawy and Revier, 2012). Business is also conducted differently in lower income countries and in higher income countries. Campos and Giovannoni (2006) opined that while companies in poor countries have to rely on corruption, legal mechanisms such as lobbying are deployed by companies in rich countries.

2.4.6 Culture

Sociologists allude to cultural variables to be the cause of corruption in contrast to the view of economists due the invariance of cultural variables over time.

There is the possibility that the causality runs from culture to corruption and not the other way around (Rose-Ackerman, 2006). Husted (1999) argues that the effective measures to deploy in the fight against corruption are dependent on culture. One of the major values that bind a particular group of people or society together is trust among its members and as stated earlier, some empirical studies suggest a reverse causality between distrust to corruption (Bjørnskov and Paldam, 2007). La Porta, Lopez-de-Silanes, Shleifer and Vishny, (1997) argue that trust can aid in the fight against corruption and Uslaner (2005) supports the negative association between corruption and trust . Rose-Ackerman (2006) is of the opinion that though corruption is low in countries with a large proportion of 'Reform Christianity' and tribal religions, it is possible that large influence of 'Pre-Reform Christianity', Islam, Buddhism and Hinduism in these countries may lead to the prevalence of higher levels of corruption. Treisman (2000) found a highly significant negative correlation between religion and corruption. Husted (1999) and La Porta et. al, (1997) postulate that hierarchies contribute to corruption and Hofstede (1997) and Robertson and Watson (2004) found other cultural variables to correlate positively and significantly to the level of corruption.

2.4.7 Geography and History

Some geographical and historical variables are also considered in literature to foster corruption. Among these variables include the abundance of natural resources, high levels of corruption in neighboring states and large distance to the world's major trading centers (Rose-Ackerman, 2006). The abundance of natural resources presents opportunities for rent seeking which leads to corruption (Ades and Di Tella, 1999; Leite and Weidemann, 1999). This assertion is supported by Seldadyo and Haan (2006) who posit that countries with a high export share of raw materials, have high probability of the occurrence of corruption practices. Apart from the high natural resource endowment of countries leading to rents-related corruption, the extent of corruption in the neighbouring countries can influence the manifestation of corruption in countries. Research shows that countries which are bordered by corrupt neighbours exhibit higher levels of corruption (Sandholtz and Gray, 2003).

2.4.8 Gender

Another area of concern with respect to the causes of corruption is the issue of gender. It is argued that male-dominated networks might encourage corruption whilst improved women's rights may lower corruption (Rose-Ackerman, 2006). Rose-Ackerman (2006) postulate that by embracing parliamentary debates with both sexes and communicating bureaucratic decisions across sexual boundaries, corruption may be decreased as a result of improved transparency. Research by Swamy, Knack, Lee and Azfar (2001) and Dollar, Fisman and Gatti (2001) indicate that, a higher female labour participation, and a high number of women in parliament and in government leads to less corruption.

All these discussions above support the point that the level of corruption varies from country to country due to differences in the determinants of corruption in these countries. Since investors care about the return on their investments, they take into consideration the level of corruption in the host country before an investment decision is made.

2.5 The Consequences of Corruption

Research on the consequences of corruption has taken a wider dimension since varied results have been reported depending on the area of interest and focus of research. The discussion of effects of corruption can be considered as an entity having independent impacts on other social occurrences or variables (Andvig, Fjeldstad, Amundsen, and Søreide, 2000).

2.5.1 "Grease in the Wheel" Hypotheses

Corruption has been argued by economist to have two sides with respect to its impact on economic development. Some authors have suggested that corruption might raise economic growth, through two types of mechanisms. The first is by "speed money" which would enable the avoidance of unnecessary bureaucratic delay and this will be beneficial to growth especially in countries where bureaucratic regulations are cumbersome. The second is that government employees who are allowed to levy bribes would work harder (Huntington, 1968; Leff, 1964 as cited in Mauro, 1995).

The “grease the wheels” hypothesis is more prominent in the early literature on economics with much emphasis on the effects of corruption on efficiency (Huntington, 1968; Leff, 1964 Leys, 1965). Beck and Maher (1986) and Lien (1986) suggested that corruption can increase efficiency because inefficient regulations constitute an obstacle to investment which can be removed by bribing bureaucrats.

2.5.2 “Sand in Wheel” Hypothesis

Aidt (2009) found very weak evidence supporting the "greasing the wheels hypothesis" but rather discovers a strong negative correlation between growth in ‘genuine wealth per capita’ and corruption. Elsewhere, some authors argue that corruption would tend to lower economic growth (Shleifer and Vishny, 1993). Svensson (2005) found highest levels of corruption to be associated with developing or transition countries**.** Malfunctioning government institutions have been argued to constitute a severe obstacle to investment, entrepreneurship, and innovation by many economists (Mauro, 1995). Mauro (1995) used cross-country subjective measures of corruption to show that corruption is negatively associated with private investment and growth. This results is supported by other empirical studies (Brunetti, Kisunko and Weder, 1997; Elliott, 1997; Knack and Keefer, 1995). Kaufmann and Wei (2000) found that firms that pay more bribes are also likely to spend more management time with bureaucrats negotiating regulations and thus face higher cost of capital.

Campos, Lien and Pradhan (1999) classify countries into three broad groups based on the level of corruption and its “predictability”. The first group constitutes countries with high levels of corruption and low predictability and these are the worst off in terms of attracting foreign investments. The second group constitutes countries with high levels of corruption but greater predictability and these countries are better off than those described in the first group in terms of attracting private investment. The third group constitutes countries with low levels of corruption and high predictability and these countries are the best off.

This study argues that corruption might be a means of making business operations in an economy easier especially in countries where bureaucratic regulations are cumbersome but when corruption goes beyond the giving out of “something” for example to avoid unnecessary bureaucratic delay, to malfunctioning

of government institutions, then corruption is expected to have a negative impact on private investment. This is because, as stated earlier, corruption restricts the use of available technologies and limits the efficiency gains from current innovation. Research has shown that at low levels of corruption the beneficial effects of corruption dominate the detrimental effects and vice versa (Mendez and Sepulveda, 2006). Wedeman (1997) is of the view that the correlation between corruption and investment might be strong for countries with little corruption but the strength weakens for countries with higher levels of corruption. Aidt (2009) suggest that the consequence of corruption depends on the specific regime and countries sort themselves into different growth-corruption regimes, conditional on the quality of their political institutions. This is based on the premise that the effect of corruption on growth has been found to be negative in countries with good governance, while in countries with poor governance, the effect is positive (or less negative) (Aidt, Dutta and Sena, 2008; Mendez and Sepulveda, 2006).

2.6 Measurement of Corruption

Corruption is a crime where both the "giver" and "receiver" are not only both guilty of the same crime but are also both beneficiary of the crime. This makes corruption difficult to measure. Various institutions have made attempt to measure corruption in various countries. These corruption perception indices, such as the World Bank's Control of Corruption index (WB), the Transparency International's Corruption Perception Index (CPI), or the corruption index of the International Country Risk Guide (ICRG) are routinely interpreted as measures of corruption experiences (Donchev and Ujhelyi, 2006). The World Bank's Country Policy and Institutional Assessment (CPIA) is a hybrid of centralized and decentralized expert-based ratings. The Worldwide Governance Indicators (WGI) are research dataset that summarize the views on the quality of governance provided by a large number of enterprises, citizen and expert survey respondents in industrial and developing countries. World Business Environment Survey (WBES) on firms gives evidence on country-level firms' corruption experience.

Corruption perception index (CPI) is a composite index which comprises of a combination of surveys and assessments of corruption, collected by a variety of reputable institutions that scores and ranks countries/territories based on how corruption in a country's public sector is perceived to be. Scores are assigned on a scale of 1-10 with 10 being the lowest level of corruption and 1 being the highest. There have been various arguments on the authenticity of the use of CPI as an indicator of corruption in a country since it is based on "mere" perception. But this argument is flawed since corruption generally comprises illegal activities, which are deliberately hidden and only come to light through scandals, investigations or prosecutions. Therefore according to Transparency International, capturing perceptions of corruption from those who are in a position to offer assessments of public sector corruption is the most dependable method of comparing relative corruption levels across countries.

Worldwide Governance Indicators (WGI) data are gathered from a number of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms. WGI started in 1996 and cover over 200 countries and territories. WGI measure six dimensions of governance and these include; political stability and absence of violence/terrorism, voice and accountability, government effectiveness, rule of law, regulatory quality and control of corruption. According to Kaufmann, Kraay and Mastruzzi (2010), WGI permit meaningful cross country and over time comparisons. Control of Corruption reflects perceptions of the extent to which public power is exercised for private gain. This includes both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The WGI data sources reflect the perceptions of a very diverse group of respondents. These sources include the World Economic Forum's Global Competitiveness Report, the Institute for Management Development's World Competitiveness Yearbook, the World Bank/EBRD's Business Environment and Enterprise Performance surveys, the Gallup World Poll, Latinobarometro, Afrobarometro, and the AmericasBarometer. The respondents in the surveys include individuals or domestic firms with firsthand knowledge of the governance situation in the country. Estimate of governance ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance (World Bank - WGI, 2013). Kaufmann, Kraay and

Mastruzzi (2003) deployed different strategy than Transparency International to aggregate the corruption indicators and concluded that definitions and 'aggregation choice' seem to matter only marginally since the main difference between the indicators depends on the countries and years covered. This is because Kaufmann et. al (2003) found that the correlation between control of corruption (from 2002) and the corruption perceptions index (from 2003) is 0.97. The correlation between control of corruption or the corruption perceptions and the corruption scores from the International Country Risk Guide (from 2001) is 0.75 (Svensson, 2005).

2.7 Corruption in Africa

African countries continue to face various levels of challenges with respect to political instability due to internal conflict, external conflict, military in politics, corruption and religious tensions as indicated earlier. The extreme poverty on the African continent is largely attributed to the corruption by the authorities. Transparency International scores countries on a 10-point scale, with zero being the most corrupt. Also as stated earlier, over the years majority of African countries scored either 3.0 or below on the corruption perception index rating. In 2008, 2009 and 2011, 87% of the countries scored either 3.0 or below. The percentage was 83% in 2010. In 2012, 77% of the countries scored either 3.0 or below and this indicates a slight improvement over the previous years. These percentages give an alarming indication of the extent of corruption on the African continent. This is shown in Figure 1 below.

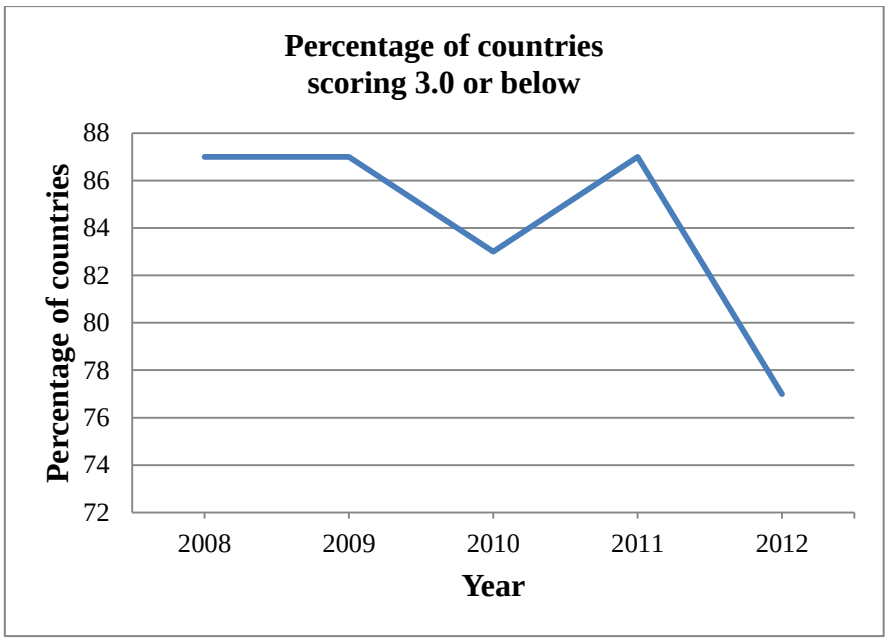

Figure 2.1 Percentage of countries scoring 3.0 or below on the corruption perception index

The 2010 list of countries on the corruption perception index ranked six African nations among the 10 most corrupt countries. These countries are Somalia, Sudan, Chad, Burundi, Angola and Equatorial Guinea. Majority of the countries scored 2.0 on the corruption perception index over the years as depicted in Figure 2. Though it has been argued that corruption might have positive influence on investment, beyond certain levels of corruption, its influence on investment may be negative (Transparency International, 2009, 2010, 2011, 2012).

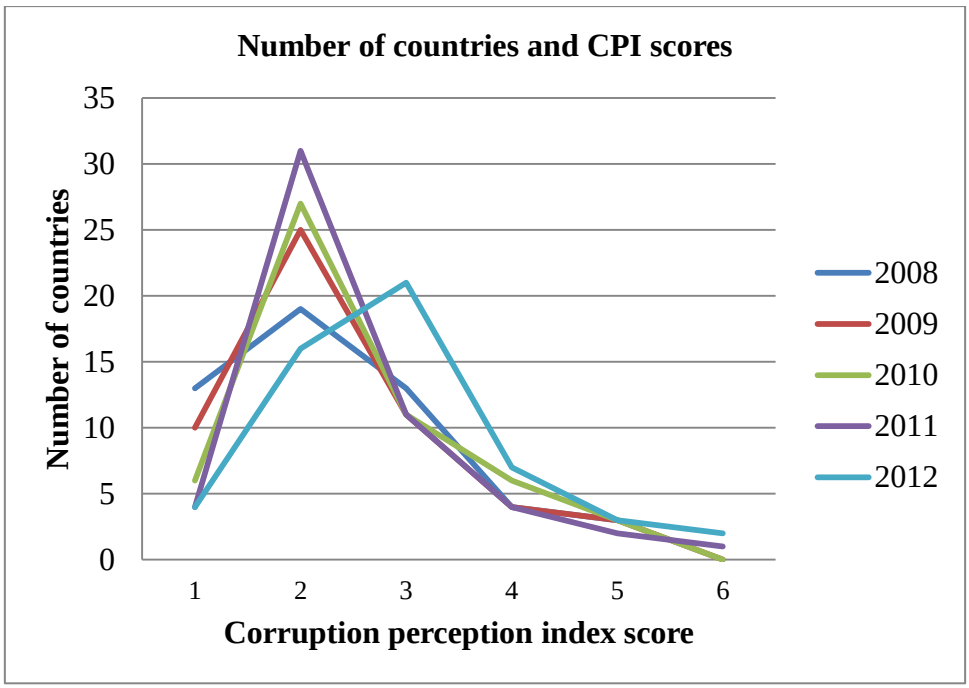

Figure 2.2 The number of countries and corruption perception score

Though African countries are signatories to the United Nations Convention against Corruption (UNCAC), majority of Africans do not trust the anti-corruption efforts of their governments. This is indicated by the 2013 Afrobarometer survey on corruption perception. The 2013 Afrobarometer survey report by Dulani, Mattes and Logan, (2013) revealed that, 56% of the participants surveyed were of the view that their governments have done a "fairly" or "very bad" job in fighting corruption while just 35% opined that their governments have done this "fairly" or "very well". This is against the conscious efforts claimed by many political leaders and most major international organizations to have been made in eradicating corruption and improving governance in Africa.

The literature reviewed highlighted on the causes and consequences of corruption as well as the benefit and uncertainty associated with corruption. How this benefit and uncertainty or risk associated with corruption affect foreign direct investment is the object for discussion in the next chapter.

CHAPTER 3

THEORY OF FOREIGN DIRECT INVESTMENT AND CORRUPTION

This chapter commences with literature review on the theories of foreign direct investment. This is followed by the formulation of a theory relating corruption and FDI inflow. The next issue discussed is foreign direct investment inflow to Africa which is followed by the determinants of foreign direct investment inflow. The rest of the chapter discusses foreign firms' ownership and corruption and then the determinants of foreign ownership of firms.

3.1 Foreign Direct Investment

Direct foreign investment is defined as an investment in which the investor acquires a substantial controlling interest in the foreign firm or sets up a subsidiary in the foreign country. Companies that engage in direct foreign investment are referred in literature as multinational enterprises (MNE). International trade economists have tried to use theory to explain foreign direct invest (Markusen, Melvin, Kaempfer and Maskus, 1995). Ricardo's theory of comparative advantage was the first attempt to explain FDI (Denisia, 2010). Denisia (2010) explained that since Ricardo's theory of comparative advantage is based on two countries, two products and a perfect mobility of factors at local level, the theory cannot be used to explain FDI. A distinction has been made by most international trade economist between direct and portfolio investment. It has been observed that MNEs rarely move substantial amount of capital between countries but rather frequently provide for many of their needs from the foreign capital market. The failure of Ricardo's comparative advantage theory to explain the rising share of FDI called for the development of other models such as the portfolio theory. The portfolio theory explains the achievement of foreign investments in a portfolio but also failed because the theory could not explain the direct investments (Denisia, 2010). The theory explicates that, capital move from low

interest rates countries to high interest rates countries as long as there is no risk or barriers in the way of capital movement. This assertion has been criticized of having no basis in reality (Hosseini, 2005). Actually MNEs are formed to take advantage of specific business opportunities rather than the secondary benefits of general level of interest rates and return on capital. A theory by Mundell (1957) also tried to explain FDI involving two countries by using a model of international trade which include two goods, two production factors and two identical production functions in both countries. In the model, the production of a good requires a higher proportion of a factor than the other. But Mundell's model fell short in explaining international production through FDI, since foreign investment consist of either short term investment or portfolio investment (Denisia, 2010). International trade economists are of the view that there are differences between direct investment and portfolio investment.

It is important to acknowledge the fact that foreign firms are at an inherent disadvantage in the domestic market compared to the domestic firm. Therefore for a foreign firm to enter a domestic firm, that firm must find it profitable which calls for MNEs to possess some special advantage such as superior technology or lower cost due to economics of scale (Markusen et al., 1995). Markusen et al. (1995) enumerated various inherent disadvantages of setting up MNEs abroad. Among these include the costs needed in maintaining branch plants or subsidiaries in foreign countries and in communication and transportation which is not faced by domestic firms. The language and cultural differences between the home and foreign countries unavoidably create costs for the MNEs that are not faced by domestic firms. The local laws such as tax laws and other government's procedures tend to discriminate actively against MNEs. MNEs also faces risk such as exchange rate volatility, expropriation, or other capricious government activities that may not necessary affect the domestic firm. If firms and their owners are risk – averse, the uncertainties faced by the MNEs constitute a true business cost (Markusen et al., 1995). As a result of these disadvantages, MNEs will enter a foreign market only if it possesses some compensating advantages such as superior technology over the domestic firms and this must be included in the analysis of foreign direct investment.

3.2 Theories of Foreign Direct Investment

The following is the classification of theories of foreign direct investment.

3.2.1 Production Cycle Theory of Vernon

Vernon (1966) developed the production cycle theory to explain foreign direct investment made by U.S. companies in Western Europe in the manufacturing industry. The theory explains that in the first stage of the production cycle, manufacturers have an advantage by possessing new technologies and with the development of the product, the technology becomes known and so other companies tend to imitate. This theory tried to explain certain types of investments made by U.S. companies in Europe Western between 1950 and 1970 (Denisia, 2010).

3.2.2 The Theory of Exchange Rates on Imperfect Capital Markets

Cushman (1985) analyzed the influence of uncertainty as a factor of FDI. Cushman assertion was based on the premise that an increase in the real exchange rate promoted FDI made by USD, while appreciation of foreign currency reduced American FDI. Nevertheless, cases of simultaneous foreign direct investment between countries using different currencies cannot be explained by this theory (Denisia, 2010).

3.2.3 The Internalization Theory

This is a theory developed by Buckley and Casson (1976) and then by Hennart (1982). The theory explained the growth of transnational companies and their enthusiasms for investing abroad. Buckley and Casson, (1976) demonstrated in their theory that transnational companies organize their internal activities so as to build up some specific advantages. In the assertion of FDI at firm level, Hymer (1976) is of the view that FDI is a firm-level strategy decision to make rather than a capital-market financial decision and therefore posits that FDI will take place only if the benefits accruing from exploiting firm-specific advantages outweigh the relative operation costs abroad. Dunning (1988) relied on this internalization theory in developing the eclectic theory.

3.2.4 Dunning Eclectic Paradigm

The Dunning (1988) eclectic theory is made up of three different theories of direct foreign investments; the ownership advantage, the location advantage and the internalization theories (O-L-I). These theories are discussed below.

3.2.4.1 "O" from Ownership advantages:

This refers to products or production process or intangible assets such as trademark, which are exclusive possesses of the company and may be transferred within transnational companies at low costs resulting in either higher incomes or reduced costs. To successfully enter a foreign market, a company must possess certain characteristics that would make the company profitable on a foreign market since MNCs face some additional costs of operations when performed in different countries. Agarwal and Ramaswami (1992) suggest that MNCs must possess superior assets and skills when moving operations to a foreign market in order to be competitive and earn sufficient economic rents. A firm can use its own specific advantages in the foreign country to earn a higher marginal profit or decrease marginal cost than its competitors (Dunning, 1973, 1980, 1988 as cited in Denisia, 2010).

The following are three types of specific ownership advantages by Gorg and Greenaway (2002) and cited by Denisia (2010).

1) "Monopoly advantages in the form of privileged access to markets through ownership of natural limited resources, patents, trademarks";

2) "Technology, knowledge broadly defined so as to contain all forms of innovation activities"

3) "Economies of large size such as economies of learning, economies of scale and scope, greater access to financial capital".

According to Dunning (1980), Resource-based view (RBV) can be used as an analytical tool to recognize a firm's resources and identify its ownership advantages. RBV suggests that companies that have superior resources with attributes such as being valuable, rare, imperfectly imitable and non-substitutable can earn sustainable returns (Óladóttir, Harðardóttir and Jóhannsdóttir, 2008). This notwithstanding, Priem and Butler (2001) as cited in (Óladóttir et al. 2008) argue that RBV is repetitious and cannot pass empirical tests and therefore does not meet the test of being a theory.

3.2.4.2 "L" from Location:

Among the key factors in determining the host countries for transnational corporations are the location advantages of these countries. The specific location advantages of each country can be divided into three categories (Hanson, 2001) and these categories are cited by Denisia (2010) as follows;

1) "The economic benefits consist of quantitative and qualitative factors of production, costs of transport, telecommunications, market size etc".

2) "Political advantages: common and specific government policies that affect FDI flows"

3) "Social advantages: includes distance between the foreign and home countries, cultural diversity, attitude towards strangers etc".

According to Óladóttir et al. (2008), sources of location advantages include structural market distortions, like government intervention which has the potential of affecting the costs of business operation and the generated revenues. It has been suggested that government intervention can motivate or discourage companies to locate and operate in a particular country (Dunning, 1988). This depends on whether the intervention encourages entrepreneurial activities or not. The institutions in the domestic country has the potential of attracting or otherwise foreign firms depending on whether with the existing institutions, the foreign firm can capitalize on its location advantage. Institutions are defined by Douglass North as 'rules of the game in society' or 'human-devised constraints that shape human interaction'. North (1990) posits that any strategic choice that a firm makes will be affected by either the formal constraints (political rules, judicial decisions and economic contracts) or informal constraints (norms of behaviour and traditions) of the institutional framework. North, (2005) postulates that stable institutions structure efficient markets towards an 'economic exchange orientation' which leads to low transaction cost and reduced uncertainty. This offers incentives for the firms to compete through price and quality (Óladóttir et al., 2008).

3.2.4.3 "I" from Internalisation:

If a firm has some ownership and location advantages, the firm must be able to use these advantages, together with other factors outside the country of origin to be profitable (Dunning, 1973, 1980, 1988).

According to Denisia (2010), this third characteristic of the eclectic paradigm of OLI builds a framework for evaluating different ways in which the company can operate in the foreign country by exploiting its capabilities. Internalization theorists opine that FDI occurs when the benefits due to internalization outweigh its cost (Fina and Rugman, 1996). Williamson (1985) suggests that the desire to minimise transaction cost will inform the choice of a firm governance structure by MNCs for a venture. Unlike the neoclassical view of efficiency, Transaction Cost Theory (TCT) considers the firm as a hierarchy that adds value by economizing on transaction costs. Firms therefore exploit their ownership and location advantages in order to minimize their transaction cost.

Eclectic paradigm OLI framework shows that OLI parameters differ from firm to firm and the extent to which a firm can benefit from these OLI parameters depends on the economic, political and social characteristics of the host country. Therefore the objectives and strategies of the firms, the magnitude and pattern of production (Denisia, 2010) and the choice of country to invest will be contingent on the challenges and opportunities present in these countries.

3.3 Theory of Corruption and FDI inflow

It has been argued that a strong policy and regulatory regime, appropriate institutions, good infrastructure, and political and economic stability are important in attracting FDI inflow (Mwilima, 2003). One area of institutions of the domestic country which has generated a lot of interest in recent times is corruption. Tebaldi and Mohan (2009) posit that good institutions enhance the efficacy of technology and augment both labour and capital productivity while bad institutions decrease the efficacy of technology as well as labour and capital productivity. It has also been shown that poor institutional arrangements which is manifested by corruption and poor enforcement of laws and contracts reduce the returns to investments and capital accumulation (Brunetti, Kisunko and Weder, 1997; Lambsdorff, 1999; Mauro, 1995; Wei, 2000a). Most research on the effect of institutional quality on FDI inflow reveal that countries that have weak institutions, in particular, high corruption and a legal system that is not reliable tend to receive less FDI (Gastanaga et al., 1998; Wei,

2000b). Few studies such as Wheeler and Mody (1992) and Poelhekke and van der Ploeg, (2010) found no significant relationship between FDI and institutional quality. Asiedu (2013) attributed the measure of institutional quality and the source of country FDI as the two reasonable explanations for the conflicting results. According to Asiedu (2013) studies that found a significant relationship between institutional quality and FDI used indicators that measure a specific aspect of institutional quality whiles studies that did not find any significant relationship used a composite measure of institutional quality. Also research by Wheeler and Mody (1992) and Poelhekke and van der Ploeg (2010) was focused on FDI from one source country.

It is also argued that a firm's entry mode in a foreign market depends upon critical scrutiny of the locational advantage of each specific market in line with firm's ownership advantages (Agarwal and Ramaswami, 1992). Casi and Resmini (2011) grouped into two broad sets, the location-related determinants of FDI that are able to inform MNEs' choice of a location for their production plants. These sets include demand factors and supply characteristics. Local demand conditions usually refer to market size, market access and growth prospects. Studies on the size of market and FDI indicates that the size of the local market (Garibaldi, Mora, Sahay and Zettelmeyer, 2002; Nunes, Oscategui and Peschiera, 2006; Sahoo, 2006) and access to other neighbouring markets are likely to exert a strong effect on FDI location. As a result of barriers in accessing certain markets (for example the European core markets), regions with good geographical and economic accessibility to the major markets are likely to receive more FDI than other regions. Literature on GDP growth rate indicates that there exist a positive relationship between FDI and GDP growth rate. GDP growth rate is often used in the literature as a proxy for potential local demand. Nnadozie and Osili (2004) found GDP growth to have significant impact on FDI. On the supply side, Casi and Resmini (2011) indicates factors ranging from the structure of the local economy, factor costs, resource endowments, skills of labour force and all those factors in the general business environment affecting foreign firms as location-related determinants of FDI. These factors are able to inform MNEs' choice of a location for their production plants. Desai, Gompers and Lerner (2003) found that corruption does not significantly affect firm entry rates in their overall sample and the Eurozone, but significantly decreases firm entry rates in Central and

Eastern European countries. Ovaska and Sobel (2004) also find corruption to significantly decrease the number of new firms.

Research having shown corruption to have both positive and negative effect on FDI implies that there is a level of corruption that investors are likely to gain from their investments and so would not mind investing. Beyond this level, the returns to the firm's investments begin to dwindle and this makes investing in that country unattractive. The idea is to develop a model that accounts for the impacts of institutions on the adoption of available technologies and productivity which will influence the decision of the investor to choose to invest in an economy. More specifically the model seeks to find out how corruption impact on the capacity of transnational corporations to exploit its ownership and location advantages.

3.3.1 Theoretical Framework

Consider an entrepreneur who wishes to take an investment decision in a foreign country. The entrepreneur has an ability to operate his/her own technology and also choose the country of investment. This technology is assumed not to be subjected to individual-specific shocks but faces aggregate uncertainty due to the state of institution in the country of investment. This is because the entrepreneur faces the risk of eroding his/her capital if the corruption in the country exceeds a tolerable level by decreasing the returns to his/her investments and hence his/her capital accumulation. The idea is for the investor to decide whether to choose to invest in an economy or not, taking into consideration that a level of the quality of institution in that economy has the likelihood to decrease the returns to investments and reduce capital accumulation. The choice of an economy depends on the level of corruption in that economy. It is assumed that market opportunity and prices for the firm's product is the same in all economies.

Production function

At every level of capital stock, greater technology would allow greater economic output. Therefore an increase in technology from A_0 to A_1 would shift the production function higher, increasing the marginal product of capital. However, the qualities of institutional arrangements in the country which is manifested by corruption and poor enforcement of laws, may affect the technology or productivity.

If the level of quality of institution falls below $\bar{T}$ the entire production function will shift downwards from (1) to (2). A downward shift in the production function will result in the output decreasing from Y_1 to Y_2 and a subsequent decrease in the profits measured in units of output from $\frac{\pi_1(T)}{p}$ to $\frac{\pi_2(T)}{p}$ (the vertical intercept in figure 3.1). This translates to a decrease in the return to capital invested. A typical production function is shown below with the capital on the horizontal axis.

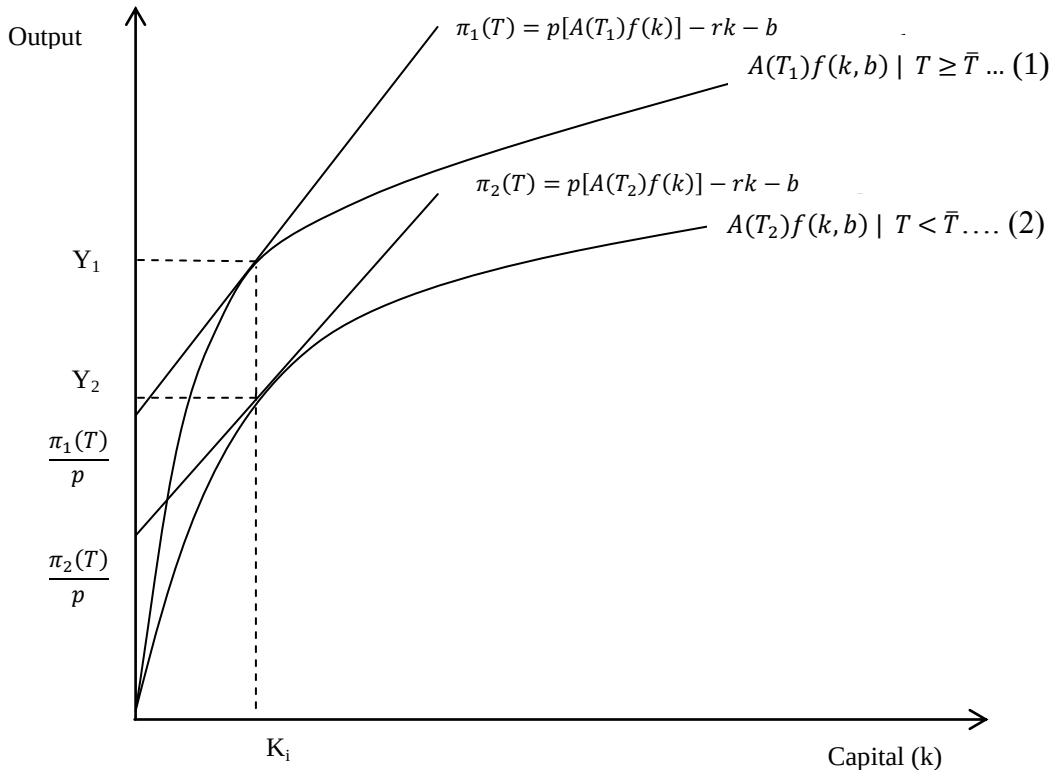

Figure 3.1 A typical production function with capital on the horizontal axis

Beyond a certain level of quality of institution in the country, the return to capital is high and below this level, the return is low. This level of quality is what is referred to as the Corruption Tolerable Level of Investment (CTLI) and indicated as $\bar{T}$ in the figure 3.1. The precise specification of the production function is described below. The productivity is a function of the level of institution in the country. Salinas-Jiménez and Salinas-Jiménez, (2007) used a –parametric frontier approach to examine the effects of corruption on total factor productivity and found that corruption had a

negative effect on efficiency. The amount of labour input is fixed at a normalized value of one. This assumption is also adopted in literature (Angeletos and Calvet, 2006; Cagetti and De Nardi, 2006; Covas and Fujita, 2011). Production function is

$$y_i = A(T_i)f(k_i)$$

where y_i refers to the output, $A(T_i)$ represents the level of productivity which depends on the quality of institutions of the foreign country i. k_i is the physical capital used by firm in production.

Assumptions about $f(k)$:

$f(0) = 0$, $f' > 0$ and $f'' < 0$ (production function is strictly increasing and strictly concave) and also obeys the Inada conditions in order to ensure that there is an interior solution.

The Inada conditions are;

1) f is twice differentiable on $(0, \infty)$,
2) $f'(k) > 0$ and $f''(k) < 0$ for each $0 < k < \infty$,
3) $f'(0) = \infty$ and $\lim_{k\to\infty} f'(k) = 0$

The firm is therefore "privately held" by the entrepreneur and so issuance of equity is not allowed. The investor has no access to risk free asset. The risk of eroding his/her capital if the corruption in a country exceeds a tolerable level can also not be insured by any insurance market.

Preposition:

Beyond a certain level of corruption in a country, firms are no longer interested in investing in that country

Figure 3.2 show the return on investment with respect to the level of institution in the country of investment. At high quality of institution of a country, the return (R_2) is high and at low quality of institution, the return (R_1) is low.

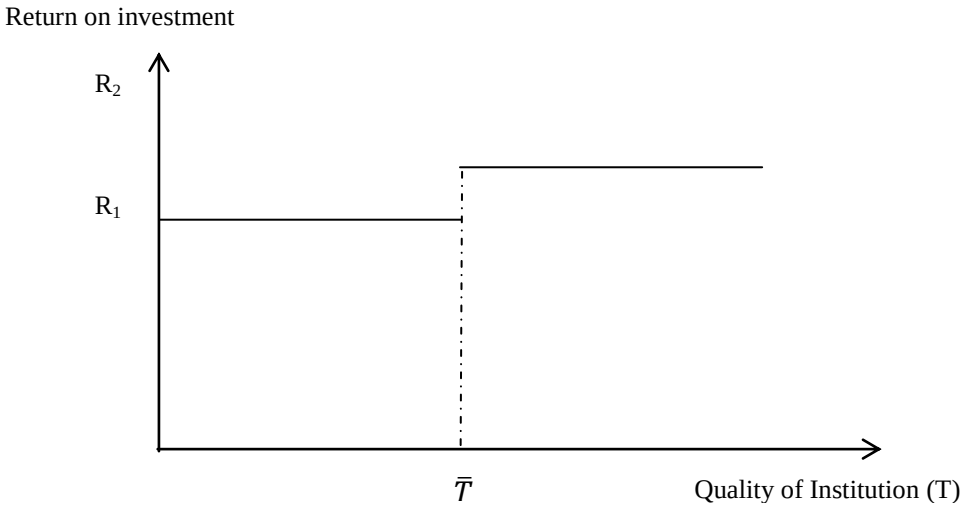

Figure 3.2 Return on investment with respect to the level of institution

3.3.2 Firm's Optimization Problem in the Foreign Country

A basic hypothesis on individual firm behaviour in the producer theory is that a firm will always choose a most profitable production plan from the production set. Therefore by deploying a firm's optimization problem, it is possible to find out the impact of the quality of institution of a country on foreign investment. Countries have been categorized in terms of level of corruption and its "predictability by Campos et al. (1999). Countries with high levels of corruption and low predictability are the worst off in terms of attracting foreign investments and those with low levels of corruption and high predictability are the best off (Campos et al., 1999). Corruption has also been categorized into two, which are pervasive corruption and arbitrary corruption (Rodriguez et al., 2005) as stated earlier. These categorizations are brought to bear on the firm's maximization problem.

3.3.3 Firm's Optimization Problem with Arbitrary Corruption

In some of the countries, investors may or may not be asked for bribes and this type of corruption is referred to as arbitrary corruption (Cuervo-Cazurra, 2008). Arbitrary corruption increases the uncertainty associated with corruption and for that matter the risk faced by the investor. With this type of corruption, investors are not able to factor the choice of bribe to be paid in their maximization problem.

The firm's optimization problem becomes

$$Max_{k_i}\ \pi(T_i) = p[A(T_i)f(k_i)] - rk_i$$

First Order Necessary Condition

$\frac{\partial \pi(T_i)}{\partial k_i} = p[A(T_i)f_k(k_i)] - r = 0$, $\frac{\partial f(k_i)}{\partial k_i} = f_k(k_i)$…… (1)

At equilibrium

$p[A(T_i)f_k(k_i)] - q = 0$…… (2)

Taking total differentiation of the equation (2) we obtain

$$[A(T_i)f_k(k_i)]dp + pA(T_i)f_{kk}(k_i)]dk_i + \left[pf_k(k_i)\frac{\partial A(T_i)}{\partial T_i}\right]dT_i - dr = 0$$

To find the impact of the quality of institutions on capital invested, dp and dr is set to zero.

That is $dp = dr = 0$.

$$pA(T_i)f_{kk}(k_i)]dk_i + \left[pf_k(k_i)\frac{\partial A(T_i)}{\partial T_i}\right]dT_i = 0$$

Therefore

$$\frac{\partial k_i}{\partial T_i} = \frac{-\left[pf_k(k_i)\frac{\partial A(T_i)}{\partial T_i}\right]}{pA(T_i)f_{kk}(k_i)] > 0}$$

This means that an increase in the level of quality of institution (decrease in corruption) increases capital investment.

Let b_i be the amount of bribes paid by investors in the foreign country. When the level of quality of institution is increasing or improving, it is expected that the amount of bribes paid reduces and so $b_i \approx 0$ if there is high level of quality of institution in the country. When level of the quality of institution is equal to or above the investment tolerable level in the country ($i.e. T_i \geq \bar{T}$, $y = f(k_i) = Y_1$ as shown in Figure 3.1), the amount of bribe paid is low. Therefore the profits measured in units of output minus the bribe paid $\left[\frac{\pi_1(T)}{p} - b_1\right]$ is high and thus the investor is motivated to invest in the country. It can therefore be postulated that when $T_i \geq \bar{T}$, corruption will have a positive effect on foreign investment inflow.

However, when level of the quality of institution is below the investment tolerable level in the country ($i.e. T_i < \bar{T}$, $y = f(k_i) = Y_2$ as shown in Figure 3.1) the

output is low with same amount of capital investment. The amount of bribe paid at this level of quality of institution is high. Therefore the profit minus the bribe paid $\left[\frac{\pi_2(T)}{p} - b_2\right]$ is low and therefore the investor is not motivated in this case to invest in the country. It can also be postulated that when $T_i < \bar{T}$, corruption will have a negative impact on foreign investment inflow. Therefore as the value of $\left[\frac{\pi(T)}{p} - b\right]$ increases, investments increases and as the value decreases, investments decrease as well. This assertion supports the argument that at low levels of corruption the beneficial effects of corruption dominate the detrimental effects and vice versa (Mendez and Sepulveda, 2006).

3.3.4 Firm's Optimization Problem with Pervasive Corruption

With pervasive corruption (known cost of corruption) investors are aware bribes will be demanded from them by both public officials and politicians to obtain for example government contracts (Cuervo-Cazurra, 2008) and so will factor this in their profit maximization problem. This is because bribery behavior is negatively related with the cost and positively related with the expected revenue (Lianju and Luyan, 2011).Therefore investors will take the choice of the amount of bribe to be paid with respect to the return on their investment into consideration in their investment decisions.

Firm's optimization problem

If the entrepreneur invests k_i, and takes the amount of bribes (b_i) paid into consideration in optimizing both cost and benefit of bribe, the firm's optimization problem in the country becomes

$$Max_{k_i,b_i}\pi(T_i) = p[A(T_i)f(k_i,b_i)] - rk_i - b_i$$

Where p and r are exogenous. p = price of output, r = interest rate

First Order Necessary Condition

$$\frac{\partial\pi(T_i)}{\partial k_i} = p[A(T_i)f_k(k_i,b_i)] - r = 0 \quad \ldots\ldots (3)$$

$$\frac{\partial\pi(T_i)}{\partial b_i} = p[A(T_i)f_b(k_i,b_i)] - 1 = 0 \quad \ldots\ldots (4)$$

For an Interior Solution, $\frac{\partial \pi(T_i)}{\partial k_i} = \frac{\partial \pi(T_i)}{\partial b_i} = 0$

Assuming $k_i, b_i > 0$

The ratio of the marginal product of capital to the marginal product of bribe equals to the ratio of payments to the factors of production where the cost of capital is r and that of bribe is normalized to 1.

$$\frac{[f_k(k_i, b_i)]}{[f_b(k_i, b_i)]} = r$$

The impact of the country's level of quality of institution on capital and bribes is found by taking total differentiation of the equations (3) and (4) which yields;

$$[A(T_i)f_k(k_i, b_i)]dp + [pA(T_i)f_{kk}(k_i, b_i)]dk_i + [pA(T_i)f_{kb}(k_i, b_i)]db_i + \left[pf_k(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right]dT_i - dr = 0 \quad \text{..... (5)}$$

$$[A(T_i)f_b(k_i, b_i)]dp + [pA(T_i)f_{bk}(k_i, b_i)]dk_i + [pA(T_i)f_{bb}(k_i, b_i)]db_i + \left[pf_b(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right]dT_i - d\tau = 0 \quad \text{..... (6)}$$

To find the impact of the quality of institutions on bribes and capital invested, dp and dr is set to zero from equations (5) and (6).

$$[pA(T_i)f_{kk}(k_i, b_i)]dk_i + [pA(T_i)f_{kb}(k_i, b_i)]db_i + \left[pf_k(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right]dT_i = 0$$

$$[pA(T_i)f_{bk}(k_i, b_i)]dk_i + [pA(T_i)f_{bb}(k_i, b_i)]db_i + \left[pf_b(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right]dT_i = 0$$

This in a matrix form

$$\begin{bmatrix}[pA(T_i)f_{kk}(k_i, b_i)] & [pA(T_i)f_{kb}(k_i, b_i)] \\ [pA(T_i)f_{bk}(k_i, b_i)] & [pA(T_i)f_{bb}(k_i, b_i)]\end{bmatrix}\begin{bmatrix}\partial k_i \\ \partial b_i\end{bmatrix} = \begin{bmatrix}-\left[pf_k(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right] \\ -\left[pf_b(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right]\end{bmatrix}\partial T_i$$

Dividing both sides by ∂T_1

$$\begin{bmatrix}[pA(T_i)f_{kk}(k_i, b_i)] & [pA(T_i)f_{kb}(k_i, b_i)] \\ [pA(T_i)f_{bk}(k_i, b_i)] & [pA(T_i)f_{bb}(k_i, b_i)]\end{bmatrix}\begin{bmatrix}\frac{\partial k_i}{\partial T_i} \\ \frac{\partial b_i}{\partial T_i}\end{bmatrix} = \begin{bmatrix}-\left[pf_k(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right] \\ -\left[pf_b(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right]\end{bmatrix}$$

Solving by Cramer's rule for $\frac{\partial k_i}{\partial T_i}$ yields

$$\frac{\partial k_i}{\partial T_i} = \frac{det\begin{bmatrix} -\left[pf_k(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right] & [pA(T_i)f_{kb}(k_i, b_i)] \\ -\left[pf_b(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right] & [pA(T_i)f_{bb}(k_i, b_i)] \end{bmatrix}}{det\begin{bmatrix} [pA(T_i)f_{kk}(k_i, b_i)] & [pA(T_i)f_{kb}(k_i, b_i)] \\ [pA(T_i)f_{bk}(k_i, b_i)] & [pA(T_i)f_{bb}(k_i, b_i)] \end{bmatrix}}$$

Where;

a) $\frac{\partial f(k_i,b_i)}{\partial k_i} > 0$, $\frac{\partial^2 f(k_i,b_i)}{\partial (k_i)^2} < 0$ (production function is increasing and concave in capital)

b) $\frac{\partial A(T_i)}{\partial T_i} > 0$, (Productivity function is increasing in the quality of institutional level)

c) $\frac{\partial f(k_i,b_i)}{\partial b_i} > 0$, $\frac{\partial^2 f(k_i,b_i)}{\partial (b_i)^2} < 0$ (production function is increasing and concave in bribes) and also obeys the Inada conditions;

1) $f(k_i, b_i)$ is twice differentiable w.r.t. b_i on $(0, \infty)$,

2) $f'(b) > 0$ and $f''(b) < 0$ for each $0 < b < \infty$,

3) $f'(0) = \infty$ and $\lim_{k\to\infty} f'(b) = 0$

d) $\frac{\partial^2 f(k_i,b_i)}{\partial b_i \partial k_i} > 0$ (The marginal productivity of bribe is increasing in capital since capital and bribe are assumed to be complementary)

The denominator of the comparative static above is positive and since the sufficient condition for a profit maximization problem is that the discriminant D should be positive - $D = pA(T_i)[f_{kk}f_{bb} - (f_{bk})^2] > 0$, it can be concluded that $\frac{\partial k_i}{\partial T_i} > 0$. This means that an increase in the level of quality of institution (decrease in corruption) increases capital investment.

Next is solving by Cramer's rule for $\frac{\partial b_i}{\partial T_i}$ which yields

$$\frac{\partial b_i}{\partial T_i} = \frac{det\begin{bmatrix} [pA(T_i)f_{kk}(k_i, b_i)] & -\left[pf_k(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right] \\ [pA(T_i)f_{bk}(k_i, b_i)] & -\left[pf_b(k_i, b_i)\frac{\partial A(T_i)}{\partial T_i}\right] \end{bmatrix}}{det\begin{bmatrix} [pA(T_i)f_{kk}(k_i, b_i)] & [pA(T_i)f_{kb}(k_i, b_i)] \\ [pA(T_i)f_{bk}(k_i, b_i)] & [pA(T_i)f_{bb}(k_i, b_i)] \end{bmatrix}}$$

Since the discriminant is positive, the relationship between the bribes paid and level of institutions depends on the sign of the numerator. Since the numerator is also positive it means that $\frac{\partial b_i}{\partial T_i} > 0$. This theory predicts that so far as bribe is treated as an input factor, an increase in the level of quality of institution (decrease in corruption) increases bribe paid. This is contrarily to expectations that high quality of institutions should lead to decrease in bribes paid. It is possible that in countries with high quality of institutions, stringent punitive actions are taken against corrupt officials and this renders corruption a high risk venture. Therefore any official who get involved in corrupt practice will demand high bribes as compensation.

It is clear from the analysis that at high level of quality of institution (low corruption) capital investment increases. Also when level of the quality of institution is equal to or above the investment tolerable level in the country ($i.e. T \geq \bar{T},\ y = f(k_i) = Y_1$ as shown in Figure 3.1) the output as well as the profit is comparatively high and thus the investor is motivated to invest in the country. Similar argument is also developed at low level of quality of institution (high corruption) where investor is not motivated to invest. When the level of the quality of institution is below the tolerable level in the country, the investor is not motivated to invest in the country since the output and the profit is low ($i.e. T < \bar{T},\ y = f(k_i) = Y_2$ as shown in Figure 3.1).

3.3.5 Game Theoretic between Firm (Briber) and Government Official (Bribee)

This is a game with complete information where the two players (the firm and the official) have a better understanding of each other. The game is about firms choosing to invest in corrupt country and pay bribes or not to invest and the public officer choosing to accept the bribe or not. Therefore firms want to get a service which is valuable to them in the country of investment from the public officer. The game starts with firms choosing to invest or not to invest in a corrupt country and then decide to pay or not to pay bribes to the public officer as presented in figure 3.3. The public officer then chooses to accept the bribe or not to accept and when the public officer decides not to accept the bribe, he/she may choose to report or not to report the

briber to the authorities. The payoff of a firm which does not invest in the foreign country is the return (r_i') the firm will get from his/her investment in the home country and the payoff of the government official in the foreign country is zero.

The payoff of the firm that decides to invest in the foreign corrupt country depends on whether the firm pays bribes or not to the public officer. If the firm invests but refuses to pay bribes, the firm incurs a cost as a result of red tape which impedes entrepreneurial activity and delays investment leading to loss of return on investment. The payoff to the firm is the return (r_i) minus the cost the firm incurs as a result of the red tape (c_i); i.e. ($r_i - c_i$) and the payoff to the public official is zero. If the firm pays bribes, the payoff depends on whether the public official chooses to accept the bribe or not. If the public official decide to accept the bribe, the payoff of the firm is the return on investment of the firm which is a function of bribe paid ($r_i(b_i)$) minus the cost of bribe (b_i); i.e. ($r_i(b_i) - b_i$). Public officer, using his/her advantageous position as the unique provider of the service, tries to obtain illegal private benefit from these firms. The payoff if the public official accept the bribe is the benefit (b_i) that the public officer gets minus the cost of accepting bribes (e_i); i.e. ($b_i - e_i$). The cost of accepting bribes to the public official is the risk the official faces of being punished if caught.

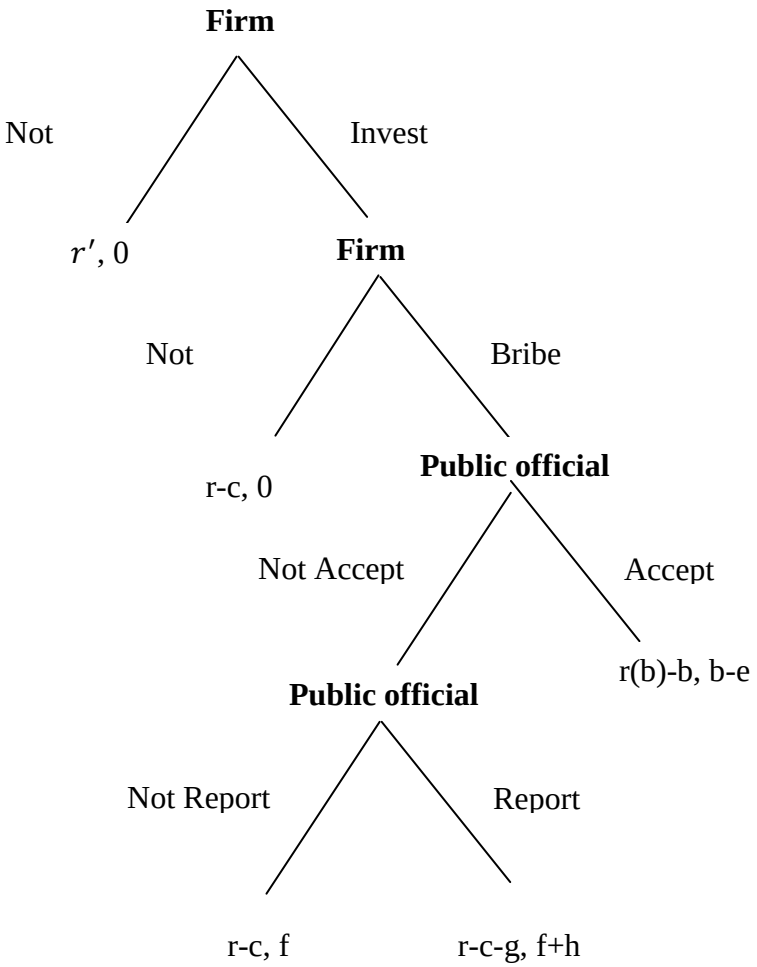

Figure 3.3 The game tree of the firm and the public official

Now if the public official refuses to accept the bribes, the payoff will depend on whether the public official will choose to report the bribery incidence for the authorities to penalize the firm or not. If the public official chooses not to report, the payoff of the firm is the return (r_i) minus the cost the firm incurs due to the red tape (c_i) and the payoff of the public official is the satisfaction (f_i) the public official get by avoiding the risk of being punished if caught. On the other hand if the public official chooses to report, the payoff to the firm is return on investment minus the cost the firm incurs due to red tape if the public official refuses to be bribed minus the cost of penalty the authorities will inflict on the firm ($r_i - c_i - g_i$). If the public official refuses to accept the bribes but chooses to report, the payoff is the satisfaction (f_i) the public official gets by avoiding the risk of being punished if caught plus the reward to

the public official by the state (h_i). Whistleblower reward laws which was designed to protect and encourage "insiders" to report misconduct has proven to be an effective fraud detection mechanism in the fight against fraud and corruption (NWC, 2015). Becker (1977) postulates that the elasticity of response of offenses with respect to a change in the probability of discovering an offense and the apprehension and conviction of the offender would generally, in equilibrium, have to exceed its response to a change in the size of the punishment for those convicted. Therefore Becker (1977) demonstrated that optimal policies to combat illegal behaviour are part of an optimal allocation of resources.

3.3.6 Subgame-Perfect Nash equilibrium

Let assume that the return on investment for paying bribe ($r_i(b_i)$) is higher than that of not paying bribe (r_i) and also the return on investment in a corrupt country with or without bribe is higher than that (r_i') in the home country of the firm. Let also assume that the cost to the firm due to red tape is more than the cost of bribe; i.e. $c_i > b_i$, and also the benefit (b_i) that the public officer gets minus the cost of accepting bribes (e_i) is greater than the benefit (f_i) public official gets if bribes is refused; $(b_i - e_i) > (f_i + h_i)$. Assuming each player maximizes his/her expected payoff, conditional on the information set available at which he/she has the move, then each strategy by the firm and public official exhibits sequential rationality. For games of perfect information, backward induction is the process to solve a game based on common knowledge of sequential rationality. Therefore we can eliminate actions that are not sequentially rational, node by node, starting from the bottom of the game tree. From the bottom of the tree, the public official will choose to report since $(f_i + h_i) > f_i$. At the next stage of the tree, the public official will choose to accept the bribe because $(d_i - e_i) > (f_i + h_i)$. At the next level of the tree, the firm will choose to bribe since by the assumption $(r_i(b_i) - b_i) > (r_i - c_i)$. Similarly at the final stage of the tree, firm will choose to invest because $(r_i(b_i) - b_i) > r_i'$. Therefore using the subgame-perfect Nash equilibrium approach, the unique Nash equilibrium of the game is; "(Invest, Accept bribe)" which is also Pareto optimal solution. This is true because of the assumption made with respect to the benefits and costs to the both players. Without these assumptions it will be difficult to obtain the

Nash equilibrium of the game. For example if the return on investment in a corrupt country with or without bribe (($r_i(b_i)$, r_i) is less than in the home country of the firm (r_i'), investors will not invest in the foreign country. Also if the return on investment for paying bribe ($r_i(b_i)$) is less than that for not paying bribe (r_i), investors will invest but not pay bribes. It is also worth noting that if cost to the firm due to red tape is less than the cost of bribe; i.e. $c_i < b_i$, investors will not pay bribes. On the part of the public official, if the benefit or reward for not accepting the bribe is higher than accepting, the official will not be motivated to involve him/herself in bribery activities.

3.3.7 Nash Equilibrium Analysis

Both players of the game, firm (Briber) and government official (Bribee) pursue profit maximization and therefore it is assumed that $a_i, b_i, c_i,\ e_i, f_i, g_i, h_i, r_i\ , r_i' > 0$. The mechanism of the game is that players choose the optimal strategy which maximizes their own profit while considering other players' strategies. Once these assumptions are relaxed, the Nash equilibrium of the above game can no longer be obtained by using the backward induction method. The strategies in Nash equilibrium must be best responses to each other, where the firm chooses to invest and pay bribes or not to invest in a corrupt country and the public officer choosing to accept or not to accept the bribe. Assuming at the point of Nash equilibrium, firm choose the strategy "Invest and pay bribe" with the probability p and choose the strategy "Not invest and not pay bribe" with probability $1 - p$ then the firm's optimal strategy is $(p, 1 - p)$. Similarly, assuming public official choose the strategy "Accept bribe and not report" with the probability q and strategy "Not accept bribe and report" with $1 - q$ probability, then the optimal strategy of the public official is $(q, 1 - q)$. The payoff matrix of the game is presented in figure 3.4.

		Public official		
		Accept bribe/no report	Not accept bribe/report	
Firms	Invest/ Bribe	$(r_i(b_i) - b_i)$, $(b_i - e_i)$	$(r_i - c_i - g_i)$, $(f_i + h_i)$	p
	Not Invest/ Not pay bribe	r_i', 0	r_i', 0	$1 - p$
		q	$1 - q$	

Figure 3.4 The payoff matrix of a bribery game between firm and government official

Firm therefore chooses an appropriate probability to optimize the following

$$Max_p \; pq(r_i(b_i) - b_i) + p(1-q)(r_i - c_i - g_i) + q(1-p)r_i' + r_i'(1-q)(1-p)$$

The solution to the unconstrained optimization problem is as shown in equation (7).

$$q(r_i(b_i) - b_i) + (1-q)(r_i - c_i - g_i) - r_i' = 0 \quad \ldots\ldots (7)$$

$$q^* = \frac{c_i + g_i + r_i' - r_i}{r_i(b_i) + c_i + g_i - b_i - r_i}$$

Firstly, the optimal probability q^* of firm increases with the increase in the parameters c_i, g_i and r_i' . This means that an increase in the cost due to red tape to the firm (c_i), the cost of penalty the authorities will inflict on the firm (g_i) or the return on investment in the home country of the investor (r_i'), increases the probability of choosing "Not invest and not pay bribe". Secondly, the optimal probability q^* of firm also increases with the increase in the parameters b_i and r_i. This means that an increase in the cost of bribe to the firm and return on investment when no bribe is paid increases the probability of choosing "Not invest and not pay bribe". As long as the cost due to red tape to the firm (c_i), the cost of penalty the authorities will inflict on the firm (g_i) are high, firms will choose not to invest since

these costs will erode the firms' returns. Thirdly, the optimal probability q^* of firm decreases with increase in the return on investment of the firm when bribe is paid $(r_i(b_i)$. This implies that an increase in the return on investment when bribe is paid decreases the probability of choosing "Not invest and not pay bribe".

The public officer also chooses an appropriate probability to optimize the following

$$Max_q \ pq(b_i - e_i) + p(1-q)(f_i + h_i)$$

The solution to the unconstrained optimization problem is as shown in equation (8).

$$p(b_i - e_i) - p(f_i + h_i) = 0 \quad \text{..... (8)}$$

$$p^* = 0$$

Thus the Nash equilibrium of the game when the assumptions are relaxed is a mixed strategy situation $[(p^*, 1-p^*), (q^*, 1-q^*)]$. This procedure was also deployed by Lianju and Luyan (2011) in investigating the mechanism of the bribery behavior based on the non-cooperative static game theory. Lianju and Luyan (2011) postulate bribery behaviour to be negatively related with the cost, and positively related with the expected revenue which is consistent with the analysis in this study. The game analysis above depicts that the cost due to red tape, the cost of bribery as well as the cost of penalty of bribery are positively related to the probability of choosing not to invest and not to pay bribe. The game analysis also shows that the return on investment of the firm in a corrupt country is negatively related to the probability of choosing not to invest and not to pay bribe. Since the analysis shows that an increase in the cost due to red tape to the firm increases the probability of choosing "Not invest and not pay bribe", it means firms are not motivated to invest in countries with unnecessary bureaucratic structures. To overcome this hurdle, firms are motivated to bribe officials thus supporting the proponents of the 'grease the wheels' hypothesis especially when firms are sure of the cooperation of the officials. In countries where bribers are confident that favours will be reciprocated, corruption is higher (Lambsdorff and Cornelius, 2000). The demand-side of bribery activity has linked overregulation to increased corruption (Friedman, Johnson, Kaufmann and

Zoido-Lobaton, 2000). Studies also reveals that unrestrained bureaucracy, the rule of law, and political legitimacy increase national levels of corruption (Ali and Isse, 2003). Dreher and Gassebner (2013) posits that one way to avoid regulation is by bribing officials and so in corrupt countries, government officials can be bribed to perform their official duties which potentially facilitate entrepreneurial activity and particularly, firm entry into an official market. Firms engage public officials to manipulate business functions such as obtaining contracts, garnering favorable regulatory decisions and other policy determinations in their favours by using bribes as a method of influence and coercion.

An increase in the level of quality of institution (decrease in corruption) will result in the decrease of the amount of bribes. In countries where the level of quality of institution is relatively high, firms pay lesser bribe and coupled with high marginal return on bribe, firms are not deterred from choosing to invest in these corrupt countries. Also in countries where the level of quality of institution is relatively low, firms pay more bribes with low marginal return and thus firms are deterred from choosing to invest in these corrupt countries. Therefore there is some level of quality of institution above which the marginal return on bribery activities is high (low corruption) and below which the marginal return on bribery activities is low (high corruption). This level of corruption is tolerable by investors. An increase in the cost of bribe to the firm increases the probability of choosing "Not invest and not pay bribe" which means that firms are not interested to invest in countries in which the cost of bribe is so high since this will culminate in high transaction cost. At high transaction cost, corruption is high above the investment tolerable level and this support the "sand in the wheels of commerce" hypothesis. Therefore countries with levels of corruption below the tolerable level attract more investment while countries with corruption above the tolerable levels attract relatively less investments.

3.3.8 The Corruption Tolerable Level of Investment

FDI involves ownership and/or control of a business enterprise abroad and according to Markusen et al. (1995), these foreign firms are at an inherent disadvantage in the domestic market of the foreign country as stated earlier. Because of these disadvantages, the foreign firm will enter a foreign market only if it has some

compensating advantages over the local firms. Since ownership advantages of transnational corporations as well as location advantages of different countries are the key factors in determining who will become host countries for the activities of the transnational corporations, it is important to find out how corruption impact on the capacity of these transnational corporations to exploit these advantages.

Certain benefits could not be obtained without corruption (bribes) by investors. Some of these benefits include firms avoiding to comply with regulations, taxes or being granted a contract among others (Boddewyn, 1988; Boddewyn and Brewer, 1994), obtaining official permits to import, export, build, and also avoiding cumbersome bureaucratic structures during firm establishment and registration. Some authors had argued that corruption could actually help increase efficiency since it might help poorly functioning institutions work better by "greasing the wheels" (Huntington, 1968; Leff, 1964; Leys, 1965). This is because corruption may be beneficial in a second best world by alleviating the distortions caused by ill-functioning institutions. Egger and Winner (2005) seem to confirm this position by finding a positive impact of corruption on FDI. Some other authors are also of the view that corruption by government officials such as bribes acts as an irregular tax on business which increases operation costs and demotivate investors (Shleifer and Vishny, 1993; Wei, 2000a). Corruption also create uncertainty with respect to the costs of operation in the country (Kaufmann, 1997; Rose-Ackerman, 1999). The increases in cost and uncertainty according to Cuervo-Cazurra (2008) leads to a reduction in FDI inflow into a country. Corruption is also found to negatively affect efficiency of firms (Dal Bo and Rossi, 2007; Picci, 2005; Yan and Oum, 2011).This negative impact of corruption is viewed as "sand in the wheels of commerce" (Cuervo-Cazurra, 2008). Recent studies have shown that corruption deters foreign direct investments (Aizenman and Spiegel, 2003; Barassi and Zhou, 2012; Cuervo-Cazurra, 2006, 2008; Habib and Zurawicki, 2002; Hakkala, Norback and Svaleryd, 2008; Javorcik and Wei, 2009; Voyer and Beamish, 2004; Wei, 2000a).

Corruption at low levels is seen as "greasing the wheels" and at high levels is also seen as "sand in the wheels of commerce". The "grease the wheels" hypothesis suggests that an inefficient bureaucracy create a major impediment to economic activity and so some ‘‘grease" money may be needed to circumvent this impediment.

With the "sand in the wheels of commerce" proposition, the malfunctioning of government institutions actually create obstacle to economic activity. When corruption reduces FDI due to increases in transaction costs, uncertainty and inefficiencies, corruption is described as "sand in the wheels of commerce" and when corruption increases efficiency, winning contracts, obtaining official permits, and avoiding cumbersome bureaucratic structures, corruption is described as "greasing the wheels". Therefore depending on the level of quality of institutions in the country, corruption may play the role of "sand in the wheels of commerce" or "greasing the wheels". Mauro (1995) found lower investment levels to be associated with lower institutional quality. At low level of institutional quality, corruption is high and at higher level of institutional quality, corruption is low. This theory proposes that at high level of institutional quality, corruption is expected to have a positive impact on FDI and when corruption goes beyond paying bribes to win contracts, obtaining official permits, and avoiding unnecessary bureaucratic delays to situations where there is malfunctioning of government institutions or low level of institutional quality, corruption is expected to have a negative impact on FDI. This is because malfunctioning of government institutions affects the adoption of available technologies and the productivity of physical capital as demonstrated in the firm maximization problem and the game analysis above. This affects the returns to the firm's investments as a result of inefficiencies and high transaction cost. This implies that FDI inflow to countries with institutional quality above certain level (CTLI) increases but decreases to countries with institutional quality below this level.

Therefore above CTLI corruption plays the role of "sand in the wheels of commerce" since the extent of corruption in these potential host countries preclude transnational corporations from exploiting their ownership as well as location advantages. Thus these transnational corporations are less motivated to invest in potential host country because of high transaction cost due to corruption as explained earlier. Below CTLI corruptions play the role of "greasing the wheels" since at these levels of corruption in these potential host countries, transnational corporations are able to exploit their ownership as well as location advantages to reduce their transaction cost. This motivates these transnational corporations to invest in the potential host country.

This model developed shows that at certain level of quality of institution of the country, investors are motivated to invest in that country and below which investors will decline to invest. Since there are many other factors in the foreign countries that affect the use of ownership and location advantages of foreign firms, the corruption tolerable level of investment of the foreign must be a matter of concern to the foreign investor. Therefore the corruption tolerable level of investment of a country will determine whether that country is likely to attract FDI inflows or not.

3.4 Foreign Direct Investment Inflow to Africa

FDI inflow to Africa has experience some challenges in recent times in the wake of the global economic crisis. The top two sources of investment into Africa are the US and UK (EY's Attractiveness Africa Survey, 2014) with a rising share coming both from Asia particularly India and China and from within Africa itself. World Investment Report (2010) indicates that FDI flows to Africa fell to $59 billion which represent 19 percent decline compared to 2008 due to contraction in global demand and falling commodity prices. Flows to North Africa also declined despite its more diversified FDI and sustained privatization programmes. The report indicated that contraction of investment in the services sector in Africa within the period was less pronounced than in other sectors with the telecommunications industry becoming the largest recipient of FDI inflows.

In 2010 the global Foreign Direct Investment (FDI) inflows rose moderately to $1.24 trillion but this figure is 15 percent below the pre-crisis. Despite the fact that developing and transition economies together in 2010 attracted more than half of global FDI flows, some of the poorest regions continued to see declines in FDI flows. The World Investment Report (2011) shows that FDI flows to Africa continued its downward trend. FDI flows to Africa fell by 9 percent in 2010. At $55 billion, the share of Africa in total global FDI inflows was 4.4 percent in 2010, down from 5.1 percent in 2009. Inflows to South Africa declined to a little more than a quarter of those for 2009. North Africa saw its FDI flows fall slightly (by 8 percent) in 2010. The uprisings which broke out in early 2011 impeded FDI flows in the first quarter of 2011. The sector that attracted the FDI inflow is the oil industry and this accounted

for the rise in FDI inflow to Ghana and declines of inflows to Angola and Nigeria. The report suggests that even though there is some indication that intraregional FDI is beginning to emerge in non-natural resource related industries, in terms of volume and industry diversity, intraregional FDI flows in Africa are still limited.

The World Investment Report (2012) also indicated that the global foreign direct investment (FDI) flows exceeded the pre-crisis average in 2011, reaching $1.5 trillion despite turmoil in the global economy. However, Africa and the least developed countries (LDCs) saw a third year of declining in FDI inflows. The 2011 decline in flows to the continent was due largely to divestments from North Africa. FDI inflows to Egypt and Libya, which had been major recipients of FDI inflow, came to a halt owing to their protracted political instability. Nonetheless, inflows to sub-Saharan Africa recovered from $29 billion in 2010 to $37 billion in 2011, close to their historic peak. According to the report, factors contributing to this turn around include the continuing rise in commodity prices and a relatively positive economic outlook for sub-Saharan Africa.

Global FDI flow fell by 18 percent in 2012 to $1.35 trillion. In 2012, developing economies gained more FDI than developed countries and this represent about 52 percent of global FDI flows. Though FDI flows to developing regions witnessed a small overall decline in 2012, there were some bright spots. Africa reversed the trend with a 5 percent increase in FDI inflows to $50 billion. This growth was driven partly by FDI in extractive industries, investment in consumer-oriented manufacturing and service industries. FDI inflows to Africa rose by 5 percent to $50 billion, making it one of the few regions that registered year-on-year growth in 2012. The World Investment Report (2013) suggests that FDI inflows in 2012 were driven partly by investments in the extractive sector in countries such as the Democratic Republic of the Congo, Mauritania, Mozambique and Uganda. There was also an increase in FDI in consumer-oriented manufacturing and services sectors and this reflect changes in demography of these countries. FDI flows to North Africa reversed their downward trend with Egypt getting back to their investment attraction from European investors.

In 2013, FDI inflows to Africa rose by 4 percent to $57 billion and this is driven by international and regional market-seeking and infrastructure investments

according to World Investment Report (2014). The reports indicated that the overall increase was due to the increase in the Eastern and Southern African sub regions, as others saw falling investments. In Southern Africa FDI flows almost doubled to $13 billion, mainly due to record-high flows to South Africa and Mozambique. In both countries, infrastructure was the main attraction, with investments in the gas sector in Mozambique also playing a role. The report also indicated that FDI inflow increased by 15 percent to $6.2 billion as a result of rising flows to Ethiopia and Kenya in East Africa. FDI flows to North Africa decreased by 7 percent to $15 billion. Central and West Africa saw inflows decline to $8 billion and $14 billion, respectively, partly due to political and security uncertainties. The most encouraging is the increasing intra-African investments led by South African, Kenyan, and Nigerian TNCs.

3.5 Determinants of FDI Inflow

The framework on Multinational Enterprise (MNE) postulates that the reason why firms invest abroad is to look for three types of advantages which are Ownership (O), Location (L), and Internalization (I) advantages. Both policy and non-policy factors have also been identified as drivers in the literature on the forces driving FDI inflow (Fedderke and Romm, 2006 as cited in Anyanwu, 2012). The policy factors include openness, product-market regulation, labour market arrangements, corporate tax rates, trade barriers, and infrastructure. Non-policy factors include market size of the host country, distance/transport costs, factor endowments, political and economic stability (Mateev, 2009). Another non-policy factor which plays a role in the attraction of FDI to a country is the level of quality of institution of the country. This is captured as the perception of corruption of the public sector in the host country and is expected to have both negative and positive effect on the inflow of FDI into a country depending on the level of quality of institutions as predicted by the theory developed above. Factors that determine FDI inflow are discussed below.

3.5.1 Corruption

The literature on the historical, cultural, economic and political determinants of corruption is quite developed (Fiorino and Galli, 2010). For example,

countries characterized by common law systems that embody greater protection of property against the state (La Porta, Lopez-de-Silanes, Andrei and Vishny, 1999), less hierarchical religions like Protestantism (La Porta et al., 1997), higher levels of income and education (Lipset, 1960), less government expenditures and regulations (Glaeser and Shleifer, 2003), lower diversity along ethnic and income lines (Alesina, Baqir and Easterly, 2002; Mauro, 1995) and higher degrees of civicness of the population (Putnam, 1993) are expected to be less corrupt (Fiorino and Galli, 2010). Mixed predictions have been provided by literature about the impact of federalism on corruption (Breton, 1996; Tanzi, 1995; Weingast, 1995) and of electoral systems (Lijphart, 1999; Persson and Tabellini, 1999).

Another set of theories on the determinants of corruption has focused on the effect of ethnic fragmentation on corruption and wasteful redistribution (Alesina et al., 2002; Fearon and Laitin, 1996; Mauro, 1995). Persson and Tabellini (1999) and Persson, Tabellini and Trebb (2003) suggest the existence of a systematic link between corruption and electoral rules. Differences among countries in the extent of corruption may also depend on the degree to which officials compete against each other to sell mutually substitutable benefits to private agents (Shleifer and Vishny, 1993). Rose-Ackerman (1978) suggested that the existence of competition at the level of the officials receiving bribes reduces corruption. All these determinants put together suggest that the level of corruption in Africa countries may differ with some countries being relatively highly corrupt whilst others are relatively less corrupt. It cannot be disputed that corruption is difficult to eradicate completely but then countries with strong institutions are expected to reduce or maintain corruption at a tolerable level to attract investors.

There are incentives for both the government official (receiver) and the firms (giver) of bribes to indulge in the act. Whenever an official has discretion over the distribution of a “good” or the avoidance of a “bad” to the private sector (Rose-Ackerman, 1999) there are incentives for corruption. The official also has an incentive to demand bribe and increase his or her income in exchange for a favour that has little cost to him or her. In this situation the official is merely allocating a good owned by the government (Shleifer and Vishny, 1993). On the part of the firm, bribes are offered in order to get rewards in return which under normal circumstances would

have been difficult to get but through corruption (Boddewyn, 1988; Boddewyn and Brewer, 1994). Earlier studies did not find a significant correlation between the size of FDI inflow and the host country's risk factors including corruption and other variables (Alesina and Weder, 1999; Wheeler and Mody, 1992). Méon and Sekkat (2005) also obtained no significant impact of corruption on FDI inflows. Egger and Winner (2005) found a positive short run and long run impact of corruption on FDI which confirms the position of Leff (1964). On the contrary however, some other studies provide evidence to the fact that corruption deters foreign direct investments (Aizenman and Spiegel, 2003; Barassi and Zhou, 2012; Cuervo-Cazurra, 2006, 2008; Habib and Zurawicki, 2002; Hakkala et al., 2008; Javorcik and Wei, 2009; Voyer and Beamish, 2004; Wei, 2000a).

Cuervo-Cazurra (2008) posits that there is an 'empirical anomaly' that seems to contest existing theoretical arguments on corruption and FDI inflow on the basis that though transition economies have high levels of corruption, these countries have received enormous amounts of FDI. This Cuervo-Cazurra (2008) alluded to the type of corruption rather than the level of corruption since different types of corruption have a different impact on FDI inflow in transition economies. On the one hand, corruption increases transaction costs and uncertainty leading to reduction in FDI inflow and so described as sand. On the other hand corruption helps avoid the extra costs of operating in a business environment characterized by poor regulations leading to increases in FDI inflow and so described as grease. Because these illegal payments are sometimes recurrent, investors in countries with pervasive corruption may either avoid or decrease their investments in those countries since the increase in transaction costs due to bribes may render investment projects unprofitable (Cuervo-Cazurra, 2008). Arbitrary corruption represents the uncertainty associated with corruption and in situations when bribes are paid, it creates additional uncertainty because there is no assurance that the promises will be fulfilled (Cuervo-Cazurra, 2008).

Taking these two types of corruption into consideration, this study raises the arguments that it is the nature of corruption that determines the level of corruption and how beneficial it is to potential investors. When the level of corruption in a country goes beyond paying bribes to both public officials to process paperwork and politicians to obtain government contracts or get things done to a point where though bribes are paid but the work will not be done and the failure of institutions then

investors are no longer motivated to invest in those countries. At low levels of corruption, corruption is beneficial to investors and at high levels, corruption is no longer beneficial. Since corruption is known to occur in all countries irrespective of whether the country is a developed or a developing one and also since it has become extremely difficult to completely eradicate corruption there is the need to find out the level of corruption that can be tolerated by investors. According to Cuervo-Cazurra (2008) corruption leads to increases in transaction cost and uncertainty that result in the decrease in FDI inflow. This study goes further to argue that apart from the cost and uncertainty, another problem confronting investors in corrupt countries is production inefficiency. This study proposes that corruption is expected to have a negative impact on private investment in countries where corruption goes beyond just avoiding unnecessary bureaucratic delays to situations where there is malfunctioning of government institutions. But in countries where corruption is just to avoid unnecessary bureaucratic delays, this study proposes a positive impact of corruption on private investment. The malfunctioning of government institutions affects the adoption of available technologies and the productivity of physical capital and this affects the returns to the firm's investments. In highly corrupt countries managers are unable to improve the technology of their firms since most of their efforts are geared toward engaging public officials to get things done. Thus the returns to their investment dwindle due to inefficiency. Earlier studies on corruption and firm efficiency found corruption to negatively affect efficiency of firms (Dal Bo and Rossi, 2007; Picci, 2005; Yan and Oum, 2011). In this study, control of corruption index is the variable used to capture corruption and it is expected to have a negative and significant effect on FDI inflows at low values and a positive and significant effect at high values.

3.5.2 GDP Growth Rate and GDP Per Capita

Economics literature indicates that FDI has led to economic development of the host country. This is because FDI inflow enables valuable tangible and intangible assets such as enhanced technology, managerial skills, know-how, innovation capability, capital formation and the obtainment of related physical assets to be acquired (Liu, Shu, and Sinclair, 2009; Vu, Gangnes and Noy, 2008; Wang, 2009). Elsewhere market size has also been predicted to be a positive and significant

determinant of FDI flows (Garibaldi et al., 2002; Nunes et al., 2006; Sahoo, 2006). This is because larger consumer markets translate to more potential consumption and thus enhance trade. Market size is generally measured by Gross Domestic Product (GDP) or GDP per capita income. Real GDP growth rate has also been used in literature to represent a country's economic track record and as an indicator of profitable investment opportunities (Anyanwu, 2012). On the one hand FDI inflow causes economic growth and on the other hand economic growth attracts FDI inflow thus leading to bi-causality issues and endogeniety problems.

Holland and Pain (1998) and Asiedu (2002) found growth and market size as insignificant determinants of FDI flow. Carcovic and Levine (2005) found that FDI has no significant impact on economic growth whilst Choe (2003), Mullen and William (2005) and Yao (2006) posits that FDI entry has positive effect on economic growth. Temiz and Gokmen (2014) in a more recent study found no significant relation between FDI inflow and GDP growth in Turkey both in the short and long run. Some other studies on FDI and economic growth concluded that FDI entry could lead to positive economic growth only when fundamental factors such as competent human resource exist (Alfaro, Chanda, Kalemli-Ozcan and Sayek, 2004; Alfaro, Kalemli-Ozcan and Volosovych, 2008; Borensztein, De Gregorio and Lee, 1998). Nnadozie and Osili (2004) found GDP growth to have significant impact on FDI inflow but found less robust evidence on the role of GDP per capita. Dauti (2008) found ICT infrastructure market to positively influence FDI inflows while factors such as GDP growth, GDP per capita and GDP level show significantly negative effects on FDI inflows. Alsan, Bloom and Canning (2006) suggests that GDP per capita can also be thought of as a proxy for labour costs and so the coefficient on GDP per capita should therefore be interpreted with caution, because it may reflect both a market size and a cost effect. Though GDP has been used in literature as a determinant of FDI inflows, this study rather intends to use the lag of GDP growth rate as a better indicator of FDI inflows in order to find out the influence of the previous year’s GDP growth rate on current FDI inflow and also to avoid endogeniety problems. Also included in the analysis is the effect of GDP per capita on FDI inflows. High previous year’s GDP growth rate and GDP per capita of the host country is expected to attract more FDI in this study.

3.5.3 Trade Openness

Trade openness refers to the sum of exports and imports of goods and services into a country and gives an indication of how liberalized a country is in terms of trade. The impact of trade openness on economic growth can be positive and significant mainly due to the accumulation of physical capital and technological transfer as a result of FDI inflow. Therefore trade openness is important as a vehicle for technological spillovers. Trade liberalization is said to enhance domestic investment by permitting domestic agents to import relatively cheaper and more efficient capital goods. In so doing, structural constraints on investment are removed and efficiency of capital accumulation is also increased (Baldwin and Seghezza, 1996; Lee, 1995). According to Eicher (1999), Lee (1993) and Young (1991) openness to trade also promote domestic investment by encouraging competition in domestic and international markets which generate higher returns on investment through economies of scale. Trade openness is generally expected to be a positive and significant determinant of FDI inflow (Asiedu, 2002; Sahoo, 2006). Imports and exports have been suggested by empirical studies in trade to be complements rather than substitutes for FDI inflow and so volume of trade reflects the trade openness of a country (Ranjan and Agrawal, 2011). Anyanwu and Erhijakpor (2004) reports that trade openness, telecommunications infrastructures and economic growth significantly increase FDI inflows to Africa. In this study trade openness is captured as trade per GDP and it is expected to facilitate the flow of FDI to the hosting country.

3.5.4 Natural Resource and Political Stability

FDI attraction to Africa can also be influenced by the availability of natural resource on the continent. Jadhav (2012) is of the view that resource-seeking FDI is motivated by the availability of natural resources in the host countries. This resource-seeking FDI remains a relevant source of FDI for various developing countries. Studies have shown that natural resources play a vital role in overall FDI attraction to Africa (Asiedu, 2002, 2005; Dupasquier and Osakwe, 2006). Similar result was found in transition economies such as Euro-Asia countries (Deichmann, Eshghi, Haughton, Sayek and Teebagey, 2003). In Africa, countries that have natural resources were more attractive than those without such resources (Asiedu, 2005).

According to North and Weingast (1989) and Li (2009), democratic institutions may have a positive impact on FDI since democracy provides checks and balances on elected officials. This in turn decreases arbitrary government intervention, lowers the risk of policy reversal and strengthens property right protection. According to Asiedu and Lien (2011) natural resources in host countries may affect the FDI-democracy relationship. Two possible explanations were given for this relationship with the first one being that FDI in natural resource exporting countries is more concentrated in extractive industries. Since the exploration and extraction of these resources is a capital intensive investment (sunk cost), prolong government implies a more stable and predictable business environment. This renders democratic regimes less preferable by MNCs because democracies are classically associated with a frequent regime change and hence government officials. The second explanation is that FDI in extractive industries is mainly driven by access to natural resources and because natural resources are politically and financially vital to host countries, FDI in natural resources is strongly controlled by the government. Therefore the best option for the investor is to foster close relationship with the government which is more feasible under autocratic regimes. This assertion is supported by Li and Resnick (2003) with the reason that autocratic governments may be in a better position to provide more generous incentive packages, offer protection from labour unions and also permit the MNCs to exploit their oligopolistic or monopolistic positions.

Asiedu and Lien (2011) found that democracy facilitates FDI inflow in countries where the share of natural resources in total exports is low, but has a negative effect on FDI inflow in countries where exports are dominated by natural resources. They also find that the effect of democracy on FDI depends on the size and not the type of natural resources available in the host country (Asiedu and Lien, 2011). Therefore, the influence of natural resource and political stability on FDI has to be determined empirically.

3.5.5 Economic Stability and Growth Prospects

Economic stability has been found to be a positive indicator of FDI inflows (Mateev, 2009). A country which has a stable macroeconomic condition with high and sustained growth rates is expected to have more FDI inflows than a more volatile

economy (Ranjan and Agrawal, 2011). The proxies for macroeconomic stability of a country include GDP growth rates, industrial production index, interest rates and inflation rates (Dasgupta and Ratha, 2000). High inflation rate is associated with economic disarray and lower purchasing power and so inflation risk becomes an important factor in the long run of investment plan of investors. Inflation has been found to have a negative relation with FDI inflow though its magnitude is very less (Ranjan and Agrawal, 2011).

However, research on the impact of exchange rate on FDI inflows has shown varied results. Whilst Kyereboah-Coleman and Agyire-Tettey (2008) posit that real exchange rate has a negative impact on FDI inflow, Jeon and Rhee (2008) shows that FDI inflows have a positive and significant association with real exchange rate. Nonetheless, Brahmasrene and Jiranyakul (2001) and Dewenter (1995) did not find any statistically significant relationship between the level of the exchange rate and FDI inflows (Anyanwu, 2012). When a country's currency devalues, foreign investors take advantage to purchase assets at a reduced cost. Investment in countries whose currency is faced with high depreciation is relatively less expensive. Therefore it is expected that high inflation rate of the host country attracts less FDI whilst high exchange rate of the host country attracts more FDI.

3.5.6 Infrastructure Facilities

The importance of infrastructure development to the attraction of FDI inflow cannot be ignored. Reports by Musila and Sigue (2006) and Dupasquier and Osakwe (2006) on FDI indicate that FDI in Africa is dependent on infrastructure development. Similar results were obtained by Kersan-Skabic and Orlic (2007) in Western Balkan Countries and by Botric and Lorena (2006) in Southeast European Countries. This shows that embarking on infrastructure development provides an opportunity for the country to attract FDI inflow. Some studies (Ranjan and Agrawal, 2011) used an infrastructure index (INFREX) constructed by indexing electric power consumption (kwh per capita), energy use (kg of oil equivalent per capita) and telephone lines and had similar results. Infrastructure in this study is capture by the telephone lines per 100 population and is expected to lead to greater FDI inflow and hence have a positive impact on FDI inflow.

3.6 Foreign Firms Ownership and Corruption

As stated in the earlier chapters, corruption might be a means of achieving certain benefits which make business operations in an economy easier (Dreher and Gassebner, 2013) which otherwise might be difficult. Dreher and Gassebner (2013) empirically tested whether corruption can be an efficient grease by reducing the negative effect of regulations on entrepreneurship in highly regulated economies based on the 'grease the wheels' hypothesis. Their empirical analysis shows that corruption can indeed be beneficial. Really they concluded that at the maximum level of regulation, corruption significantly encourages entrepreneurial activity and therefore, corruption might be viewed as being beneficial rather than harmful.

This study suggests that corruption is expected to have a negative impact on private foreign investment when corruption goes beyond just avoiding unnecessary bureaucratic delay (by bribing public officials) to situations where there is malfunctioning of government institutions as indicated earlier. As a result the returns to the firm's investments dwindle thus making investing in that country unattractive. The malfunctioning of government institutions increases the transaction cost of the firm and this increase the firm's probability of choosing not to invest as predicted in the game theoretical model discussed earlier. In highly corrupt countries managers are unable to exert much effort to improve the technology of their firms. Managers spend more time negotiating with the public officials to the detriment of their firms. Managers are unable to adopt good technologies to increase the rate at which capital and labour are transformed into output leading to inefficiency. Kaufmann and Wei (2000) postulate that multinational firms paying more bribes end up spending more time negotiating with foreign officials, working against the 'grease the wheels' hypothesis. In their model, Dal Bo and Rossi (2007) focused on how corruption affects the level of price negotiation effort, labour use and managerial efforts in deriving the effects of corruption on firm efficiency. In their study, they try to prove the assertion that firms in more corrupt environments will be more inefficient: their managers will exert more effort in engaging public officials and less effort at coordinating the use of factors. As a consequence managers will employ more labour to produce a given level of output leading to inefficiency. Dal Bo and Rossi (2007)

found in their research that countries reported to have higher corruption tend to have more inefficient electricity distribution firms.

Yan and Oum (2011) suggest in their model that productivity depends on the efforts of management in monitoring and coordinating production process, the talent of management and a random noise representing productivity shock. Yan and Oum (2011) postulate that in a more corrupt environment, policy-makers and bureaucrats tend to reduce the accountability of making public policy, so as to be in a better position to extract some private benefits. The underlying supposition is that the diversion of managerial effort depends on an external factor such as the interruption of flows of incentives along a chain of control. Yan and Oum (2011) investigated the effects of institutional arrangements on cost efficiency of firms and concluded that politicians in low corrupt environments can influence decision making in order to pursue political goals. Such influences hamper the manager's efforts to exploit more efficient inputs allocation. Abrate, Boffa, Erbetta and Vannoni (2013) concluded that, studies by both Dal Bo and Rossi (2007) and Yan and Oum (2011) are based on the idea that corruption leads to weak incentives and therefore to low efficiency levels, but they are different as to the underlying mechanisms (external versus internal) at stake.

This study is based on the premise that malfunctioning of government institutions affects the adoption of available technologies by the firm and this affects the productivity of physical capital and labour (stated earlier) and as a result increases the transaction cost of the firm. The relationship between managerial effort and corruption in this study is based on the theories developed by Dal Bo and Rossi (2007) and Yan and Oum (2011). As stated earlier, firm's entry mode in a foreign market depends upon the examination of its locational advantage in each specific market (Agarwal and Ramaswami, 1992). Since poor institutions such as high corruption preclude firms from the use of available technologies to (Tebaldi and Elmslie, 2008) and also limit the efficiency gains from current innovation (Matthews, 1986) as indicated earlier, foreign firms are unable to exploit their location advantage in the foreign economies and so are less motivated to invest in those economies. Corruption is found to significantly reduce firm entry into new economies (Desai et al., 2003; Ovaska and Sobel, 2004). Foreign firms are not motivated to invest in high

corrupt economies because poor institutional arrangements reduce the returns to investments and capital accumulation (Brunetti et al., 1997; Lambsdorff, 1999; Mauro, 1995).

3.7 Determinants of Foreign Ownership of Firms

Foreign firms seeking to invest in a foreign economy must make an important strategic decision on which economy to invest in. There are several policy and non-policy factors that assist the entrepreneurs in making an informed decision. Apart from these policy and non-policy factors, the entrepreneur considers the Dunning (1988) eclectic theory which consist of three different theories of direct foreign investments (O-L-I); "O" from Ownership advantages, "L" from Location and "I" from Internalisation.

With respect to ownership advantage, the firm owns its specific advantages and so using these advantages abroad may lead to higher marginal profitability or lower marginal cost (Dunning, 1973, 1980, 1988). The key factor in determining the host countries for the transnational corporations is the location advantages that these corporations can exploit in the host countries as stated earlier. The specific advantages of each country include the economic benefits which consist of quantitative and qualitative factors of production, costs of transport, telecommunications and market size. Also included in the location advantages are the political and institution advantages (political stability, corruption) and social advantages (i.e. distance between the home and foreign countries, cultural diversity, and attitude towards strangers). For a firm to be profitable in a foreign economy, it must use these advantages, to reduce its transaction cost. Therefore the extent to which a firm can benefit from these OLI parameters depends on the economic, political and social characteristics of the host country as well as the firms' own characteristics. Among these factors include bribery (corruption in the host country), cost of raw materials and intermediate goods, firm size, technology of the firm, labour cost and infrastructure development. This stage of the study tries to find out whether the extent of corruption in Africa allows firms to exploit these advantages. The study explores the impact of the percentage of total annual sales of a firm paid as informal payments

(bribes) to public officials on foreign ownership of firms in Africa while controlling for firm characteristics and other factors (variables) outside the country of origin of investment. Some of these factors are discussed below.

3.7.1 Corruption (Informal Payments)

According to Lianju and Luyan (2011) bribery is one of the important manifestations of corruption, and its purpose is to get reciprocity of benefits through the exchange of money and power. Cuervo-Cazurra (2006) suggest that bribery activity can involve both home and foreign firms and can also involve local or foreign governments with which firms might interact during business operations. Bribery activity may also differ based on the supplier and one demanding the bribes and also whether public or private sector institutions are involved (Cuervo-Cazurra, 2006). It has been established in literature that weak governments with unstable political institutions find it difficult in precluding their agents from demanding bribes from firms (Shleifer and Vishny, 1993). Studies have also revealed that national levels of bribery is connected to the dimensions of culture and socioeconomic factors (Getz and Volkema, 2001; Husted, 1999) and historical development (Treisman, 2000). Many equivalent terms to bribery exist and this include; kickbacks, gratuities, "commercial arrangements", baksheesh, sweeteners, pay-offs, speed and grease money. These are all notions of corruption in terms of the money or favours paid to employees in private enterprises, public officials, and politicians (Andvig et al., 2000).

Martin, Cullen and Parboteeah (2007) reviewed literature on the demand and supply side of bribery activity. Literature on demand-side side of bribery activity has related higher tax rates to reduced levels of corruption, and overregulation to increased levels of corruption (Friedman et al., 2000). Studies elsewhere mention entry barriers, effectiveness of legal system, and infrastructure services to decrease corruption across countries (Rodriguez et al., 2005) while unrestrained bureaucracy, the rule of law, and political legitimacy tend to increase corruption (Ali and Isse, 2003). On the supply side, Wu (2005) distinguished between active and passive bribery. Active bribery is referred to as a 'strategic influence mechanism' involving firms engaging public officials (Martin et al., 2007) and passive bribery is used as defensive mechanism to avoid sanctions or other punishments. Dreher and Gassebner

(2013) suggest that regulatory intervention can either be beneficial or harmful depending on one's view of its purposes and effects. The ways to overcome these regulations may or may not be welcome. As stated earlier, one way to avoid regulation is by bribing officials (Dreher and Gassebner, 2013) which actually supports the proponents of the 'grease the wheels' hypothesis in the early literature (Huntington, 1968; Leff, 1964; Leys, 1965). There are some current empirical evidence in support of the 'grease the wheels' hypothesis (Vial and Hanoteau, 2010). Bribes also serve the function of giving incentives to bureaucrats by speeding up this process (Leys, 1965; Lui, 1985). According to Dreher and Gassebner (2013) the level of regulation in a country rises in the long-run as a result of corruption especially when regulations are introduced by corrupt officials to allow for the extraction of bribes.

Martin et al. (2007) deployed the conceptual foundations of anomie theory to advance the argument that cultural and social drivers and certain firm-level conditions encourage bribery activity among firms. Empirical research based on anomie theory suggests that perceived pressures in a local environment result in anomic strain which encourage bribery activity. Also firms do evaluate their markets with respect to the existing cultural and institutional forces that may obstruct efforts to do business ethically (Martin et al., 2007) in their daily business operations. Firms may be able to pay the highest bribe to gain a particular contract, and in so doing compromise on the quality of the product (Rose-Ackerman, 1997). This may occur especially in cases when firms fail to break-even. Firms who do not wish to compromise the quality of their products because of the 'brand name' will be less attracted to countries where they cannot break-even due to corruption. Corruption might also increase uncertainty thus increasing risks fronting the foreign firms (Campos et al., 1999) and this imply that more risk averse investors may not be motivated to invest in high corrupt countries. As stated earlier, Lianju and Luyan (2011) posits that bribery behavior is negatively related with the cost, and positively related with the expected revenue which imply that the higher the cost, the less bribery behavior, while the greater expected revenue, the more bribery behavior. Therefore firms will be less attracted to corrupt countries where the outcome of the bribery raises transaction cost and where bribery does not meet the expected revenue. Research on the impacts of bribery

demands on multinational firms entering into local markets shows that local bribery demands may discourage firm entry (Uhlenbruck, Rodriguez, Doh and Eden, 2006; Voyer and Beamish, 2004). It is expected in this study that informal payment to public officials by firms will explains a good portion of foreign ownership of firm and that foreign ownership of firm decreases with increase in informal payment.

3.7.2 Firm Size

The relationship between firm size and performance has been well established in literature. Empirical evidence suggests that firm size is correlated with the probability of outward FDI (Dunning, 1988). In fact, empirical studies indicate that the impact of firm size on foreign direct investment is positive (Buckley and Casson, 1976; Kimura, 1989). According to Badunenko, Fritsch and Stephan (2008) studies have shown that larger firms have better penetration in the market and can exploit economies of scale. In addition, larger firms have more funds to employ better managers (Kumar, 2003). According to Lin (2010) firm's specific advantages such as brand names, external and internal economies of scale, R&D, product differentiation, proprietary management skills, and government promotion policies usually increase with firm size. Empirical studies suggest that internationalization is correlated with firm size (Kuo and Li, 2003) and therefore smaller firms are more prone to internationalization-related disadvantages and risks.

Lin (2010) explains that large firms are able to use more actively their firm-specific advantages, to attain strategic motives through their outward FDI, either to protect or enhance themselves or build on global synergies. Lin (2010) also posits that large firms are more sensitive to costs and have the capacity to select the location for outward FDI more carefully than smaller firms. Firm size is often considered as a proxy for resources availability of the firm as prior studies suggest that large firms have more resources to spend on foreign expansion (Barkema and Vermeulen, 1998). Kuo and Li (2003) also finds that large firms have more resources and capabilities than smaller firms, and thus they are better placed for foreign direct investments.

Blomstrom and Lipsey (1991) suggests that large size, which incorporates the firm's ownership-specific advantages, produces a cumulative and dynamic effect on the expansion of MNCs. Lipsey, Kravis and O'Connor (1983), compared U.S. firms

that invest abroad with those that did not and found that firm size was the most important determinant of the probability that a firm would invest abroad. Blomstrom and Lipsey (1991) concluded in their study that evidence of the influence of size on the likelihood or probability of foreign investment is quite strong. Lin (2010) found that the motivations of export orientation and firm size are important factors influencing the FDI decisions of Taiwanese firms in the IT sector. This study controls for firm size by using the number of employees of the firm. Firm size is expected to explain a good portion of foreign firm ownership variation across firms and that foreign ownership of firm increases with firm size. The size of the firm is expected to be positively correlated with its propensity to enter foreign markets.

3.7.3 Technology

Literature reviewed by Anwar and Sun (2014) reveal that FDI-related productivity spillover effects are connected to technology diffusion in most theoretical studies. This technology diffusion according to Anwar and Sun (2014) is linked to two approaches. The first approach is based on the size of the technology gap between the domestic and foreign firms and the second approach is based more on a contagion effect. It is argued in the first approach that technological convergence would occur relatively faster when the technology gap is wide. The second approach refers to the importance of personal contacts in the process of technology diffusion (Anwar and Sun, 2014). Existing studies according to Anwar and Sun (2014) have mentioned three main channels through which FDI-related spillovers can occur. The first channel is backward and forward linkages that are formed between FDI-invested and domestic firms (Lin and Saggi, 2007; Markusen and Venables, 1999; Rodriguez-Clare, 1996). The second is labour mobility and the third is the demonstration and competition effects (Blomström and Kokko, 1998). Domestic firms can be either local suppliers which is referred to as backward linkage or customers which is referred to as forward linkage to FDI-invested firms.

Anwar and Sun (2014) posits that superior technology and technical know-how are typical strategic advantages that FDI-invested firms possess. This assertion supports the idea that FDI-invested firms, usually possess some strategic advantages as compared to their domestic counterparts (Buckley and Casson, 1976; Dunning,

Kogut and Blomstrom, 1990). In high corrupt countries, corruption makes local bureaucracy less transparent and as a result increases the value of a local joint venture partnership between the local firm and the foreign investor. In the process, these strategic advantages that FDI-invested firms possesses tend to be transferred to domestic firms thereby enhancing their productivity. But Tekin-Koru (2006) found corruption to have a negative impact on joint ventures, particularly for the FDI originating from developed countries. Duanmu (2011) found that the higher corruption distance it is between countries which are less corrupt and a corrupt one, the higher probability that their MNEs will choose wholly owned subsidiary over joint venture. The finding by Driffield, Mickiewicz, Pal and Temouri (2010) also supports this assertion. The technological content of a foreign investment varies with the ownership composition of the investment. Smarzynska and Wei (2000) argue that foreign investors with sophisticated technology may be disturbed about the possible leakage of this technology through joint venture partnership and are therefore less motivated to form a joint venture. Smarzynska (2000) shows empirically that foreign investors with more sophisticated technologies are less likely to share ownership than investors possessing fewer intangible assets. It is expected in this study that the use of foreign technology explains a good portion of foreign ownership of firm variation across firms, and that foreign technology increases with foreign ownership of firms.

3.7.4 Labour Cost

Research has shown labour costs to be among the key economic variables frequently used in the discussion of the determinants of investment location decisions of firms (Havlik, 2005). According to Bellak, Leibrecht and Riedl (2008) labour costs appear as one of the country-level cost-related location determinants in the OLI-paradigm and in the general equilibrium models. FDI responds to factor cost differentials (comparative advantage) based on differences in labour costs. Unlike the horizontal FDI (both the multinational parent and the affiliates are located in developed countries) which is dominated by flows between developed countries where FDI locate production near a firm's large customer bases, vertical FDI (parts of the production process can be performed in another location) is mainly driven by production cost differences between countries. Trade and transport costs play a much

more important role than production cost differences for these FDI decisions in terms of horizontal FDI (the proximity-concentration trade-off for FDI). A firm's decision with respect to vertical FDI to break up its production chain and move parts of that chain to a foreign affiliate involve a trade-off between per-unit and fixed costs. This involves production cost differences for the parts of the production chain that are being moved and so labour cost in the destination countries plays an important role in this regard.

Literature reviewed by Bellak et al. (2008) on labour cost revealed the importance of labour costs and its measure as a determinant of FDI. The literature reviewed was on the empirical studies of FDI in the CEECs, which used different measures of labour costs. The review included macro level studies and sectoral/regional/firm level studies. Whereas some of the studies used total labour cost (Cieslik, 2005; Clausing and Dorobantu, 2005; Galego, Vieira and Vieira, 2004; Pusterla and Resmini, 2005) others used unit labour cost (Boudier-Bensebaa, 2005; Defever, 2006; Demekas, Horvath, Ribakova and Wu, 2005; Johnson, 2006a) in their analyses. On a conceptual basis, Bellak et al. (2008) classified the indicators of labour costs used in these studies into two groups; absolute labour costs and unit labour costs. Bellak et al. (2008) explains that absolute labour costs reflect expenses borne by the employer associated with an employment relationship and is captured as total labour costs and gross wages whilst unit labour costs exclude employers' contributions to social security. The main contention is an appropriate labour cost measure when dealing with FDI location decisions. Bellak et al. (2008) argue that total labour costs are perhaps not an adequate measure for labour costs when investigating location of FDI in CEECs, since these countries suffer from low quality firm-specific infrastructure and weak institutions.

Among the 26 underlying studies that were reviewed by Bellak et al. (2008), 22 of the studies had labour cost having a negative impact on FDI (Defever, 2006; Demekas et al., 2005) with 17 being significant. Two out of the four studies which reveal a positive coefficient use disaggregated data (Boudier-Bensebaa, 2005). Bellak et al. (2008) posits that, there are also factors that may mitigate the negative effects of high labour costs on FDI. Public expenditures on a well-structured education system or social infrastructure may compensate investors for high labour costs because highly

skilled and healthy workers are more productive (Bellak et al., 2008). This study uses unit labour cost as a control variable and expects it to have a negative impact on percentage of foreign ownership of firms.

3.7.5 Cost of Raw Materials and Intermediate Goods

Under the pure form of vertical FDI, a multinational corporation (MNC) locates production in the lowest-cost country. In most cases, a multinational corporation establishes plants in a developing country to get easy access to raw materials. Cost of raw materials in countries with abundant supply will be relatively low and as such attract more MNCs. Natural resource abundance affect FDI since literature has shown that much FDI attraction to Africa depends on the natural resource (Asiedu, 2002, 2005; Dupasquier and Osakwe, 2006). African countries that have natural resources were more attractive than those without such resources (Asiedu, 2005). Similar result was found in transition economies of Euro-Asia countries (Deichmann et al., 2003). Since Africa is endowed with raw materials, it is expected that the cost of raw materials will not deter foreign firm ownership in Africa but the actual influence need to be determined empirically.

3.7.6 Infrastructure Development

Electricity and internet provisions are used to capture the effect of infrastructure development on the attraction of foreign investors into Africa. Since energy is an integral part of any production process, its availability is very crucial to the attraction of FDI into a country. Sub-Saharan Africa currently faces a major electricity shortage with power outages in spite of the huge potential in natural energy resources in Africa. Africa presents the lowest electrification rate among developing countries with approximately 31% of people having access to electricity in sub-Sahara Africa, and about a 14% electrification rate in the rural areas (International Energy Agency, 2011). In fact more than 77% of the rural population in Africa has no access to electricity and this rate reaches 88% for countries in sub Saharan Africa (World Energy Outlook, 2009). Meanwhile Africa has approximately 1440TWh/year potential in the production of hydroelectricity, 20% potential of the world wind energy production and 25% potential of the world total biomass. Also worth

mentioning is that 74% of the African continent receives an annual average of solar irradiation greater than 1900 kWh/m2/year (Farcot, 2002). Apart from Ghana and Mauritius, the electrification rate by percentage in other countries is quite low; below 50% on average. Electricity generation in SSA (excluding South Africa) has the lowest electricity generation capacity among the developing regions of the world and the trend in capacity has been frozen at a point close to 50 MW per million people for more than 18 years (Suberu, Mustafa, Bashir and Mokhtar, 2013). The number of power outages experienced in a typical month is used to capture the effect of electricity on foreign firms in Africa and is expected to have a negative impact on foreign firm ownership.

Oldenski (2012) argues that while transport costs and distance still matter in proximity-concentration tradeoff between the gains to scale realized by concentrating production at the firm's headquarters and the benefits of producing near the final consumers (obviously to avoid transport costs), the increases in the trade of knowledge-based services calls for the need to pay more attention to the transmission of information when studying firm production location decisions. According to Oldenski (2012) firm communication can be divided into two categories and these are the communication of information within the firm and the communication of information from the firm to the outside customer. Therefore the provision of internet connectivity in Africa should play an important role in the attraction of foreign firms to Africa. The Regional Economic Communities (RECs) in sub-Saharan Africa have implemented a regional ICT policy in order to attract investment, harmonize regulations and enhance development of infrastructure and services. The availability of internet connectivity also indicates the extent of infrastructural development and is captured in this study by whether the firm communicates with clients and suppliers by e-mail or not. It is expected in this study that the use of e-mails by firm to communicate with clients and suppliers explains a good portion of foreign firm ownership variation across firms and that firms that communicate with clients and suppliers by e-mail are likely to be owned by foreigners.

CHAPTER 4

DATA AND METHODOLOGY

This chapter presents the methodology deployed to determine the influence of corruption on FDI inflows as well as the level of corruption that will not discourage FDI inflow to Africa. Also presented in this chapter is the methodology used to determine the impact of corruption on foreign ownership of firms in Africa. The main objective of this chapter is to identify data sources and operationalized measures that will enhance the estimation of the various models. More specifically it explains the data and its source and the method of data analyses deployed in the study.

4.1 Data

The importance of good quality data in supplying objective information for the problems under study cannot be overemphasized. Good quality data will enable appropriate analytical understanding of the problems which will help researchers to obtain solutions to the problems. Therefore there is the need for researchers to investigate the consistency of data sources and how these data may be appropriately integrated into the analysis (Statistics Canada, 2008). These principles guided the choice of data for this study.

With exception of control of corruption index, all the other variables used in this study are based on secondary data collected from the World Development Indicators (WDI) (World Bank, 2012). Frequency of the data is annual and it runs from the year, 1996 to 2012 for 50 countries in Africa. The source of the control of corruption index variable is Worldwide Governance Indicators (WGI) (World Bank, 2012).This variable is used in determining the impact of corruption on FDI inflow in Africa. This index is chosen not only because of its authenticity but also because of its free availability on the internet by the authors. The control of corruption index is one of the six dimensions of governance in the Worldwide Governance Indicators. The

source of data for analyzing the effects of corruption on foreign ownership of firms in Africa is the World Business Environment Survey (WBES) conducted by the World Bank. In all 3,290 firms are included in the analysis. These firms are made up of the manufacturing, services and retail sectors. The countries include Angola, Benin, Botswana, Burkina Faso, Cameroon, Chad, Congo D. R., Ivory Coast, Eritrea, Ethiopia, Malawi, Mali, Mauritius, Niger, Nigeria, Tanzania, Togo, Uganda, Zambia and Zimbabwe. The years include 2009, 2010, 2011 and 2013. This choice is based on data availability.

4.2 Data Analysis

Johnson (2011) explains that data analysis is a process used to transform, remodel and revise certain information (data) with a view to reach to a certain conclusion for a given situation or problem. Depending on the needs and requirements of different domains or discipline such as science, business, social science, etc., data analysis can be done using different methods and techniques. Various analytic procedures according to Shamoo and Resnik (2003) 'provide a way of drawing inductive inferences from data and distinguishing the signal (the phenomenon of interest) from the noise (statistical fluctuations) present in the data'. According to Johnson (2011), data analysis helps in structuring the findings from different sources of data collection like survey research and breaking a macro problem into micro parts. This provides a meaningful base to critical decisions. One of the most important uses of data analysis as Johnson (2011) posits is that it helps in keeping human bias away from research conclusion with the help of proper statistical treatment. Therefore in order to meet the objectives of the study, the dynamic panel data estimation technique as well as the Tobit and probit estimation techniques are deployed.

4.3 The Econometric Model One

Several studies have found lagged FDI to be correlated with current FDI (Asiedu, 2013) and so in this study, the new estimator for dynamic panel data model

based on a simple transformation of the dependent variable (FDI) is deployed. This dynamic panel model includes endogenous and exogenous variables in addition to the lagged dependent variable. The transformation is achieved by moving the lagged dependent variable to the left hand side and applying the System GMM estimator to the transformed model. The System GMM estimator is chosen over Difference GMM estimator because System GMM estimator is consistent and asymptotically more efficient than the Difference GMM estimator, though it is known to perform poorly in finite samples, especially when the variance ratio is high and when the dependent variable is highly persistent. The System GMM estimate also has an advantage over Difference GMM with respect to variables that exhibit "random walk" or close to be random-walk variables (Baum, 2006; Bond, 2002; Roodman, 2006, 2007). According to Efendic, Pugh and Adnett (2009) because model specifications including macroeconomic variables are known in economics to be characterized by random walk statistical generating mechanisms, the System GMM approach seems to be a more suitable choice. Empirical research with dynamic models shows that the System-GMM is a good estimator, at least better than the difference-GMM, which is severely downward biased (Hoeffler, 2002; Nkurunziza and Bates, 2003; Presbitero, 2005). More so Roodman (2006) suggest that it is better to avoid Difference GMM estimation, which has a weakness of magnifying gaps if one works with an unbalanced panel.

The general model is of the form;

$$y_{it} = \alpha y_{i,t-1} + x'_{it}\beta + \varepsilon_{it}$$

$$\varepsilon_{it} = u_i + v_{it}$$

for i = 1,…, N and t = 2,…, T, with $|\alpha| < 1$. The disturbance term ε_{it} has two orthogonal components which are the fixed effects, u_i, and the idiosyncratic shocks, v_{it}.

$E(u_i) = E(v_{it}) = E(u_i v_{it}) = 0$ for i = 1,…, N and t = 2,…, T.

The framework for evaluating the relationship between FDI, corruption, and other determinants of FDI is presented in equation (9).

$$y_{it} = \beta_1 + \beta_2 x_{it} + \beta_3 x_{it}^2 + \omega z_{it} + \alpha_1 y_{i,t-1} + \varepsilon_{it} \quad \text{..... (9)}$$

Where y_{it} is a measure of FDI in country i at time period t, $y_{i,t-1}$ is a measure of FDI in country i at time period $t-1$, x_{it} is an index of control of corruption in country i at time period t, x_{it}^2 is the squared index of control of corruption in country i at time period t, z_{it} are control variables in country i at time period t, and finally β_1, $\beta_2, \beta_3, \alpha_1$ and ω are parameters to be estimated and ε_{it} denotes the disturbance term. STATA 13 is the statistical tool used in the data analysis.

4.3.1 Model One: The System-GMM Model of FDI

The benchmark FDI equation in a linear form, with a constant term, is as follows:

$$\begin{aligned} FDI\_PerGDP_{it} &= \beta_1 \\ &+ \beta_2 Control\_of\_Corruption_{it} + \beta_3 Control\_of\_Corruption\_Sqr_{it} \\ &+ \beta_4 Trade\_PerGDP_{it} + \beta_5 GDP\_Per\_Capita_{it} \\ &+ \beta_6 Natural\_resource_{it} + \beta_7 Political\_stability_{it} \\ &+ \beta_8 Inflation\_Consum\_Prices_{it} + \beta_9 Exchange\_Rate\_PerUS_{it} \\ &+ \beta_{10} GDP\_Growth\_PerAnnual_{it-1} + \beta_{11} Telephone\_lines_{it} \\ &+ \beta_{12} FDI\_PerGDP_{it-1} + Time\ (Dummies) + \varepsilon_{it} \end{aligned}$$

The FDI net inflow per GDP is used as the dependent variable in the estimation of the FDI system dynamic model. In addition to the variable of interest, control of corruption and its squared values as independent variables, other control variables were carefully chosen based on previous literature and availability of dataset for the selected period. These control variables include trade openness, GDP per capita, natural resource, political stability, inflation rate, exchange rate, the lag of GDP

growth rate and telephone lines per 100 population of the host countries. To find out whether FDI inflow to Africa was affected by time related shock, time-dummies are included to capture the time related shock.

The control of corruption variable is defined as perceptions of the extent to which public power is exercised for private gain; including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests (World Bank - WGI, 2013). The control of corruption variable is transform from its original scale ranging from approximately -2.5 (weak) to 2.5 (strong) to a new scale range of 0 to 100 for computational purposes and also allow for easy interpretation of results. The following formula was use; $x = (a + 2.5) * 20$; where x is value of the transformed variable and a refers to the value of the original scale. This means that the higher a country is on the scale, the better governance performance against corruption and so the smaller the level of corruption. Therefore countries scoring low on the scale are relatively highly corrupt. Similar transformation was also done for the political stability index. Political stability index 'reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism' (World Bank - WGI, 2013).

Trade openness refers to the sum of exports and imports of goods and services measured as a share of gross domestic product. Natural resource refers to the total natural resources rents which include the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals. Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar). GDP growth rate refers to annual percentage growth rate of GDP at market prices based on constant local currency and the aggregates are based on constant 2005 U.S. dollars. Telephone lines are fixed telephone lines that connect a subscriber's terminal equipment to the public switched telephone network and that have a port on a telephone exchange. And finally GDP per capita is gross

domestic product divided by midyear population (World Bank, 2013). The correlation matrix (see appendix, table 3) indicates significant correlation among some independent variables. It is expected that the existence of this correlation among the independent variables will lead to the problem of multicollinearity in the estimation but the statistical nature of panel data estimation takes care of the collinearity problems (Ranjan and Agrawal, 2011). Therefore the inclusion of these variables in the model would not increase the variance of the coefficient estimates because this increase will render the coefficient estimates unstable.

The two-step estimator is deployed in the estimation because the standard covariance matrix is robust to panel-specific autocorrelation and heteroskedasticity and thus asymptotically efficient. Control of corruption and trade openness are treated as endogenous and all other independent variables strictly as exogenous. The endogeneity of these variables are controlled for in their lagged form as regressors by using internal instruments (lagged levels and lagged differences). It is also less probable that control of corruption and trade openness could explain the changes in the other independent variables strictly treated as exogenous. No external instruments are used. In this panel there are 50 countries (N) that are analyzed over a period of 17 years (T) and this means there are more countries (N) than years (T). It has been argued by many authors that the dynamic panel model is specially designed for a situation where “T” is smaller than “N” in order to control for dynamic panel bias (Baltagi, 2008; Baum, 2006; Bond, 2002; Roodman, 2006, 2007; Sarafidis, Yamagata and Robertson, 2006).

4.4 The Estimation of Corruption Tolerable Level of Investment

Relationships between two economic variables are predicted to be non-monotonic in various economic theories. A popular empirical test of such theories according to Plassmann and Khanna (2003) is to estimate an equation using a polynomial of the variable that is supposed to have the non-linear relationship and once the estimated turning point of the equation is well within the range of the data, then this is an indication that the true relationship is non-monotonic. The model developed in chapter 3 shows that at certain level of institution (corruption) of the

country, investors are attracted to invest in that country and below that level, investors will decline to invest in that country. Therefore Corruption Tolerable Level of Investment of a country will determine whether FDI is likely to flow to that country or not. To empirically test the model, a power term of control of corruption index is introduced in the dynamic model in order to estimate the level of corruption that attracts FDI inflow to Africa. The function of the power terms is to introduce bends into the regression line. With simple linear regression, the regression line is straight. With the addition of the quadratic term, a one bend is modeled in the regression. The response variable in this study is foreign direct investment, net inflows (% of GDP) labelled as FDI PerGDP and the variables, Control of Corruption and Control of Corruption Sqr are the control of corruption index and its square respectively. The Corruption Tolerable Level of Investment is obtained by estimating the equation and taking derivative of the estimated equation with respect to the control of corruption variable. Suppose the following is the estimated equation;

$$\hat{y}_{it} = \hat{\beta}_1 + \hat{\beta}_2 x_1 + \hat{\beta}_3 x_1^2 + \cdots$$

where $\hat{\beta}_2$ and $\hat{\beta}_3$ are estimators of the parameters β_2 and β_3 respectively. Taking the derivate w.r.t. x_1 yields

$$\frac{\delta \hat{y}_{it}}{\delta x_1} = \hat{\beta}_2 + 2\hat{\beta}_3 x_1 = 0$$

Solving this equation gives the turning point of the relationship reflecting an inverse U-shape if $\hat{\beta}_2 < 0$ and vice versa. The coefficient $\hat{\beta}_3$ tells both the direction and steepness of the curvature (a positive value indicates the curvature is upwards while a negative value indicates the curvature is downwards). This means that the turning point is given by $\varphi = -\frac{\hat{\beta}_2}{2\hat{\beta}_3}$ which is referred to as the threshold point or the Corruption Tolerable Level of Investment.

4.4.1 The Precision of the Turning Point Estimate

After estimating the turning point, it is necessary to evaluate the precision of the turning point estimate (φ) to find out whether the estimated turning point is "well within the range of the data". Three methods have been proposed in literature to

evaluate the precision of the turning point estimate (Plassmannand Khanna, 2003). These methods include;

1) 'Approximation of the distribution of φ , based on a Taylor expansion (Delta method)'

2) 'Estimate of the exact distribution of φ if $\hat{\beta}_2$ and $\hat{\beta}_3$ are bivariate normally distributed'

3) 'Finite sample estimate of the exact distribution of φ based on Markov chain Monte Carlo (MCMC) output'.

Plassmann and Khanna (2003) argue that the delta method is likely to result in making misleading inference. Lind and Mehlum (2007) suggest that using the delta method to calculate the standard deviation of the extreme point is only reliable when the number of observations is very large. If the distributions of $\hat{\beta}_1$ and $\hat{\beta}_2$ are not normal, then the estimate of the exact distribution of φ is not applicable. Also MCMC works well when assessing turning points of higher order polynomial functions (Plassmann and Khanna, 2003).

4.4.2 Test of U Shape Relationship

The control of corruption variable scale ranges from approximately -2.5 (weak) to 2.5 (strong) which means that the higher a country is on the scale, the better governance performance against corruption and so the smaller the level of corruption. Therefore countries scoring low on the scale are relatively highly corrupt and expected to attract less FDI and countries scoring high on the scale are relatively less corrupt and thus expected to attract more FDI. Therefore at low scores corruption is expected to have negative impact on FDI inflow and at high scores corruption is expected to have a positive impact on FDI inflow and this is accounting for the U shape relationship.

Most works on turning points use the criteria that if both $\hat{\beta}_2$ and $\hat{\beta}_3$ are significant and if the estimated extreme point is within the data range, then a U shape relationship have found. Lind and Mehlum (2007) reckon these criteria as sensible but posit that these criteria are neither sufficient nor necessary and argue that these criteria are too weak. It is insufficient because the estimated extreme point may be too close

to an end point of the data range. It is not generally necessary because $\hat{\beta}_2$ may be zero if the data range extends to both sides of x = 0. There is a problem when the true relationship is convex but monotone. In such cases a quadratic approximation will erroneously yield an extreme point and hence a U shape (Lind and Mehlum, 2007). According to Lind and Mehlum (2007) to properly test for the presence of a U shape relationship, there is the need to test whether the relationship is decreasing at low values and increasing at high values within the interval of values. Lind and Mehlum (2007) suggest that to be certain that there is at most one extreme point on the interval $[x_l, x_h]$, which is the observed data range with x_l and x_h representing minimum and maximum values of x respectively, $\frac{\delta y}{\delta x_1}$ is required to be monotone on this interval. A U shape is then implied by the conditions;

$$\beta_2 + \beta_3 f'(x_l) < 0 < \beta_2 + \beta_3 f'(x_h) \quad \text{..... (10)}$$

where $f' = \frac{\delta y}{\delta x_1}$. If either of these inequalities is violated then the curve is not U shaped but inversely U shaped or monotone. Testing whether the conditions in (equation 10) are supported by the data, require a test of the combined null hypothesis $H_0: \beta_2 + \beta_3 f'(x_l) \geq 0$ and/or $\beta_2 + \beta_3 f'(x_h) \leq 0$ to be rejected. Since the test involves a set of inequality constraints, the set of (β_2, β_3) that satisfy the alternative hypothesis is a sector in R^2 contained between the two lines $\beta_2 + \beta_3 f'(x_l) = 0$ and $\beta_2 + \beta_3 f'(x_h) = 0$ (Lind and Mehlum, 2007). Assuming that $\varepsilon_{it} \sim$ NID (0, σ2), a test based on likelihood ratio principle (Sasabuchi, 1980) takes the form;

For min(x)

$$H_0: \quad \beta_2 + \beta_3 f'(x_l) \geq 0$$
$$H_1: \quad \beta_2 + \beta_3 f'(x_l) < 0$$

For max(x)

$$H_0: \quad \beta_2 + \beta_3 f'(x_h) \leq 0$$
$$H_1: \quad \beta_2 + \beta_3 f'(x_h) > 0$$

Rejection of the null hypotheses in both cases is a confirmation of a U shaped relationship. This test gives the exact necessary and sufficient conditions for the test of a U shape. An equivalent test according to Lind and Mehlum (2007) is by constructing a confidence interval for the minimum point and finding out whether the confidence interval is contained within the interval $[x_l, x_h]$. Both tests will be used in this study to confirm a U shaped relationship and hence the threshold point or the Corruption Tolerable Level of Investment.

4.5 Panel Data Estimation Methodologies

Panel data or longitudinal data typically refer to data containing time series observations of a number of individuals. Many studies in economics have used panel data in their analysis using various estimation techniques including fixed and random effects, dynamic panel estimation techniques and mixed models. According to Brañas-Garza, Bucheli and García-Muñoz (2011), the advantage of panel data is that it is possible to control for the effects of unobserved or missing variables by using information about the intertemporal dynamics and individuals. With panel model estimation, it is also possible to control for the country-specific, time invariant characteristics through the use of country-specific intercepts or "fixed effects".

4.5.1 Fixed and Random Effect Models

Fixed-effects models are designed to study the causes of changes within an entity since a time-invariant characteristic cannot cause such a change, because it is constant for each person (Kohler and Kreuter, 2009). The fixed effects method treats the constant as group (section)-specific while the random effects method handles the constants for each section as random parameters rather than fixed. Under the random model, the intercepts for each cross-sectional unit are assumed to arise from a common intercept plus a random variable ε_{it} that varies cross-sectionally but is constant over time.

A typical panel model takes a form of a standard linear regression model in which there are repeated measurements $t = (1, \dots\dots\dots, T)$ or a sample of n individuals $i = (1, \dots\dots\dots, n)$,

$$y_{it} = x_{it}\beta + u_i + v_{it}$$

The dependent variable y is observed for individual, i in each of the waves, t. Similarly, the explanatory variables x are observed at each wave. Some of these variables will be time varying while others may be fixed or time invariant. The error term of the regression equation has been split into two components. The first term, u_i is an individual-specific unobservable effect - the unobserved characteristics of the individual i that remain constant over time. The second term, v_{it}, is a random error term representing idiosyncratic shocks that vary over time. Typically, it is assumed that u_i and v_{it} are uncorrelated with each other. In most of the cases before the model is estimated the researchers determine whether the variation across entities is random and uncorrelated with the predictor or independent variables included in the model (fixed or random effects).

Both the fixed effects and random effects have their drawbacks or limitations. For example the limitations of fixed effects approach include;

1) Inability to estimate effects of variables which vary across individuals but not over time

2) "Blunderbuss" approach to controlling for omitted variables – knocks out all cross-section variation in the dependent and independent variables
Inability to predict effects in levels outside of sample; prediction in levels requires prediction of the fixed effects

3) Use of fixed effects is inefficient if *i* is uncorrelated with x_{it} (i.e., if appropriate model is random effects)

4) Use of fixed effects can exacerbate biases from other types of specification problems, especially measurement error

Bell and Jones (2014) explains that fixed effects models effectively cut out much of what is actually going on which are usually of interest to the researcher, the reader, and the policy maker and as a result offer very simplistic and impoverished results which can lead to misleading interpretations.

On the other hand, the most serious weakness of the random effects approach is the problem of bias that partial pooling can introduce in the estimates of β. The random effects estimator requires the assumption that there is no correlation between

the covariate of interest, x_{it}, and the unit effects u_i in order to avoid this bias. If the assumptions made by random effects models are correct, random effects models would be the preferred choice because of its greater flexibility and generalisability and its ability to model context, including variables that are only measured at the higher level.

4.5.2 Test of Fixed or Random Effects

Researchers depend on the Hausman (1978) specification test (Greene, 2008, 2012) to choose between a random effects and fixed effects model. The Hausman test is designed to detect any violation of the random effects modeling assumption that the explanatory variables are orthogonal (no correlation) to the unit effects. If there is no correlation then estimates of β in the fixed effects model should be comparable to estimates of β in the random effects model. To decide between fixed or random effects, Hausman test is normally deployed where the null hypothesis (H_0) is that the preferred model is random affects as against the alternative (H_0) the fixed effects. The use of Hausman test to decide which model to estimate has come under critical scrutiny recently. A negative result in a Hausman test only indicates that the between effect is not significantly biasing an estimate of the within effect. According to Bell and Jones (2014) Hausman test is simply a diagnostic test of one particular assumption behind the estimation procedure usually associated with the random effects model and not taking into account what is actually going on in the data. Hausman test does not address the decision framework for a wider class of problems (Fielding, 2004). According to Clark and Linzer (2012) it is "neither necessary nor sufficient" to use the Hausman test as the sole basis of a researcher's ultimate methodological decision. This is because if the test fails and fixed effects model is chosen ahead of random effect model, time-invariant processes can have effects on time-varying variables, which are lost in the fixed effects model and this will have serious implications on the results. The Hausman test is not a test of fixed versus random effects but rather a test of the similarity of within and between effects.

The main reason why fixed effect model is preferred to random effect model is the exogeneity assumption (the residuals are independent of the covariates) of the latter which often do not hold in many standard random effect models. According to

Bell and Jones (2014), fixed effect estimation models out higher-level variance and makes any correlations between that higher-level variance and covariates irrelevant, without considering the source of the endogeneity. Since endogeneity is normally referred to bias caused by omitted variables, simultaneity, sample selection or measurement error (Kennedy, 2008), the solution to each of these causes will not be the same. Bell and Jones (2014) emphasizes that the source of the endogeneity is often itself interesting and worthy of modelling explicitly.

4.5.3 Dynamic Panel Model

Many economic relationships are dynamic in nature; meaning that current outcomes might depend on past values. Nerlove (2002) argue that economic behaviour is inherently dynamic and so most econometrically interesting relationships are explicitly or implicitly dynamic. Many processes display dynamic adjustment over time and ignoring the dynamic aspect of the data is not only a loss of potentially important information, but can lead to serious misspecification biases in the estimation. One of the advantages of panel data is to allow the researcher to better understand the dynamics of adjustment. Simple dynamic model regresses y_{it} on polynomial in time. Adjustment might be partial: this current year's outcome depends on the previous year's outcome, i.e. include lags of y. In some cases the coefficients on lagged dependent variables might not be the interest of the researcher but the introduction of these lags becomes crucial to control for the dynamics of the process. Bond (2002) is of the view that in instances when coefficients on the lagged dependent variables are not of direct interest, allowing for dynamics in the underlying process may be crucial for recovering consistent estimates of other parameters.

Brañas-Garza et al. (2011) notes that several experimental studies use a panel approach to analyze repeated experiments involving a large number of periods, such as repeated public good games (Croson, Fatás and Neugebauer, 2005), bidding behavior (Rassenti, Smith and Wilson, 2003) and ultimatum games (Botelho, Harrison, Hirsch and Rutstrom, 2005). Bond (2002) also posits that dynamic models are of interest in a wide range of economic applications which include Euler equations for household consumption and adjustment cost models for firm's factor demands. According to Wawro (2002), there are various reasons for including lags. Some of

these reasons comprise the inclusion of lags to account for partial adjustment of behavior over time. The coefficient on lagged dependent variables indicate whether these dependent variables have a greater impact over time or whether their impact decays and the rate at which it decays. The inclusion of lags of dependent variables is a parsimonious way of accounting for the effects of explanatory variables in the past which can also help to remove serial correlation in the disturbance term (Beck and Katz, 1996). Since dynamic panel models include both lagged dependent variables and unobserved individual-specific effects which may be time invariant, these models are very powerful tools that permit for empirical modeling of dynamics while accounting for individual-level heterogeneity. Dynamic panel models are useful when the dependent variable depends on its own past realizations. Also models including lagged dependent variables can also control to a large extent for many omitted variables.

The existing empirical literature according to Casi and Resmini (2011) shows that firms tend to locate where other firms with similar characteristics are already established (Crozet, Mayer and Mucchielli, 2004; Head, Ries and Swenson, 1999; Pusterla and Resmini, 2007). It can thus be concluded that current FDI depends on its own past realizations and therefore the use of the dynamic panel model where the lag of FDI is included as a regressor in the model is appropriate. This will allow the control of the dynamics of the underlying process and also assist in producing consistent estimates of other parameters.

Unfortunately, once lagged dependent variable is included as part of the panel model specification both usual fixed and random effects panel models cannot be used because of the violation of strict/strong exogeneity since the lagged dependent variable which is one of the regressors is correlated with past values of the error term. The correlation of the idiosyncratic error term v_{it} with the lagged dependent variable $y_{i,t-1}$ at time t + 2 is the source of the strict exogeneity. There is also the violation of the weaker condition of no contemporaneous correlation of the regressors with the composite error term; $\varepsilon_{it} = u_i + v_{it}$ since the composite error exhibits serial correlation due to lagged dependent variable as one of the regressors and the time-invariant panel-specific unobserved effect. When y_{it} is correlated with the fixed effects in the error term, it gives rise to "dynamic panel bias" (Nickell, 1981). The

endogeneity problem renders the estimators inconsistent and inferences from the estimated model less accurate.

4.6 The GMM Estimator

The panel dynamic model takes the following form where y exhibit state dependence

$$y_{i,t} = \alpha y_{i,t-1} + \beta' x_{i,t} + \varepsilon_{i,t}$$
$$\varepsilon_{it} = u_i + v_{i,t}$$
$$E(\varepsilon|Z) = 0$$

where β is a column vector of coefficients, y and ε are random variables, x is a column vector of k regressors, z is column vector of j instruments, and $j \geq k$. Using X, Y, and Z to represent matrices of N observations for x, y, and z, the empirical residuals are $\hat{\mathrm{E}} = Y - X\hat{\beta}$. According to Roodman (2009) the problem in estimating this model is that all the instruments are theoretically orthogonal to the error term which means $E(z\varepsilon) = 0$. Forcing the corresponding vector of empirical moments, $E_N(z\varepsilon) \equiv \left(\frac{1}{N}\right) Z'\hat{E}$, to zero generates a system with more equations than variables if $j > k$. This renders the specification to be overidentified. Roodman, (2009) posits that the magnitude of the vector $E_N(z\varepsilon)$ must be minimized because all the moment conditions cannot be satisfied at once.

Kiviet (1995) argues that one of the ways to deal with dynamic panel bias is to draw them out of the error term which can be achieved by entering dummies for each individual estimator (the least-squares dummy-variables) but Roodman (2009) opines that this approach works only for balanced panels while the potential endogeneity of other regressors remains unsolved. The solution to this problem in econometrics is normally the use of instrumental variables (IV). Roodman (2009) suggest two ways to solve this endogeneity problem. One of the ways is the use of Difference Generalized Method of Moments (D-GMM), to transform the data to eliminate the fixed effects. Deference GMM (D-GMM) is ascribed to Arellano and Bond (1991), who depended on earlier works by Anderson and Hsiao (1982) and Holtz-Eakin, Newey and Rosen

(1988). The other one is the use of System Generalized Method of Moments (S-GMM) to instrument the lag of the dependent variable $y_{i,t-1}$ as well as any other similarly endogenous variables with variables that are uncorrelated with the fixed effects. System GMM (S-GMM), is ascribed to Blundell and Bond (1998), who also depended on Arellano and Bover (1995).

4.6.1 Difference GMM (D-GMM)

The Difference GMM refers to the removal of the individual-specific and unobserved effect in a dynamic panel model by taken the first difference of the linear dynamic panel regression. The sequential exogeneity and the zero serial and cross-section correlation of ε_{it} in the first-differenced linear dynamic panel regression imply that this moment conditions; $E\left(y_{i,t-s}\Delta\varepsilon_{it}\right) = 0$ for all i, t and $s = 2, \ldots\ldots, \infty$ hold. The past levels of the dependent variable serve as instruments for the current first differences of the dependent variable.

4.6.2 System GMM (S-GMM)

The systemic GMM assumes the Difference-GMM estimation procedure with an additional assumption $(E\left(\Delta y_{i,t-s}[\alpha_i + \varepsilon_{it}]\right) = 0$ for all i, t and $s = 2, \ldots\ldots, \infty)$ leading to an additional set of moment conditions to leverage. The S-GMM therefore necessitates lagged changes in the dependent variable to be valid instruments for the level of the lagged dependent variable in the level equation. Though more assumptions are involved with System GMM than Difference-GMM, the System GMM achieves a greater efficiency once these assumptions hold. Moreover, because the System GMM uses the level version of the dynamic panel model together with the differenced version, the effects of time-invariant regressors can be estimated in contrast to Difference-GMM, where they get differenced out. The system estimator uses the first difference of all the exogenous variables as standard instruments and the lags of the endogenous variables to generate the GMM-type instruments as described in Arellano and Bond (1991) and also includes lagged differences of the endogenous variables as instruments for the level equation.

4.6.3 Specification Testing in Dynamic Panel Models

The specification testing in dynamic panel models is done to deal with problems of overidentification restrictions and serial correlation. This is accomplished by using the standard Sargan and the Hansen J test for the overidentification restrictions test and Arellano-Bond test for autocorrelation.

4.6.3.1 Over-Identifying Restrictions (OIR)

One crucial assumption for the validity of GMM is that the instruments used are exogenous. According to Roodman (2009), detection of invalid instruments is impossible if the model is exactly identified, because even when $E(z\varepsilon) \neq 0$, the estimator will choose $\hat{\beta}$ so that $Z'\hat{E} = 0$ exactly. Roodman (2009) explains on the contrarily that if the model is overidentified, a test statistic for the joint validity of the moment conditions falls out of the GMM framework. The vector of empirical moments $(\frac{1}{N})Z'\hat{E}$ is randomly distributed over 0 under the null of joint validity. To tests for overidentifying restrictions, the standard Sargan test and the Hansen J test will be used. The Sargan test works well if errors are homoskedastic but unlike Hansen's J-statistic test, Sargan test is not robust to heteroscedasticity or autocorrelation. Even though the Sargan test is more reliable, it is not appropriate if errors are homoscedastic. A difficulty with Hansen's J-statistic test is that as the number of instruments grows, its size is distorted. A test of overidentifying restrictions regresses the residuals from an IV on all instruments in Z. Under the null hypothesis that all instruments are uncorrelated with u, the test has a large-sample $\chi^2(r)$ distribution where r is the number of overidentifying restrictions. The null in both of these tests is that all of the instruments are valid and the alternative is that some subsets are not valid.

Roodman (2009) indicates that Sargan-Hansen statistics can also be used to test the validity of subsets of instruments, via a "difference-in-Sargan/Hansen" test, also known as a C statistic. The Sargan-Hansen test reports two test statistics after estimation with and without a subset of suspect instruments under the null of joint validity of the full instrument set. The difference in the reported test statistics is itself asymptotically χ^2, with degrees of freedom equal to the number of suspect instruments. The difference-in-Sargan/Hansen test is, only feasible if the regression

without the suspect instruments has enough instruments to be identified (Roodman, 2009).The caution according to Roodman (2009) is that the Sargan-Hansen test should not be relied upon too faithfully, because it is prone to weakness. When Sargan-Hansen test is applied after GMM, it tries first to drive $(\frac{1}{N})Z'\hat{E}$ close to 0, and then test whether it is actually close to zero. However, the more moment conditions there are, the weaker the test actually grows. The joint null hypothesis is that the instruments are valid instruments.

The instruments must satisfy three conditions:

1) the instrument should be orthogonal to the error term

2) the instrument only indirectly influence y

3) the instrument correlate with that for which they are instruments

4.6.3.2 Testing for Residual Serial Correlation

The degree of serial correlation of the residual term in either Difference-GMM or System-GMM will determine the validity of any instruments used based upon the dependent variable. The set of valid instruments based upon the dependent variable changes once the residual term is serially correlated. The lags of the change in the dependent variable greater than or equal to 1 are valid instruments for the level equation with the System-GMM framework and lags of the dependent variable greater than or equal to 2 are valid instruments for the differenced equation with the Difference-GMM framework. The full disturbance term ($\varepsilon_{it} = u_i + v_{it}$) contains fixed effects and is presumed autocorrelated and so the estimators are designed to remove this source of problem. If the ε_{it-} are serially independent, then $E(\Delta\varepsilon_{it}\Delta\varepsilon_{it-1}) = E[(\varepsilon_{it} - \varepsilon_{it-1})(\varepsilon_{it-1} - \varepsilon_{it-2})] = -E[\varepsilon_{it-1}^2] = -\sigma_\varepsilon^2$ and thus, first order serial correlation would be expected. It is however not expected that there be any second order serial correlation, (i.e. $E(\Delta\varepsilon_{it}\Delta\varepsilon_{it-2}) = E[(\varepsilon_{it} - \varepsilon_{it-1})(\varepsilon_{it-2} - \varepsilon_{it-3})] = 0$. One should therefore test for second order serial correlation since the presence of second order serial correlation indicates a specification error. The idiosyncratic disturbance term v_{it} is related to $\Delta v_{i,t-1}$ mathematically via the shared $v_{i,t-1}$ term, and so a negative first-order serial correlation is expected in differences meaning that its evidence is of no importance. Therefore to check for first-order serial

correlation in levels, it is important to check for second-order correlation in differences as well, on the basis that this will detect correlation between the $v_{i,t-1}$ in Δv_{it} and the $v_{i,t-2}$ in $\Delta v_{i,t-2}$. Therefore serial correlation of order l in levels is checked by looking for correlation of order $l+1$ in difference (Roodman, 2009).

These tests lose power when the number of instruments, i, is large relative to the cross section sample size, n. The rule of thumb is to keep the number of instruments less than or equal to the number of groups and so when the ratio; r of the sample size to the number of instruments is less than one, $ratio = \frac{n}{i} < 1$, the assumptions underlying the two procedures may be violated. Furthermore, a lower r raises the susceptibility of the estimates to a Type 1 error. The easiest solution to this problem according to Roodman, (2007; 2009) is to reduce the instrument count by limiting the number of lagged levels to be included as instruments.

4.7 Probit and Tobit Models (Limited Dependent Variables)

Limited Dependent Variables (LDV) are simply dependent variables whose range of values is substantially restricted. It must be noted that most of the time models with limited dependent variables lead to inconsistent parameter estimates when OLS is used in the estimation since the sample is not representative of the population. This is because in regressions where the dependent variable is not completely observed and also regressions where the dependent variable is observed completely only in a selected sample, the sample may not be true representative of the population. Estimation of these models with OLS leads to omitted variable bias and heteroskedastic error. Wooldridge (2002) posits that using OLS in such a setting leads to problems with the estimation.

Some of the techniques deployed in the estimation of models with limited dependent variables include probit, logit and Tobit. The Tobit and probit models are comparable in many ways but differ in measurement models. In the Tobit model, the value of y* (continuous latent variable) is known when y* > 0, while in the probit model the value of y* is known only if y* > 0.

4.7.1 The Econometric Model Two

Equation (11) is deployed in the estimation of the impact of bribes paid by firm on foreign ownership of firms. The dependent variable is the percentage of foreign firm ownership and the independent variables include corruption and other as control variables(X).

$$Y_i = \alpha_i + \delta_i corruption_i + X_i'\beta + \varepsilon_{it} \quad \text{..... (11)}$$

Greene (2003) postulates that the probit estimates should be consistent with this expression $\frac{1}{\sigma_{tobit}}(\beta_{tobit})$. Which means that if the Tobit model is correctly specified, then by multiplying the probit coefficients (β_{probit}) by the estimated standard error of the Tobit regression (σ_{tobit}), we should get the Tobit coefficients (β_{Tobit}) or if we divide the Tobit coefficients by σ_{tobit} we to get the probit coefficients.

4.7.2 Probit Models

Both the Logit and probit models are often encouraged in terms of a latent variable specification but the choice of any of the models depend on whether the error term is assumed to have standard logistic distribution or standard normal distribution. These models assume that there is some continuous latent variable y* that determines foreign ownership of a firm. We can think of y* as a firm whose owner is a foreigner. The firm ownership may be completely 100% foreign or some percentage of foreign ownership. If y* is positive, the firm ownership is either completely 100% foreign or some percentage of foreign ownership and the observed binary outcome equals 1. Otherwise, the firm ownership is completely domestic and the observed value equals 0. Then the latent variable y* is modelled by a linear regression function of the independent variables x_i and it is assumed that the error term in this equation has a standard normal distribution. Therefore probit model is estimated by the method of maximum likelihood estimation. Due to the nonlinear nature of probit and logit models, Maximum Likelihood Estimation (MLE) is normally used. The general theory of conditional MLE for random samples implies that, under very general conditions, the MLE is consistent, asymptotically normal and asymptotically efficient.

More specifically, the model is of the form;

$$Y_i = \beta_i X'_i + \varepsilon_i$$

Where the dependent variable (Y_i) represents whether a firm is owned by a foreigner or not,

$$Y_i = \begin{cases} 1 & if\ percentage\ of\ firm\ owned\ by\ foriegn\ investor > 0, \\ 0 & otherwise \end{cases}$$

and the independent variables (X_i) include corruption captured as the percent of total annual sales of the firm paid as informal payments to public officials and other control variables, β_i is a vector of unknown parameters (to be estimated) and ε_i is the stochastic error term. The regression function includes two types of explanatory variables. The first type can be treated as though they were continuous variables and these include percent of total annual sales of the firm paid as informal payments to public officials, unit cost of labour, number of power outages experienced in a typical month in the previous fiscal year, cost of raw materials and intermediate goods used in production. The other explanatory variables which are the use of e-mail as a means of communication with clients and suppliers and the use of foreign technology are binary or dummy variables. These take the value 1 if the firm has a particular characteristic and 0 otherwise.

Model Two: The Probit model of Foreign Firm Ownership

The benchmark equation in a linear form, with a constant term, is as follows:

$$Foreign\_Owned\_Firm_i = \alpha_i + \beta_1 Percent\_Sales\_Informal\_Pay_i + \beta_2 Labour\_Cost_i + \beta_3 Number\_Power\_Outage_i + \beta_4 Cost\_Raw\_Materials_i + \beta_5 Use\_Email\_Client_i + \beta_6 Use\_Foreign\_Tech_i + \varepsilon_i$$

Where the dependent variable is a binary outcome referring to the percentage of the firm owned by private foreign individuals, companies or organizations which assumes the value one if the firm ownership is completely 100% foreign or some percentage of foreign ownership or assumes the value zero if the firm ownership is completely

(100%) domestic. The independent variables include percent of total annual sales of the firm paid as informal payments to public officials, unit cost of labour, number of power outages experienced in a typical month in the previous fiscal year, cost of raw materials and intermediate goods used in production, communication with clients and suppliers by e-mail and the use foreign technology.

4.7.3 The Tobit Model

In applications where the observed dependent variable y_i describe some population with characteristics such as; y_i taking on the value 0 with positive probability but is also a continuous random variable over strictly positive values, the Tobit model is appropriate estimation technique to deploy. Tobit models are often related to censoring where data on the dependent variable is limited but that on the regressors is available. When the variable to be explained is partly continuous but has positive probability mass at one or more points, censored regression models are the appropriate choice. Wooldridge (2002) categorise censored regression applications into two, namely; censored regression applications and corner solution models. With censored regression applications, because data on the dependent variable y is not observed for some part of the population, y is censored from above and/or below depending on lost observations. When censoring is down below at a threshold of zero, it means some observation below zero is/may not be available. Contrary to this, in the corner solution applications, the issue is about the features of the distribution of y such as E(y) and P(y=0). These types of models are better referred to as corner solution models rather than censored regression models (Wooldridge, 2002).

The corner solution and the censored regression applications are both the standard censored Tobit model. This study seeks to model firm ownership by foreign investors which may be completely 100% foreign or some percentage of foreign ownership or completely domestic in which case the foreign ownership is 0. The observed variable y_i represents the fraction of foreign ownership of firms. Since some of the firms are completely owned by domestic investors, the data is likely to be characterized by lots of zeros. A significant fraction of the data has zero value. The Tobit model is a useful specification to account for mass points in a dependent variable that is otherwise continuous. The maximize log-likelihood is used to estimate

the parameters of the Tobit model. The estimates of the Tobit model are expected be more efficient because there is more information in the Tobit model.

4.7.3.1 The setup of Tobit model

The structural equation in the Tobit model is:

$$y^* = X_i\beta + \varepsilon_i$$

$$i = 1, 2, \ldots\ldots\ldots\ldots..N$$

Where ε_i is assumed to be $\text{NID}(0, \sigma^2)$ and independent of X_i; i.e. $\varepsilon_i \sim N(0, \sigma^2)$ and y^* is a latent variable that is observed for values greater than τ and censored otherwise.

The observed y is defined by the following measurement equation

$$y = \begin{cases} y^* \; if \; y^* > \tau \\ y_\tau \; if \; y^* \leq \tau \end{cases}$$

In the typical Tobit model, it is assumed that τ = 0 which means that the data are censored at 0. Thus, we have

$$y = \begin{cases} y^* \; if \; y^* > 0 \\ 0 \; if \; y^* \leq 0 \end{cases}$$

The likelihood function for the censored normal distribution is

$$L = \prod_{i}^{N} \left[\frac{1}{\sigma} \emptyset \left(\frac{y - \mu}{\sigma}\right)\right]^{d_i} \left[1 - \Phi \left(\frac{\mu - \tau}{\sigma}\right)\right]^{1-d_i}$$

where τ is the censoring point.

In the traditional Tobit model, τ is set to 0 and parameterize μ as $X_i\beta$. This gives the likelihood function for the Tobit model as

$$L(\beta,\sigma)=\prod_{i}^{N}\left[\frac{1}{\sigma}\emptyset\left(\frac{y-\ X_i\beta}{\sigma}\right)\right]^{d_i}\left[1-\Phi\left(\frac{X_i\beta}{\sigma}\right)\right]^{1-d_i}$$

Taking log on both sides, the log-likelihood function for the Tobit model becomes

$$lnL(\beta,\sigma)=\sum_{i=1}^{N}\left\{d_i\left(-ln\sigma+ln\emptyset\left(\frac{y-\ X_i\beta}{\sigma}\right)\right)+(1-d_i)ln\left(1-\Phi\left(\frac{X_i\beta}{\sigma}\right)\right)\right\}$$

The overall log-likelihood is made up of two parts where the first part is the classical regression for the uncensored observations, and the second part is the relevant probabilities that an observation is censored. The Tobit model is also called Type I Tobit Model and can be said to be a combination of two models:

1) A Probit model: It determines whether y=0 (No) or y > 0 (Yes).

2) A truncated regression model for y > 0.

4.7.3.2 Model three: The Tobit model of Foreign Firm Ownership

The benchmark equation in a linear form, with a constant term, is as follows:

$$Foreign\_Owned\_Firm_i=$$
$$\alpha_i+\beta_1 Percent\_Sales\_Informal\_Pay_i+\beta_2 Labour\_Cost_{\ i}+$$
$$\beta_3 Number\_Power\_Outage_i+\beta_4 Cost\_Raw\_Materials_i+$$
$$\beta_5 Use\_Email\_Client_i+\beta_6 Use\_Foreign\_Tech_i+\varepsilon_i$$

Here the dependent variable refers to the percentage of the firm owned by private foreign individuals, companies or organizations. The observed value equals 0 if the firm ownership is completely domestic. The independent variables include percent of total annual sales of the firm paid as informal payments to public officials, unit cost of labour, number of power outages experienced in a typical month in the previous fiscal year, cost of raw materials and intermediate goods used in production, communication with clients and suppliers by e-mail and the use of foreign technology as in the probit model.

4.7.3.3 Specification and test for Tobit models

The validity of the Tobit estimator depends on the assumption of normality and thus the Tobit estimator becomes inconsistent when the normal distribution assumption of the disturbance is not satisfied (Goldberger, 1983). With corner solution applications, Wooldridge (2002) posits that the presence of heteroskedasticity or nonnormality in the latent variable model entirely changes the functional forms for $E[y]$ and $E[y \mid y > 0\ ]$. This is because Tobit model requires that the independent variables should have the same effect on the probability of being observed in the sample as in the observed segment of the model. An informal misspecification test is to estimate the probit part separately where the binary outcome; firm ownership equals one if the firm ownership is completely 100% foreign or some percentage of foreign ownership or equals zero if the firm ownership is completely (100%) domestic. It is expected that the parameters γ_i in the probit model equals to $\frac{\beta_i}{\sigma}$ where β_i is the parameters in the tobit model. The estimates of the probit model can be compared to the separate estimates from the Tobit model. Therefore the estimated parameter $\widehat{\gamma_i}$ in the probit model should be close to $\frac{\widehat{\beta_i}}{\sigma}$ where $\widehat{\beta_i}$ is the estimated parameter in the Tobit model (stated earlier). If they are statistically different we can conclude a misspecification.

4.7.3.4 Interpretation of Tobit model results

In the Tobit model, there are three different expected values and marginal effects or conditional means: those of the latent variable y^*, the observed dependent variable y, and the uncensored observed dependent variable $y \mid y > 0$. The purpose of the analysis will determine the choice of the expected values (Greene, 2003) or marginal effects. The estimation of a Tobit model yields three expected values (Sigelman and Zeng, 1999) and the choice of the expected value to use depends on the purpose of the study. As indicated earlier, those of the latent variable y^*, the observed dependent variable y sometimes called the "unconditional expectation" and the uncensored observed dependent variable $y \mid y > 0$ which is sometimes called the "conditional expectation" because it is conditional on $y > 0$.

Expected value of the latent variable: $E[y^*] = X_i\beta$

Expected value of y: $E[y] = \Phi\left(\frac{X_i\beta}{\sigma}\right)\left[X_i\beta + \sigma\frac{\emptyset\left(\frac{X_i\beta}{\sigma}\right)}{\Phi\left(\frac{X_i\beta}{\sigma}\right)}\right]$

Expected value of $y \mid y > 0$: $E[y \mid y > 0] = X_i\beta + \sigma\frac{\emptyset\left(\frac{X_i\beta}{\sigma}\right)}{\Phi\left(\frac{X_i\beta}{\sigma}\right)}$

The ratio $\frac{\emptyset\left(\frac{X_i\beta}{\sigma}\right)}{\Phi\left(\frac{X_i\beta}{\sigma}\right)}$ is referred to as the inverse Mills ratio which is the ratio between the standard normal probability density function (pdf**)** and standard normal cumulative density function (cdf**)**. The inverse Mills refers to the probability of being uncensored multiplied by the expected value of y given that y is uncensored.

Therefore the interpretation depends on whether one is concerned with the marginal effect of X on y^*, y or $y \mid y > 0$. In this study for example, the interpretation could be y^* to understand the underlying propensity of a foreign investor to own a firm, y to understand the determinants of firm ownership by foreigners and domestic investors alike, or $y \mid y > 0$ to understand the extent of firm ownership by foreign investors alone. The marginal effect on the latent dependent variable y^* refers to the case where the Tobit coefficients shows how a unit change in an independent variable x_k alters the latent dependent variable;

$$\frac{\partial E[y^*]}{\partial x_k} = \beta_k$$

In the case of the marginal effect on the expected value for y, the marginal effect indicates how a unit change in an independent variable x_k affects the censored and uncensored observations;

$$\frac{\partial E[y]}{\partial x_k} = \Phi\beta_k\left(\frac{X_i\beta}{\sigma}\right)$$

The last case is the marginal effect on the expected value for $y \mid y > 0$ which indicates how a unit change in an independent variable x_k affects uncensored observations

$$\frac{\partial E[y \mid y > 0\ ]}{\partial x_k} = \beta_k\left[1 - \frac{\emptyset\left(\frac{X_i\beta}{\sigma}\right)}{\Phi\left(\frac{X_i\beta}{\sigma}\right)}\left(\frac{X_i\beta}{\sigma} + \frac{\emptyset\left(\frac{X_i\beta}{\sigma}\right)}{\Phi\left(\frac{X_i\beta}{\sigma}\right)}\right)\right]$$

CHAPTER 5

RESULTS AND DISCUSSION

Corruption is known to occur in all countries irrespective of whether the country is a developing or a developed one. Based on the differences in the determinants of corruption in each country, the enthusiasm to fight corruption in each country as well as the effectiveness of anticorruption policies in each country, it can be concluded without ambiguity that the levels of corruption differs from country to country. It is argued in this study that corruption might be a means to achieve certain benefits especially in countries where bureaucratic regulations are cumbersome but when corruption goes beyond just bribing to avoid unnecessary bureaucratic delay to malfunctioning of government institutions then corruption is expected to have a negative impact on private investment. The quality or level of institutions in the domestic country has the potential of attracting or otherwise foreign firms depending on whether with the existing institutions, the foreign firm can get the most out of its location advantage. Dunning (1988) suggest that government intervention can motivate or discourage companies to locate and operate in a particular country. Research has also revealed that poor institutional arrangements reduce the returns to investments and capital accumulation (Brunetti et al., 1997; Mauro, 1995; Wei, 2000a). Therefore it is proposed that beyond a certain level of corruption in a country, firms are no longer interested in investing. This can also be stated in terms of control of corruption index, that below certain level of control of corruption index, investors are no longer attracted to invest in those countries. This level of control of corruption index is what is referred to as the Corruption Tolerable Level of Investment (CTLI). To empirically show this, a power term of control of corruption index was introduced in the dynamic model in order to estimate the level of corruption that does not deter FDI inflow to Africa. The response variable in this study is foreign direct investment, net inflows (% of GDP) labelled as FDI_PerGDP and the variables

control_of_corruption and control_of_corruption_Sqr are the control of corruption index and its square respectively.

5.1 Descriptive Statistics of Variables Used in the Dynamic Model

The descriptive statistics of the variables deployed in the study are presented in Table 5.1. The observations vary from 727 as lowest to 877 as the highest observations. The period under study is from the year; 1996 to the year; 2012. The variables obtained from Worldwide Governance Indicators (control of corruption and political stability) have data missing for three years (1997, 1999 and 2001) and this is accounting for those variables having the lowest number of observations. Telephone lines have highest number of observations which gives an indication of the level of infrastructure development in Africa. The mean of GDP per capita is 1688.28 and the standard deviation of 2591.61 shows that the observations are widely dispersed. Also worthy of mention is the mean of exchange rate (714.10) and the standard deviation of 1857.42 which shows a high fluctuation of exchange rate within the period of observation. The mean of inflation rate is 20.10 and the standard deviation of 158.95 also indicates high fluctuation of inflation rate within the period of observation. Variables with the lowest dispersions include FDI inflow, control of corruption, trade openness, natural resource, GDP growth and telephone lines.

Table 5.1 Descriptive Statistics of Variables in the Dynamic Model

Variable	Observation	Mean	Std. Dev.	Min	Max
FDI PerGDP	805	4.874661	10.38533	-82.8921	145.202
Control of Corruption	727	38.05282	11.91438	8.800001	75
Control of Corruption Sqr	727	1589.774	994.3457	77.44002	5625
Trade PerGDP	797	77.11778	37.27615	17.85861	275.2324
Natural resource	863	15.36953	18.02374	0.003196	100.3669
Inflation Consum Prices	797	20.9961	158.9528	-9.79765	4145.107
Exchange Rate PerUS	859	714.0977	1857.418	0.010014	19068.42
FDI PerGDP (lagged one year)	805	4.874661	10.38533	-82.8921	145.202
GDP Growth PerAnnual (lagged one year)	848	4.807308	7.160985	-32.8321	106.2798
Telephone lines per100people	877	3.499723	5.821433	0.000236	33.11384
GDP Per Capita	851	1688.275	2591.605	53.09856	14901.35
Political stability	728	38.95907	19.05746	-16.4	73.8

Source: data analyzed

5.2 Empirical Results of Fixed Effect Model

The fixed effect model was estimated so as to compare the results with that of the dynamic model. To decide between fixed and random effects, Hausman test was deployed where the null hypothesis (H_0) is that the preferred model is random affects as against the alternative (H_0) the fixed effects. The chi-square test with 14 degrees of freedom, the statistic value (272.27) and the reported p-value (0.0000) indicate that the null hypothesis can be rejected and therefore conclude that the model fits a fixed effect. This basically indicates that the unique errors (u_i) are correlated with the regressors.

Table 5.2 Results of the Fixed Effect Model Estimation

VARIABLES	FDI_PerGDP
Control of Corruption	0.112
	(0.282)
Control of Corruption Sqr	-0.000970
	(0.00323)
Trade PerGDP	0.181***
	(0.0214)
Natural resource	-0.272***
	(0.0506)
Inflation Consum Prices	-0.00338**
	(0.00158)
Exchange Rate PerUS	0.00140**
	(0.000596)
GDP Growth PerAnnual (lagged one year)	-0.209***
	(0.0566)
Telephone lines per100people	0.675**
	(0.266)
GDP PerCapita	-0.00525***
	(0.000420)
Political stability	0.0484
	(0.0432)
2007 (year dummy)	1.933*
	(1.028)
2008 (year dummy)	2.550**
	(1.071)
2009 (year dummy)	0.959
	(1.050)

Table 5.2 (continued)

VARIABLES	FDI_Per_GDP
2010 (year dummy)	1.721
	(1.066)
Constant	-3.088
	(6.235)
Observations	572
Number of countries	50
R-squared	0.410

Source: data analyzed

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results in Table 5.2 show that both the control of corruption variable as well as its squared variable is not significant. This shows that dynamic panel model is more suitable since FDI inflow depends on its own past realizations. Also the inclusion of the lagged dependent variable can control to a large extent for the omitted variables.

5.3 Empirical Results of Dynamic Panel Model

The results of the dynamic panel model estimated including endogenous and exogenous variables in addition to the lagged dependent variable are presented in Table 5.3. The System GMM estimator is chosen over Difference GMM estimator because System GMM estimator is consistent and asymptotically more efficient than the Difference GMM estimator. The FDI net inflow per GDP is used as the dependent variable in the estimation of the FDI model. The control of corruption variable and its squared values as well as other control variables are used as independent variables. The two-step estimator is deployed in the estimation with control of corruption and trade openness variables treated as endogenous and all other independent variables treated strictly as exogenous. No external instruments are used.

5.3.1 Model One Specification Diagnostics Test

The validity of the estimated results in System GMM depends on the statistical diagnostics test. The results indicate that the specification pass the Hansen-J statistic test for Over-Identifying Restrictions (OIR), confirming that the instrument set can be considered valid. If the model is well specified, it is expected that the null hypothesis of no autocorrelation of the second order AR(2) is not rejected and therefore the Arellano-Bond tests for serial correlation supports the model specification. Since the number of instruments (47) is less than the number of groups (50) the assumptions underlying the two procedures are not violated. Finally the Wild Chi-square test of joint significance of the variables indicates that the model is well specified. Details of the test are presented in Table 5.3.

More specifically, compared to the OLS model, Efendic et al. (2009) posits that System GMM does not only assume normality but it also allows for heteroskedasticity in the data which is a common problem with dynamic panel models. The two-step estimates that report the Hansen's J-statistic test and yield theoretically robust results (Roodman, 2006) are reported. There is also the need to test for autocorrelation in the error terms, which is also a test for the validity of instruments since the System GMM assumes that the twice-lagged residuals are not autocorrelated. According to Arellano and Bond (1991) the GMM estimator allows for first-order serial correlation but requires that there is no second-order serial correlation in the residuals. The null hypotheses in diagnostics test (1) and (2) in Table 5.3 are that there is no first-order and second-order serial correlation respectively. This means that one may not reject both diagnostics test (1) and (2) and this support the validity of the model specification (Basu, 2008). The test of correct model specification and valid overidentifying restrictions, i.e. validity of instruments is achieved using the Hansen J-statistic tests and by rejecting the null hypothesis, it means either or both assumptions are violated. The Hansen J- test of overidentifying restrictions fails to reject the null at any conventional level of significance ($p = 0.188$) meaning that the model has valid instrumentation.

Table 5.3 Model specification diagnostics test

Model diagnostics test	Chi-square	Prob > F
1) Wild Chi- test of joint significance		
H0: Independent variables are jointly equal to zero	22959.58	0.000
2) Arellano-Bond test for AR(1) in first differences		
H0: There is no first-order serial correlation in residuals	z = -1.89	Pr > z = 0.059
3) Arellano-Bond test for AR(2) in first differences		
H0: There is no second-order serial correlation in esiduals	z = 0.97	Pr > z = 0.331
4) Hansen J-test of overidentifying restrictions		
H0: Model specification is correct and all overidentifying restrictions (all overidentified instruments) are correct (exogenous)	37.76	0.188
5) Difference-in-Hansen tests of exogeneity of GMM instrument subsets: Hansen test excluding SGMM instruments (i.e. the differenced instruments)		
H0: GMM differenced- instruments are exogenous	9.66	0.471
6) Difference-in-Hansen tests of exogeneity of GMM instrument subsets		
H0: system-GMM instruments are exogenous and they increase Hansen J-test	28.10	0.137
7) Difference-in-Hansen tests of exogeneity of standard “IV” instrument subsets		
H0: GMM instruments without ”IV” instruments are exogenous	30.31	0.175
8) Difference-in-Hansen tests of exogeneity of standard “IV” instrument subsets		
H0: Standard “IV” instruments are exogenous and they increase Hansen J-test	7.45	0.383

Source: data analyzed

The difference-in-Sargan/Hansen test is used to test the validity of subsets of instruments. The null hypothesis of the model diagnosis test (5) and (6) which states that the specified variables are proper instruments with p-value 0.471 for GMM differenced- instruments and 0.137 for system-GMM instruments cannot be rejected. This shows that the exogeneity of any GMM instruments used are valid instruments. Similarly the null hypothesis of the model diagnosis test (7) and (8) which states that the specified variables are proper standard "IV" instrument subsets cannot be rejected.

The dynamic panel models can generate an enormous number of potentially "weak" instruments due to the number of instruments used and this can lead to biased estimates. Though there are no clear rules determining how many instruments is "too many", the rule of thumb suggest that the number of instruments should not exceed the number of groups (Roodman, 2006, 2007). The results show that the number of instruments (47) is less than the number of groups (50) hence the estimates by the System GMM are not biased. The 47 instruments came from the restriction to use two lags for levels and two for differences in the data (i.e., setting the restriction to (2 2) in xtabond2).

Efendic et al. (2009) is of the view that the suggestion by Roodman (2006) to check for the "steady state" assumption can also be used to investigate the validity of instruments in System GMM. This assumption requires a kind of steady-state in the sense that deviations from long-term values are not systematically related to the fixed effects. The estimated coefficient on the lagged dependent variable in the model should indicate convergence by having a value less than (absolute) unity otherwise System GMM is invalid (Roodman, 2006). The results show that the estimated coefficient on the lagged dependent variable (FDI_PerGDP_1) is 0.468, implying that the steady-state assumption holds. The Wild Chi-square test of joint significance reports which states that the null hypothesis of the independent variables are jointly equal to zero (p=0.000) at any conventional level of significance may be rejected. Based on the various statistical tests that have been conducted, there is enough evidence to conclude that the examined statistical tests satisfy the key assumptions of System GMM estimation and that this model is an appropriate statistical generating mechanism.

5.3.2 Interpretation and Discussion of Results

The results of the estimated System GMM are presented in Table 5.4. All variables with positive estimates have positive impact on the dependent variable and those with negative estimates have negative impact on the dependent variable. The response variable in this model is foreign direct investment, net inflows (% of GDP) and the independent variables include control of corruption index and its square as well as other control variables. The results show that control of corruption is negative and highly significant whilst the square of control of corruption is positive and also highly significant. The control of corruption variable as is captured reflects perceptions of the extent to which public power is exercised for private gain and this include both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The control of corruption scale ranges from approximately -2.5 (weak) to 2.5 (strong) which mean that the higher the score of the country, the less corrupt. Thus at low scores corruption has a negative impact on FDI inflow and at high scores corruption has a positive impact on FDI inflow. This gives an indication that below certain level of corruption, corruption does not have a negative effect on foreign direct investment and beyond that level potential investors are no longer motivated to invest in that country as predicted by the theoretical model developed in chapter three. Potential foreign investors in Africa are very sensitive to the perception of corruption in the host country. This confirms the evidence from earlier studies that corruption deters foreign direct investments (Aizenman and Spiegel, 2003; Barassi and Zhou, 2012; Cuervo-Cazurra, 2006, 2008; Habib and Zurawicki, 2002; Hakkala et al., 2008; Javorcik and Wei, 2009; Voyer and Beamish, 2004; Wei, 2000a).

With exception of inflation as expected and GDP per capita, all the other control variables are positive. Also with the exception of natural resource, telephone lines and political stability, all the other control variables are significant. Results by Jadhav (2012) on FDI shows that traditional economic determinates are more important than institutional and political determinants of FDI. The findings also show that trade openness is a positive and significant determinant of FDI inflow. The results show that a 1 unit increase in the percentage of trade openness to the GDP of a country leads to 4.13% increase in the percentage of FDI inflow to GDP of that

country. This supports the assertion that trade liberalization leads to increased FDI inflow (Anyanwu, 2012; Anyanwu and Erhijakpor, 2004; Asiedu, 2002; Ranjan and Agrawal, 2011; Sahoo, 2006). The results also show that a 1 unit increase in inflation leads to 1.59% decrease in the percentage of FDI inflow to GDP. The higher the volatility of the inflation rate, the more unstable the macroeconomic environment of the host country becomes and thus the lower the FDI inflow to that country. This results is consistent with Ranjan and Agrawal, (2011) who found inflation to have a negative relation with FDI inflow though its magnitude is very less.

Similarly, a 1 unit increase in previous year's GDP growth rate leads to 1.54% increase in the percentage of FDI inflow to GDP. This shows that since GDP growth rate represent a country's economic track record it is an indicator of profitable investment opportunities to the outside world. This finding is consistent with earlier assertion that market size is a positive and significant determinant of FDI flows (Garibaldi et al., 2002; Nunes et al., 2006; Sahoo, 2006). Contrary to expectations, GDP per capita have a negative and significant impact on FDI inflows but this finding is consistent with earlier findings (Dauti, 2008). The results show that a 1unit increase in GDP per capita leads to 0.04% decrease in percentage of FDI inflow to GDP. These results suggest that perhaps foreign investors prefer growing economies to large economies and so they are attracted to African countries whose economies grow. Since GDP per capita can also be thought of as a proxy for labour costs, it means foreign investors desire countries with relatively cheap labour cost. Alsan et al. (2006) posits that GDP per capita may reflect both a market size and a cost effect. Exchange rate is found as expected to have positive impact on FDI inflow. The results show that a 1unit increase in exchange rate leads to 0.07% increase in the percentage of FDI inflow to GDP in the host country. High exchange rate value relative to the US dollar in the host country accrue to the advantage of the foreign investor since a depreciated currency leads to reduced cost of investment in the host country. It is worth mentioning that natural resource, telephone lines (infrastructural development) and political stability even though not significant have the expected sign. The global economy went into severe recession inflicted by a massive financial crisis and acute loss of confidence in 2009. Economies around the world have been seriously affected by the financial crisis and slump in activity. FDI inflow to Africa suffered some

challenges in the recent times in the wake of the global economic crisis. To find out whether FDI inflow to Africa was affected by the time related shock, time-dummies were included to capture this time related shock. The inclusion of time-dummies in the specification is also likely to improve the statistical diagnostics as a result of potential heterogenous cross-section dependence and also remove universal time-related shocks from the error term (Efendic et al., 2009; Sarafidis, Yamagata and Robertson, 2006). The time-dummy variables capturing the universal time related shocks before and after the global economy recession are mainly significant. The dummy for 2009 is negative and highly statistically significant and this finding suggest that FDI inflow to Africa suffered time related shock in 2009 due to the severe global economy recession.

Table 5.4 Results of the Dynamic System GMM Estimation

VARIABLES	FDI_PerGDP
Control of Corruption	-0.533***
	(0.142)
Control of Corruption Sqr	0.00599***
	(0.00146)
Trade PerGDP	0.0413***
	(0.00708)
Natural resource	0.0154
	(0.0141)
Inflation Consum Prices	-0.0159***
	(0.00323)
Exchange Rate PerUS	0.000689***
	(4.19e-05)
FDI PerGDP (lagged one year)	0.468***
	(0.0133)
GDP Growth PerAnnual (lagged one year)	0.0154**
	(0.00757)

Table 5.4 (continued)

VARIABLES	FDI_PerGDP
Telephone lines per100people	0.0262
	(0.0538)
GDP Per Capita	-0.000370***
	(8.92e-05)
Political stability	0.00470
	(0.0159)
2007 (year dummy)	1.225***
	(0.167)
2008 (year dummy)	0.904***
	(0.205)
2009 (year dummy)	-0.793***
	(0.158)
2010 (year dummy)	0.911***
	(0.189)
Constant	9.905***
	(3.058)
OIR test (p-value)	0.188
Arellano-Bond test for AR(1)	0.059
Arellano-Bond test for AR(2)	0.331
Number of instruments	47
Observations	537
Number of groups	50

Source: data analyzed

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

5.4 The estimate of Corruption Tolerable Level of Investment

The result in Table 5.5 shows that above a certain level of corruption of the host country, corruption does not deter foreign direct investment and below that level, investors decline to invest in that country. Estimating that level of corruption which will likely not deter potential investor to Africa is very important not only to Africa leaders but to all potential investors (new and old) in Africa. This level of corruption is the Corruption Tolerable Level of Investment of a country which will determine whether FDI is likely to flow to a country or not.

The coefficient $\hat{\beta}_3$ of the control of corruption variable tells both the direction and steepness of the curvature. Since $\hat{\beta}_3$ is a positive value, it indicates the curvature is upwards but less steep. The turning point given by $\varphi = -\frac{\hat{\beta}_2}{2\hat{\beta}_3}$ is 44.51 and is highly statistically significant with 95% confidence interval between 37.20; minimum and 51.81; maximum as shown in Table 5.5.

Table 5.5 The turning point estimate

FDI_PerGDP	Coefficient
Control of Corruption (Turning point)	44.50556***
	(3.7263)

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Before the turning point can be used for any analysis, it is prudent to test for its precision to ensure its robustness or otherwise. The usual criteria by most researchers that so far as both $\hat{\beta}_2$ and $\hat{\beta}_3$ are significant and also the estimated extreme point is within the data range, they have found a U shape relationship is satisfied in this study. This is because the results in Table 5.4 shows that both control of corruption and the squared of control of corruption variables are significant. But these criteria though sensible are neither sufficient nor necessary and too weak as argued by Lind and Mehlum (2007).

Lind and Mehlum, (2007) posits that to properly test for the presence of a U shape relationship, on some interval of values, we need to joint test whether the relationship is decreasing at low values and increasing at high values within the interval. The results of the combined test (Table 5.6) with null hypothesis $H_0: \beta_2 + \beta_3 f'(x_l) \geq 0$ and/or $\beta_2 + \beta_3 f'(x_h) \leq 0$ rejects the null hypothesis and confirm a U shape relationship on the observed data range. This test gives the exact necessary and sufficient conditions for the test of a U shape. The confidence interval ($37.20225 \leq \varphi \leq 51.80888$) for the turning point is contained within the observed data range which further confirms this U shape relationship.

Table 5.6 Joint hypothesis test results

FDI_PerGDP	**Coefficient**
$H_0: \beta_1 + \beta_2 f'(x_l) \geq 0$	-0.42765***
	(0.1184)
$H_0: \beta_1 + \beta_2 f'(x_h) \leq 0$	0.365239***
	(0.0940)

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Once the exact necessary and sufficient conditions for the test of a U shape relationship are satisfied, it can be safely stated that the estimate of Corruption Tolerable Level of Investment (CTLI) in Africa is 44.51. This figure translates to -0.27 on the original control of corruption scale ranging from approximately -2.5 (weak) to 2.5 (strong). This means that all African countries falling below the Corruption Tolerable Level of Investment (-0.27) are less likely to encourage FDI inflow into those countries. All the countries falling below the Corruption Tolerable Level of Investment are above the threshold of corruption levels and those falling above the Corruption Tolerable Level of Investment are indeed below the threshold of corruption levels. This result shows that corruption has a negative effect on FDI when corruption is below CTLI and a positive effect when above. This finding seem to support the finding by Cuervo-Cazurra (2008) that pervasive corruption has a greater negative impact on FDI inflow in transition economies, while arbitrary corruption has a lesser negative impact on FDI there. More specifically, the findings in this study is

in consistent with a research by Cole, Elliott and Zhang (2009) on the determinants of province-level FDI in China who found that foreign capital prefers to locate in regions where the government has made more effort to fight corruption and where local government is considered to be more efficient. Barassi and Zhou (2012) used non-parametric methods to show that the impact of corruption on FDI stock is not homogenous. The results of this study complement findings of Barassi and Zhou (2012) which shows that for the top percentile of FDI stock distributions, the effect of corruption on FDI might not be negative after controlling for other relevant.

Table 5.7 Countries with corruption level above CTLI

2009	index	2010	index	2011	index	2012	index
Botswana	0.92	Botswana	1.00	Botswana	0.99	Botswana	0.94
Cape Verde	0.77	Cape Verde	0.80	Cape Verde	0.87	Cape Verde	0.81
Ghana	0.03	Ghana	0.06	Ghana	0.05	Ghana	-0.09
Lesotho	0.16	Lesotho	0.18	Lesotho	0.18	Lesotho	0.11
Madagascar	-0.19	Mauritius	0.65	Mauritius	0.59	Mauritius	0.33
Mauritius	0.63	Morocco	-0.18	Namibia	0.31	Namibia	0.32
Namibia	0.25	Namibia	0.32	Rwanda	0.43	Rwanda	0.66
Rwanda	0.13	Rwanda	0.46	Seychelles	0.26	Seychelles	0.33
Seychelles	0.31	Seychelles	0.29	South Africa	0.04	South Africa	-0.15
South Africa	0.14	South Africa	0.09	Tunisia	-0.22	Tunisia	-0.18
Swaziland	-0.20	Swaziland	-0.17				
Tunisia	-0.11	Tunisia	-0.15				

Source: data analyzed

In 2009 and 2010 the number countries whose corruption levels were above CTLI are 12 but reduced to 10 in 2010 and 2012 (Table 5.7). Madagascar fell out in 2010, 2011 and 2012 whilst Morocco appeared only in 2010. These countries are within Southern Africa, West Africa, Eastern Africa and North Africa regions of the Africa continent. Conspicuously missing is the Central or Middle Africa sub-region. This seems to confirm the publication that Southern Africa is the leading region with respect to destination of FDI projects, with both Eastern and West African regions experiencing strong FDI growth rates (EY's Attractiveness Africa Survey, 2014).

The results give an indication that many African countries are less likely to attract FDI as a result of corruption. This finding therefore serves as a wakeup call to all countries below the CTLI to intensify their efforts to reduce the level of corruption in their various countries to at least the CTLI. The confidence interval ($37.20225 \leq \varphi \leq 51.80888$) for the CTLI translates to ($-0.64 \leq \varphi \leq 0.09$) on the original control of corruption scale. Therefore countries that fall within this range can be referred to as transition countries.

5.5 Descriptive Statistics of Variables used in the Tobit and Probit Analysis

The descriptive statistics of variables used in the analysis is shown in Table 5.8. The results show that on the average 7.3% of the firms used in the analysis has some percentage of foreign ownership and the percentage of total annual sales paid as informal payments to officials or bribes is 2.9%. The average number of power outages experienced in a typical month is almost 22. About 4.8% of the firms communicate with clients and suppliers by e-mail and 1.2% use foreign technology. The average number of permanent, full-time employees of these firms is 46.

Table 5.8 Descriptive statistics of variables used in the Probit and Tobit Regression

Variables	observation	Mean	Std. Dev.	Min	Max
Foreign Owned Firm	3290	7.297021	24.08034	0	100
Percent Sales Informal Pay	3290	2.573526	5.36931	0	75
Labour Cost	3290	1431523	1.68E+07	28.74444	$8.33x10^{08}$
Number Power Outage	3290	21.57508	18.58956	0	200
Cost Raw Materials	3290	1.83E+08	3.00E+09	0	$1.15x10^{11}$
Use Email to Client	3290	0.048024	0.21385	0	1
Use Foreign Tech	3290	0.012158	0.109608	0	1
Full Time Employee	3290	46.17416	217.9686	1	6500

Source: data analyzed

5.6 Empirical Probit Model Results of Foreign Firms and Corruption

The regression results of model two (probit model) deployed in the estimation of the impact of bribes paid by firm owners on attraction of firms into a country is presented in Table 5.9. The dependent variable represents whether a firm has any percentage of foreign ownership or not. The number of observations in the dataset for which all of the response and predictor variables are non-missing is 3,290. The log likelihood of the fitted model (-973.55098) is used in the Likelihood Ratio Chi-Square test of whether all predictors' regression coefficients in the model are simultaneously zero. The Likelihood Ratio (LR) Chi-Square test that at least one of the predictors' regression coefficients is not equal to zero, is 209.47 and the p-value (0.0000) from the LR test indicate that the null hypothesis that all of the regression coefficients are simultaneously equal to zero is rejected and therefore can be concluded that at least one of the regression coefficients in the model is not equal to zero. The results in column two of Table 5.9 represent the coefficients of the probit regression and the results in column three represent the marginal effect of the explanatory variables on the probability of firm ownership by foreign investors.

The coefficients give the signs of the partial effect of each X_i on the response probability and the statistical significance of each X_i is determined by whether the null hypothesis is rejected or not at a sufficiently small significance level. The results have both qualitative and quantitative implications. In order to interpret the quantitative implications of the results, there is the need to compute marginal effects for continuous explanatory variables and average effects for binary explanatory variables. For continuous explanatory variables, the marginal effect of the explanatory variables on the probability of firm ownership by foreign investors are considered whiles for the dummy variables, the average effect of the explanatory variables on the probability of firm ownership by foreign investors are considered. The coefficients on the X variables in this study tell us how this probability changes with changes in the determinants of foreign ownership of firms.

The independent variables include corruption captured as the percent of total annual sales of the firm paid as informal payments to public officials and others as control variables (X). The results indicate that percent of total annual sales of the firm

paid as informal payments to the public officials is negative and highly significant (1%) which is an indication that African countries where high informal payments are made to the public officials are less likely to attract foreign investors to own firms in those countries. The marginal effects (column three) depicts that the probability of a firm being owned by a foreign investor decreases by 0.6% for every 1% increase in the percentage of total annual sales of firms paid as informal payments to public officials. This means that informal payment or bribes paid to public officials actually deter foreign investors from investing in Africa. This is because corruption renders engagement with government officials less transparent and more costly, particularly for foreign investors. The foreign firms are not able to exploit their ownership, location and internalization advantages to minimize their transaction cost. This finding is consistent with the findings by Uhlenbruck et al. (2006) which showed that local bribery demands may deter firm entry and also Desai et al. (2003) who found that corruption significantly reduces firm entry into new economies. This findings also seem to support the assertion that corruption has negative impact on foreign-local joint ventures (Driffield et al., 2010; Duanmu, 2011; Tekin-Koru, 2006). The findings by Fisman and Svensson (2007) showed that the negative impacts of bribes on firm activity are higher than the corresponding impacts of taxation with substantially large magnitudes for both.

This study used unit labour cost as a control and expected it to have a negative impact on percentage of foreign ownership of firm since studies have found labour cost to have a negative impact on FDI (Defever, 2006; Demekas et al., 2005). On the contrary, the sign on the labour cost indicate a positive and significant relationship with foreign firm ownership but its impact is negligible as indicated by its marginal effect. Since labour is relatively abundant in Africa and coupled with high unemployment rates, wages of workers are most often low. Also the local firms sometimes do not pay the realistic or official wages (minimum wage). It is the foreign firms that tend to pay these official wages (required by law) which may be higher than what the local firms pay. This may be attributed to the positive and significant relationship between foreign firm ownership and labour cost.

Table 5.9 Results of the probit regression and the marginal effects

VARIABLES	Probit regression Foreign_Owned_Firm	Marginal effects Foreign_Owned_Firm
Percent Sales Informal Pay	-0.0363***	-0.00564***
	(0.00828)	(0.00126)
Labour Cost	3.70×10^{-09}***	5.75×10^{-10}***
	(1.30×10^{-09})	(2.01×10^{-10})
Number Power Outage	-0.0117***	-0.00181***
	(0.00189)	(0.000289)
Cost Raw Materials	3.30×10^{-13}	5.12×10^{-14}
	(0)	(0)
Use Email to Client	0.748***	0.175***
	(0.113)	(0.0352)
Use Foreign Tech	0.764***	0.185***
	(0.211)	(0.0691)
Full Time Employee	0.000550***	8.54×10^{-05}***
	(0.000104)	(1.64×10^{-05})
Constant	-1.105***	
	(0.0500)	
Log likelihood	-973.55098	-973.55098
LR chi2(7)	209.47	209.47
Prob > chi2	0.0000	0.0000
Observations	3,290	3,290

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The coefficient of cost of raw materials is not statistically significant. The number of power outages experienced in a typical month has a negative and significant impact on foreign firm ownership as expected. It means countries which

experience high number of power outages in a typical month are less likely to attract foreign investors to own firms in those countries. The marginal effects show that the probability of a firm being owned by a foreign investor decreases by 0.2% when the number of power outages experienced in a typical month increase by 1.This is not surprising since electricity plays an important role in all sectors of the economy as well as the production process and foreign investors are not motivated to invest in countries that experiences substantial power outages. The provision of stable power supply must be a matter of concern to all African leaders in order to attract foreign investors.

As expected, the use of e-mails by firm to communication with clients and suppliers explained a good portion of foreign ownership of firm variation across firms. The coefficient of the use of e-mails is positive and significant which means that firms that use e-mails are more likely to be owned by foreign investors and so the availability of internet connectivity in Africa plays an important role in the attraction of foreign firms to Africa. On the average firms that use e-mails to communication with clients and suppliers have a probability of 17.5% of being owned by foreign investors more than firms that do not use e-mails. This is consistent with studies by Musila and Sigue (2006) and Dupasquier and Osakwe (2006) which showed that FDI in Africa is dependent on infrastructure development. The coefficient of the use of foreign technology is positive and significant and this implies that firms that use foreign technology are more likely to be owned by foreign investors. On the average firms that use foreign technology have a probability of 18.5% of being owned by foreign investors more than firms that do not use foreign technology. This finding is consistent with Smarzynska and Wei (2000) who argue that foreign investors with sophisticated technology may worry about leakage of technological know-how by joint venture partners and therefore are less inclined to form a joint venture. In countries with high corruption, having a local partner will reduce the transaction cost to foreign investors but this may come at a cost to the foreign investor since sharing ownership may lead to leakage of technology. The coefficient on firm size is positive and significant which shows that foreign firm ownership increases with firm size. This finding supports the empirical studies which indicates that firm size has a positive impact on foreign direct investment (Buckley and Casson, 1976; Kimura,

1989). According to Badunenko et al. (2008), studies have shown that larger firms have better penetration in the market and they can exploit economies of scale.

5.7 Empirical Tobit Model Results of Foreign Firms and Corruption

There are three different expected values in the Tobit model. The expected values include the latent variable (y^*), the observed dependent variable (y), and the uncensored observed dependent variable ($y \mid y > 0$). For corner solution outcomes, Wooldridge (2002) posits that we must avoid placing too much emphasis on the latent variable (y^*). The regression results of model three (Tobit model) deployed in the estimation of the impact of bribes paid by firm owners on attraction of firms into a country is presented in Table 5.10. The dependent variable in the Tobit model represents the percentage of foreign ownership of the firm. The observed variable y_i represents the fraction of foreign ownership of firms. When the firms are completely owned by domestic investors, the dependent variable assumes the value zero. The number of observations in the dataset for which all of the response and predictor variables are non-missing is 3,290. The log likelihood of the fitted model (-2706.6636) is used in the Likelihood Ratio Chi-Square test of whether all predictors' regression coefficients in the model are simultaneously zero. The Likelihood Ratio (LR) Chi-Square test that at least one of the predictors' regression coefficients is not equal to zero, is 204.95 and the p-value (0.0000) from the LR test indicate that the null hypothesis that all of the regression coefficients are simultaneously equal to zero is rejected and therefore can be concluded, just like the probit model that at least one of the regression coefficients in the model is not equal to zero. The estimated standard error of the regression is 124.5. The results in column two of Table 5.10 represent the coefficients of the Tobit regression.

The estimated coefficients of the Tobit model represent the effect of the independent variables on the latent variable y* and not on the observed variable y. The results in column three represent the marginal effects for the left-truncated mean $E[y \mid x, y > 0]$ and the result in the fourth column represent the marginal effect of the censored mean $E[y \mid x]$.

Table 5.10 Results of the Tobit regression and the marginal effects

	Tobit regression y^*	**sigma**	**Marginal effects**	
VARIABLES	**Foreign_Owned_Firm**	$\sigma_{(tobit)}$	**E[y |x, y>0]**	**E[y |x]**
Percent Sales Informal Pay	-4.568***		-0.7419	-0.4022
	(1.013)			
Labour Cost	4.27 x10^{-07}***		0.0000	0.0000
	(1.54 x10^{-07})			
Number Power Outage	-1.420***		-0.2306	-0.1250
	(0.232)			
Cost Raw Materials	2.84 x10^{-10}		0.0000	0.0000
	(8.17 x10^{-10})			
Use Email to Client	88.98***		17.5555	13.9367
	(13.56)			
Use Foreign Tech	79.41***		15.5326	12.1368
	(23.76)			
Full Time Employee	0.0581***		0.0094	0.0051
	(0.0120)			
Constant	-134.6***	124.5***		
	(9.710)	(6.016)		
Log likelihood	-2706.6636			
LR chi2(7)	204.95			
Prob > chi2	0.0000			
Observations	3,290			

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The coefficients of Tobit regression are interpreted in the similar manner to that of OLS but the linear effect is on the uncensored latent variable and not the observed outcome. The expected dependent variable changes by coefficient for each

unit increase in the corresponding predictor variable. The results indicate that if the percent of total annual sales of the firm paid as informal payments to the public officials increase by 1%, the percentage of firm ownership by foreign investors decrease by 4.6%. This implies that the higher the percent of total annual sales of the firm paid as informal payments to the public officials the lower the percentage of firm ownership by foreign investors in Africa. With respect to the observed percentage of firm ownership by foreign investors, censored at zero; $E[y\,|x]$, for the whole sample, the results show that when the percent of total annual sales of the firm paid as informal payments to the public officials increase by 1%, the percentage of firm ownership by foreign investors decrease by 0.40%. With the non-censored observed percentage of firm ownership by foreign investors E[y |x, y>0]; a 1% increase in the percent of total annual sales of the firm paid as informal payments to the public officials results in a 0.74% decrease in the percentage of firm ownership by foreign investors. This confirms the earlier assertion that informal payment or bribes paid to public officials actually deter foreign investors from investing in Africa.

With the exception of cost of raw materials, all the other variables are statistically significant. Also with exception of labour cost, all other variables have the expected signs. Just as in the probit model, the number of power outages experienced in a typical month has a negative and significant impact on foreign firm ownership. This confirms that countries which experience high number of power outages in a typical month are less likely to attract foreign investors to own firms in those countries. The marginal effects show that the percentage of firm ownership by foreign investors decreases by 1.4%, 0.23% or 0.12% when the number of power outages experienced in a typical month increase by 1% depending on whether the latent variable y*, marginal effects for the left-truncated mean or marginal effect of the censored mean respectively is taking into consideration. The results of the other control variables are not different from the probit results discussed.

5.8 Estimates of the Probit Compared with Estimates from the Tobit Model

An informal misspecification test of Tobit model is to estimate the probit part separately and compare the coefficients (β_{probit}) with the parameters γ_i in the Tobit

model which equals to $\frac{\beta_{tobit}}{\sigma_{(tobit)}}$ where β_{tobit} are the parameters in the Tobit model. If they are statistically different we can conclude a misspecification.

Table 5.11 Estimates of the probit compared with estimates from the Tobit model

Variables	**coefficients of tobit model (β_{tobit})**	**Sigma (σ_{tobit})**	**$\gamma = \frac{\beta_{tobit}}{\sigma_{tobit}$)**	**coefficients of probit model (β_{probit})**	**Prob > F**
Percent Sales Informal Pay	-4.568	124.5135	-0.0367	-0.0363	0.9624
Labour Cost	$4.27x10^{-07}$	124.5135	0.0000	0.0000	0.8278
Number Power Outage	-1.42	124.5135	-0.0114	-0.0117	0.8729
Cost Raw Materials	$2.84x10^{-10}$	124.5135	0.0000	0.0000	0.7661
Use Email to Client	88.98	124.5135	0.7146	0.7480	0.7591
Use Foreign Tech	79.41	124.5135	0.6378	0.7640	0.5083
Full Time Employee	0.0581	124.5135	0.0005	0.0006	0.3862

Source: data analyzed

The Wald test of nonlinear hypotheses was used to test whether the estimates of the probit model are statistically equal to the estimates γ_i from the Tobit model. The Null hypothesis is that; H_0: $\gamma = \beta_{probit}$. The hypotheses results in Table 5.11 show that, because all the p-values are greater than 0.05, we fail to reject the null hypothesis that estimates of the probit model are statistically equal to the estimates γ_i from the Tobit model and conclude that the Tobit model is well specified.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

Many empirical studies have examined the influence of corruption on the economic growth at the country level but only few have looked at the effects of the levels of corruption on FDI inflow as well as the general impact of corruption on foreign ownership of firms. This research seeks not only to establish that in general corruption have negative impact on FDI inflow to Africa but also to show that there is a threshold referred to as the Corruption Tolerable Level of Investment (CTLI) below which FDI will still be attracted to countries in Africa. The Corruption Tolerable Level of Investment will serve as guide to potential investors in the selection of countries in Africa to invest. The Corruption Tolerable Level of Investment will also motivate leaders in Africa to try and control corruption in their countries to levels that will not deter FDI inflows since corruption is difficult if not impossible to exterminate. It is the opinion of the researcher that the findings of this study will inform political leaders, governments and all stakeholders on the importance of the perception of corruption and also the impact of actual corruption at the firm level in the economic development of their nations. This will call for the need to strengthen the measures put in place in controlling corruption and improving governance in Africa. This research also sorts to establish that corruption has a negative impact on foreign ownership of the firms in Africa.

6.1 Conclusion

The Neoclassical theory predicts higher marginal returns to the factor that is relatively scarce and this suggests that capital should flow from rich countries to Africa where capital is relatively scarce. But unfortunately studies have shown that corruption is one of the factors among others that preclude the flow of capital into countries where capital is scarce. Corruption is known to occur in all countries and

based on the differences in the determinants of corruption in each country and also the enthusiasm to fight corruption in each country as well as the effectiveness of anticorruption policies in each country, it can be concluded without ambiguity that the levels of corruption varies from country to country. The quality of institutions or level of corruption in the domestic country has the potential of attracting or otherwise foreign direct investment depending on whether with the existing institutions the foreign firm can exploit its location advantage to their benefit. Since corruption cannot be completely eradicated, reducing it to a threshold that can be accommodated by investors must be the goal that African leaders should endeavor to achieve. This threshold is referred to as the Corruption Tolerable Level of Investment (CTLI) in this study. Using the dynamic panel data estimation technique while controlling for other variables, the estimated Corruption Tolerable Level of Investment (CTLI) in Africa is -0.27 on the control of corruption scale which ranges from approximately -2.5 (weak) to 2.5 (strong). With this estimate of CTLI, at most only 12 countries since 2009 are above the threshold. This suggests that many African countries are less likely to attract FDI as a result of corruption. At the firm level, where data on actual corruption is deployed, the results indicate that the percent of total annual sales of the firm paid as informal payments to the public officials has a negative and highly significant impact on foreign firm ownership of firms in Africa. The foreign firms are not able to exploit their ownership, location and internalisation advantages to minimize their transaction cost. This means informal payment or bribes paid to public officials actually deter foreign investors from investing in Africa.

6.2 Recommendations

African governments over the periods have endeavored to create a congenial investment environment to attract foreign investors by designing and implementing policies and building institutions. The results show that policies that enhance economic stability and sustained growth prospects must be the focus of African governments in order to attract FDI inflows. More importantly is the issue on the control of corruption among public officials of African countries. African governments should institute policies to control corruption in the public sector in

order to enhance the country's performance on the control of corruption index survey. This will boost foreign investors' confidence in their economies. In 2009 and 2010, only 12 Africa countries in terms of control of corruption in their countries had score either equal or above CTLI. In 2011 and 2012, the number of countries reduced to 10. It suggests that the level of corruption in majority of African countries goes beyond just the receiving of bribes to malfunctioning of government institutions. The results obtained at the firm level data also reinforce this point. Therefore all African leaders and stakeholders, especially in countries that fall below the CTLI should intensify their efforts in the fight against corruption to reduce the level of corruption in their various countries to at least the CTLI so as to attract FDI to enhance development in their countries. It is the view of the researcher that the CTLI in Africa will also serve as a guide to potential investors in the choice of countries in Africa to invest. Since the game theory analysis shows that firms are not motivated to invest in countries with unnecessary bureaucratic structures, this study recommends that governments should endeavour to remove all unnecessary bureaucratic structures in their countries. This will prevent the creation of red tape by officials which will intend reduce the cost of bribe to the firm. This is because the more red tapes are created; the more opportunities are also created for more bribes to be demanded by officials. Therefore the removal of all unnecessary bureaucratic structures will encourage foreign investors to invest in these countries.

6.3 Limitations

This study also has its limitations that result from the assumptions made, nature of analysis and the availability of the data deployed in the study. These limitations include;

1) In the game analysis, it was assumed that officials are rewarded for reporting the incidence of corruption but in countries where there are no policy instruments to reward the public official for reporting the incidence of corruption by the state, the public official is indifferent between choosing to or not to report the incidence of corruption though he/she refuses to accept the bribe. Also in countries where the cost of accepting bribes to the public official is high, this may not only

deter the public official from accepting bribes but may also encourage the public official to accept high bribes due to the cost involved in accepting bribes.

2) Another limitation to this study is the assumption that foreign investors' choice of a country is based solely on level of corruption of the host country since there are other country business risks and individual-specific shocks which investors take into consideration before investment decision is made.

3) Another limitation is the assumption that market opportunity and prices for the firm's product is the same in all economies. If this assumption is relaxed, it is likely to influence the decision of the investor with respect to the choice of investment destination.

4) Even though many suggestions according to Andvig et. al (2000) exist on how to categorise different forms of corruption and also how to define and categorise corruption into sub-phenomena, this was not considered in this study. Corruption has been found to be state-society relationship and so the distinction between "political" corruption and "bureaucratic" corruption is made. Also other categories include "functional" and "dysfunctional" corruption and corruption as a mechanism of either "upward extraction" or "downward redistribution". It is possible that different forms of corruption exist in different African countries but information on that is not available. It is recommended that in measuring corruption, researchers should endeavor to disaggregate corruption into its various categories and components. This will not only help researchers in finding the causes and consequences of corruption but also help stakeholders to take informed decision in anticorruption policy formulation and also know where to direct these policies.

5) Another limitation worth mentioning is the aggregation of all the firms together in finding the impact of bribery on foreign firm ownership in general. It is recommended that future studies should segregate these firms into various sectors so as to determine which of the sectors suffers the most impact.

6) Frequency of the data used in determining CTLI is annual and it span from 1996 to 2012 for 50 countries in Africa with data missing for three years (1997, 1999 and 2001). More robust results would have been obtained if these data was available and included in the analysis

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APPENDIX

TABLES

Table 1 Variable names, meaning and data source in the dynamic model

Variable Name	Variable Label	Data Source
FDI_PerGDP	Foreign direct investment, net inflows (% of GDP)	WDI DATABANK (2012)
Control of Corruption	Transformed corruption control index	WGI DATABANK (2012)
Control of Corruption Sqr	Squared transformed control of corruption index	WGI DATABANK (2012)
Trade PerGDP	Trade (% of GDP)	WDI DATABANK (2012)
Natural resource	Total natural resources rents (% of GDP)	WDI DATABANK (2012)
Inflation Consumer	Inflation, consumer prices (annual %)	WDI DATABANK (2012)
Exchange_Rate~S	Official exchange rate (LCU per US$, period average)	WDI DATABANK (2012)
GDP Growth PerAnnual	Lag of GDP annual growth	WDI DATABANK (2012)
Telephone_lines	Telephone lines (per 100 people)	WDI DATABANK (2012)
GDP PerCapita	GDP per capita (constant 2005 US$)	WDI DATABANK (2012)
Political stability	Transformed political stability index	WGI DATABANK (2012)

Table 2 Variable names and meaning used in the Probit and Tobit regression

Variable names	Meaning
Foreign Owned Firm	percentage of firm owned by private foreign individuals, companies or organizations
Percent Sales Informal Pay	percent of total annual sales paid in informal payments
Labour Cost	unit cost of labour
Number Power Outage	number of power outages experienced in a typical month in last fiscal year
Cost Raw Materials	cost of raw materials and intermediate goods used in production in last fiscal year
Use Email to Client	currently communicate with clients and suppliers by e-mail
Use Foreign Tech	Use foreign technology
Full Time Employee	number of permanent, full-time employees of this firm at end of last fiscal year

Table 3 Correlation Matrix of Variables used in the Study

	FDI_Per GDP	Control of Corruption	Control of Corruption Sqr	Trade PerGDP	Natural resource	Inflation Consum Prices	Exchange Rate PerUS	FDI PerGDP (lagged one year)	GDP Growth PerAnnual (lagged one year)	Telephone lines per100people	GDP Per Capita	Political stability	2007 (year dummy)	2008 (year dummy)	2009 (year dummy)	2010 (year dummy)
FDI_PerGDP	1															
Control of Corruption	-0.0481	1														
Control of Corruption Sqr	-0.0416	0.9824*	1													
Trade PerGDP	0.3830*	0.1087*	0.1392*	1												
Natural resource	0.2221*	-0.5300*	-0.4845*	0.3457*	1											
Inflation Consum Prices	-0.0107	-0.1022*	-0.0846*	0.0778*	0.0847*	1										
Exchange Rate PerUS	0.1244*	-0.0794*	-0.1007*	-0.0955*	-0.045	-0.0164	1									
FDI PerGDP (lagged one year)	0.3592*	-0.0945*	-0.0694	0.2984*	0.2534*	0.0257	0.1201*	1								
GDP Growth PerAnnual (lagged one year)	0.2810*	-0.0873*	-0.063	0.1592*	0.2824*	-0.0577	-0.0144	0.2832*	1							
Telephone lines per100people	-0.012	0.5080*	0.5373*	0.2382*	-0.1743*	-0.0475	-0.1051*	-0.0148	-0.0339	1						
GDP Per Capita	0.0384	0.2583*	0.3132*	0.3710*	0.2329*	-0.0401	-0.1300*	0.0567	0.0741*	0.6644*	1					
Political stability	0.0286	0.6769*	0.6422*	0.2718*	-0.2647*	-0.1292*	0.0589	-0.0248	-0.0047	0.4374*	0.4357*	1				
2007 (year dummy)	0.033	-0.0029	-0.0049	0.0467	0.0424	-0.0224	0.0343	0.0025	0.0135	0.0183	0.0228	0.0194	1			
2008 (year dummy)	0.0341	0.0018	0.0019	0.061	0.0628	-0.0132	0.0126	0.033	0.043	0.0195	0.0302	0.0154	-0.0625	1		
2009 (year dummy)	-0.0051	0.0027	0.0011	-0.0103	-0.0065	0.0015	0.0256	0.0341	0.0033	0.0234	0.0286	0.0202	-0.0625	-0.0625	1	
2010 (year dummy)	0.0315	0.0033	0.0035	0.0194	0.0184	-0.0221	0.0374	-0.0051	-0.0613	0.0235	0.0192	0.0065	-0.0625	-0.0625	-0.0625	1

Source: Data analysed

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