Foreign Ownership of Firms and Corruption in Africa

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ABSTRACT

The study finds the impact of the percentage of total annual sales of a firm paid as informal payments to public officials (bribes) on foreign ownership of firms in Africa while controlling for other variables outside the country of origin of investment. The study used secondary data from the World Business Environment Survey conducted by the World Bank. In all 3290 firms made up of the manufacturing, services and retail sectors are included in the analysis. The Tobit and probit estimation techniques were used. The results 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. African leaders should therefore institute policies to control corruption in order to boost foreign investors' confidence in their economies.

Keywords: Foreign Ownership of Firm, Informal Payments, Corruption, Institutions, Foreign Investors
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1. INTRODUCTION

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. Dreher and Gassebner (2013) posit that corruption might be a means to achieve certain benefits which make work in the official economy easier. Dreher and Gassebner (2013) tested whether corruption can be efficient grease, reducing the negative impact 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. But earlier studies, Kaufman and Wei (2000) posit that multinational firms paying more bribes also spend more time negotiating with officials, working against the "grease the wheels" hypothesis.

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. Dal Bo and Rossi (2007) found that countries with higher corruption tend to have more inefficient firms because managers of firms in more corrupt environments will exert more effort in engaging public officials and less effort at coordinating the use of factors. Yan and Oum (2011) also posits that in a more corrupt environment,

policy-makers and bureaucrats tend to reduce the accountability of public policy making, so as to be in a better position to extract some private benefits. This hinders firms' manager's efforts in exploiting more efficient inputs allocation. In Abrate et al. (2013) assertion, both studies by Dal Bo and Rossi (2007) and Yan and Oum (2011) are built 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 vs. internal) at stake.

Foreign firms seeking to invest in a foreign economy 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. The policy factors include trade openness, product-market regulation, corporate tax rates, trade barriers, and debt to gross domestic product (GDP) ratio, among others. Non-policy factors include market size of the host country, distance/transport costs, factor endowments, risk premium, political and economic stability, corruption, inflation rate among others. Apart from these policy and non-policy factors, the entrepreneur considers the Dunning (1988) eclectic theory developed based on a mix of three different theories of direct foreign investments; "O" from ownership advantages, "L" from location and "I" from internalization (OLI). With respect to ownership advantage, the firm has a monopoly over its

own specific advantages and using them abroad leads to higher marginal profitability or lower marginal cost than other competitors (Dunning, 1973; 1980; 1988). The key factor in determining who will become the host countries for the transnational corporations is the ownership and location advantages that these corporations can exploit in the host countries. The decision of potential investors to invest in an economy will largely depend on how their firms are likely to perform in that economy based on the ownership and location advantages. According to Denisia (2010), the third characteristic of the eclectic paradigm of OLI (Internalisation) builds a framework for evaluating different ways in which the company can operate in the foreign country by exploiting its capabilities. Internalisation theorists opine that foreign direct investment (FDI) occurs when the benefits due to internalisation outweigh its cost (Fina and Rugman, 1996). Firms therefore exploit their ownership and location advantages in order to minimize their transaction cost.

Over the years majority of African countries scored either 3.0 or below on the corruption perception index (CPI) rating by transparency international. For example, 77% of the countries in African scored either 3.0 or below in 2012, 87% in 2011, 2009 and 2008, and 83% in 2010 and this poses a threat to foreign firms. In fact the 2010 list of transparency international report ranks 6 African nations among the 10 most corrupt countries. Globally bribes paid by individuals and firms to the public sector as estimated by the World Bank amount to $1 trillion per year, and that 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 impacts of bribes on firm activity are higher than the corresponding impacts of taxation with substantially large magnitudes for both (Fisman and Svensson, 2007). Foreign firms are unable to exploit their location advantage in the foreign economies due to poor institutions (corruption) which prevent the use of available technologies (Tebaldi and Elmslie, 2008) and also the limit to efficiency gains from current innovation (Matthews, 1986). Corruption is found to significantly reduce firm entry into new economies (Desai et al., 2003; Ovaska and Sobel, 2004). Research also show that foreign firms are not motivated to invest in high corruption economies because poor institutional arrangements (translated into corruption and poor enforcement of laws and contracts) decrease the returns to investments and reduce capital accumulation (Brunetti et al., 1997; Lambsdorff, 1999; Mauro, 1995).

Based on this premise, this study therefore tries to find out whether in general foreign firms are able to exploit their ownership and location advantages in Africa amidst the perceived poor institutions and massive corruption by finding the impact of corruption on foreign ownership of firms while controlling for other variables outside the country of origin of investment. This is because these firms are the engines through which the growth objectives of developing countries can be achieved (Abotsi et al., 2014), Corruption is captured as the percentage of total annual sales of a firm paid as informal payments (bribes) to public officials. Critics have raised arguments on the authenticity of the use of CPI and other indexes as indicators of corruption in a country since it is based on "mere" perception but this study uses actual data on

bribery to establish the impact of corruption on firm ownership by foreigners. The study also contributes to literature by finding the impact of corruption on foreign firms' ownership in Africa. Earlier studies elsewhere focused on the impact of corruption on joint venture of foreign and local firms (Driffield et al., 2010; Duanmu, 2011; Tekin-Koru, 2006).

Using Tobit and probit estimation techniques while controlling for other variables, the empirical results show 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. The rest of the paper present literature review on corruption and the control variables, describe the methodology deployed, present and discuss the results and finally the conclusion.

2. LITERATURE REVIEW

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 firm characteristics as well as the challenges and opportunities present in these countries. 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. 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. Detailed discussions of these factors are presented below.

2.1. Bribery (Corruption)
This study is based on the premise that malfunctioning of government institutions affects the adoption of available technologies and this affects the productivity of physical capital and labour leading to inefficiency. Firm's entry mode in a foreign market depends upon critical examination of the locational advantage of each specific market in concert with firm's ownership advantages (Agarwal and Ramaswami, 1992). As stated earlier, bribery is one of the important manifestations of corruption (Lianju and Luyan, 2011). Public corruption according to Svensson (2005) is the misuse of public office for private gain and these include the sale of government property, kickbacks in public procurement, bribery and embezzlement of government funds among others. Cuervo-Cazurra (2006) posits that bribery activity can involve firms in their home countries or abroad and can also involve the local or foreign governments with which firms might interact. It has also been established in literature that weak governments with unstable political institutions have a difficult time preventing their agents from demanding bribes from local and foreign firms (Shleifer and Vishny, 1993).

Literature on demand-side of bribery activity has linked higher tax rates to reduced levels of corruption, and overregulation to increased corruption (Friedman et al., 2000). Studies elsewhere mention entry barriers, legal system effectiveness, and infrastructure services to subvert corruption across countries (Rodriguez et al., 2005). Also unrestrained bureaucracy, the rule of law, and political legitimacy tend to inflate national levels of 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 by using the temptation of payments as a method of influence and coercion to manipulate business functions such as obtaining contracts, garnering favorable regulatory decisions, and other government or policy determinations. This according to Martin et al. (2007) demonstrates that the deviance indicative of bribery frequently originates on the supply side passive bribery is used as defensive mechanism to avoid sanctions or other punishments.

Dreher and Gassebner (2013) contend that regulatory intervention can either be beneficial or harmful depending on one's view of its purposes and effects and the ways to overcome these regulations may or may not be welcome. According to Dreher and Gassebner (2013) one way to circumvent regulation is by bribing officials and so in corrupt countries, government officials can easily be bribed to perform their official duties such as issue permits which potentially facilitating entrepreneurial activity and, in particular, firm entry into the official market. This actually supports the proponents of the "grease the wheels" hypothesis in the early literature on the effects of corruption (Huntington, 1968; Leff, 1964; Leys, 1965) and there are some empirical evidence in support of the "grease the wheels" hypothesis (Vial and Hanoteau, 2010). Corruption might also increase uncertainty, thereby increasing risks (Campos et al., 1999) fronting the foreign firms and this imply that more risk averse investors may not be motivated to invest in high corrupt countries. 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 does not meet the expected revenue. Research on the effects of bribery demands on multinational firms entering local markets shows that local bribery demands may deter firm entry (Uhlenbruck et al., 2006; Voyer and Beamish, 2004). It is therefore expected in this study that percent of total annual sales of the firm paid as informal payments to the public officials (bribes) by foreign firms in Africa will explain a good portion of foreign firm ownership. Foreign firm ownership is expected to decrease with increase in informal payments.

2.2. 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 indicates that the impact of firm size on FDI is positive (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. 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 and 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. 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. The size of the firm is expected to be positively correlated with its propensity to enter foreign markets.

2.3. Technology
Anwar and Sun (2014) posits that superior technology and technical know-how are typical strategic advantages that FDI-invested firms possess, particularly in the case of FDI from developed to developing countries. This assertion supports the idea that FDI-invested firms, as compared to their domestic counterparts, usually possess some strategic advantages (Buckley and Casson, 1976; Dunning et al., 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. These strategic advantages that FDI-invested firms possesses tend to shift 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 multinational enterprises will choose wholly owned subsidiary over joint venture. The finding by Driffield et al. (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 worry about leakage of technological know-how by joint venture partners and are thus less inclined to form a joint venture. It is expected in this study that foreign technology increases with foreign ownership of firms.

2.4. 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 et al. (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) which are inter alia based on differences in labour costs. Unlike the horizontal FDI which is dominated by flows between developed countries (both the multinational parent and the affiliates are located in developed countries) where FDI locate production near a firm's large customer bases, vertical FDI is mainly driven by production cost differences between countries (for those parts of the production process that can be performed in another location). 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). This study uses unit labour cost as a control and it is expected to explain a good portion of foreign ownership of firm variation across firms but the actual influence need to be determined empirically.

2.5. 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 MNC 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 MNC. 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). Africa countries that have natural resources were more attractive than those without such resources (Asiedu, 2005). Since Africa is endowed with raw materials, it is expected that the cost of raw materials will not deter foreign firm ownership in Africa.

2.6. Infrastructure Development

Electricity and internet provisions are used to capture the effect of infrastructure development on 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 have access to electricity in sub-Sahara Africa, and about a 14% electrification rate in the rural areas (IEA, 2011). In fact more than 77% of the rural population in Africa has no access to electricity and this rate reaches 88% for sub Saharan Africa countries (WEO, 2009). 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.

The use of internet has become increasingly important especially in the operation of firms. According to Oldenski (2012) firm communication can be divided into two categories; the communication of information within the firm (during production) and the communication of information from the firm to the outside customer (during delivery or sales). Therefore the provision of internet connectivity in Africa should play an important role in the attraction of foreign firms to Africa. 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 ownership of firm variation across firms. It is expected that firms that communicate with clients and suppliers by E-mail are likely to be owned by foreign ownership of firms.

3. METHODOLOGY

The study is based on secondary data and the main source of data for analyzing the effects of corruption on foreign ownership of firms in Africa is the World Business Environment Survey conducted by the World Bank. In all 3290 firms are included in the analysis and this firms are made up of all the sectors including the manufacturing, services and retail sectors among others. The research seeks to find the general impact of bribes on foreign ownership of firms in Africa. 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.

In regressions where the dependent variable is incompletely observed and also where the dependent variable is completely observed but is observed in a selected sample, the estimation of such models with ordinary least squares (OLS) leads to omitted variable bias and heteroskedastic error. The techniques usually deployed in the estimation of models with limited dependent variables include probit, logit, Tobit among others. Therefore in this study, the probit and Tobit models are deployed and the error term is assumed to have standard normal distribution. These models assume that there is some continuous latent variable y^* that determines foreign ownership of a firm. An informal misspecification test is to estimate the probit part separately and compared the estimates of the probit model to the estimates from the Tobit model. If they are statistically different we can conclude a model misspecification.

With the probit model, 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. 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,

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

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.

Tobit models are often related to censoring where data on the dependent variable is lost (or limited) but not data on the regressors. This study seeks to model firm ownership by foreign investors y^* 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 observed y^* is defined by the following measurement equation

$$y = \begin{cases} y^* & \text{if } y^* > \tau \\ y_{\check{A}} & \text{if } y^* \leq \tau \end{cases}$$

In the typical Tobit model, it is assumed that $\tau = 0$ which means that the data are censored at 0.

The estimates of the probit model can be compared to the separate estimates from the Tobit model. It is expected that the estimates in the probit model be equals to the estimates divided by the variation across entities in the Tobit model. If these estimates are statistically different it can concluded that there is a misspecification.

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

$$Foreign\_Owned\_Firm_i = \alpha_i + \delta_1 Percent\_Sales\_Informal$$
$$\_Pay_i + \beta_1 Labour\_Cost_i + \beta_2 Number\_Power\_Outage_i$$
$$+ \beta_3 Cost\_Raw\_Materials_i + \beta_4 Use\_Email\_Client_i$$
$$+ \beta_5 Use\_Foreign\_Tech_i + \varepsilon_i$$

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.

4. EMPIRICAL RESULTS

4.1. Probit Model Results of Foreign Firms and Corruption

The regression results of the 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 1. The dependent variable represents whether a firm has any percentage of foreigner ownership or not. The results in column two of Table 1 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 results have both qualitative and quantitative implications. The sign of the coefficients tells us about the qualitative effect of the explanatory variables and the size of the coefficient tells us

Table 1: Results of the probit regression and the marginal effects

Variables	Foreign_Owned_Firm	
	Probit regression	**Marginal effects**
Percent sales informal pay	−0.0363***	−0.00564***
	(0.00828)	(0.00126)
Labour cost	3.70×10^{-9}***	5.75×10^{-10}***
	(1.30×10^{-9})	(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^{-5}***
	(0.000104)	(1.64×10^{-5})
Constant	−1.105***	
	(0.0500)	
Log likelihood	−973.55098	−973.55098
LR Chi-square (7)	209.47	209.47
P>Chi-square	0.0000	0.0000
Observations	3290	3290

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

about the quantitative effect of the variable. 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. A negative coefficient means that investors with those attributes are less likely to own a firm in a foreign country, and a positive coefficient means they are more likely to own a firm in a foreign country.

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 total annual sales of firms paid as informal payments to public officials and other as control variables. This means that informal payment or bribes paid to public officials actually deter foreign investors from investing in Africa. This is because corruption makes dealing with government officials, for example, to obtain local licenses and permits, less transparent and more costly, particularly for foreign investors. The foreign firms are not able to exploit their ownership, location and internalisation advantages to minimize their transaction cost. This finding is consistent with the findings by Uhlenbruck et al. (2006) which shows that local bribery demands may deter firm entry and 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) show 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) but 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 rate, wages of workers are most often low. Also the local firms sometimes do not pay the realistic or official wages (minimum wage) and so 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. 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 firm that do not use E-mails. This is consistent with studies by Musila and Sigue (2006) and Dupasquier and Osakwe (2006) which show that FDI in Africa is dependent on the development of infrastructure. 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 firm 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 technology leakage. The coefficient on firm size is positive and significant which shows that foreign firm ownership increases with firm size. This finding support the empirical studies which indicates that firm size has a positive impact on FDI (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.

Table 2: Results of the Tobit regression and the marginal effects

Variables	Tobit regression y*	Sigma	Marginal effects	
	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	4.27×10^{-7}***		0.0000	0.0000
	(1.54×10^{-7})			
Number power outage	−1.420***		−0.2306	−0.1250
	(0.232)			
Cost raw materials	2.84×10^{-10}		0.0000	0.0000
	(8.17×10^{-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 Chi-square (7)	204.95			
P>Chi-square	0.0000			
Observations	3290			

Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1

Table 3: Estimates of the probit compared with estimates from the Tobit model

Variables	Coefficients of tobit model (β_{tobit})	Sigma (σ_{tobit})	$\gamma = \dfrac{\beta_{tobit}}{\sigma_{(tobit)}}$	Coefficients of probit model (β_{probit})	P>F
Percent sales informal pay	−4.568	124.5135	−0.0367	−0.0363	0.9624
Labour cost	4.27×10^{-7}	124.5135	0.0000	0.0000	0.8278
Number power outage	−1.42	124.5135	−0.0114	−0.0117	0.8729
Cost raw materials	2.84×10^{-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

4.2. Tobit Model Results of Foreign Firms and Corruption

There are three different expected values and marginal effects or conditional means in the Tobit model (Table 2). The expected values include the latent variable y^*, the observed dependent variable y, and the uncensored observed dependent variable $y \mid y > 0$. 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 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 $E[y \mid x]$.

The coefficients of Tobit regression are interpreted in the similar manner to that of OLS however; the linear effect is on the uncensored latent variable, not the observed outcome. The expected dependent variable changes by coefficient for each unit increase in the corresponding predictor. 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. With respect to the observed percentage of firm ownership by foreign investors, censored at zero; $E[y \mid x]$, for the whole sample, the results shows 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 $E[y \mid x, y > 0]$; 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 and also with exception of labour cost, the other entire 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 confirming 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 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 meanor 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 obtained.

4.3. Estimates of the Probit Compared with Estimates from the Tobit Model

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 hypothesis H_0: Null hypothesis that $\gamma = \beta_{probit}$. The hypotheses results in Table 3 shows that since all the $P > 0.05$, 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 not mis-specified.

5. CONCLUSION AND RECOMMENDATIONS

This research sort to establish that corruption captured as bribery has negative impact on foreign ownership of firms in Africa. The quality of institutions or level of corruption in the host country has the potential of attracting or otherwise foreign firms depending on whether with the existing institutions the foreign firms can exploit their location advantages to their benefit.

The results indicate that 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 ownership of firms in Africa. This means informal payment or bribes paid to public officials actually deter foreign investors from investing in Africa. 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. African governments should formulate good and stringent policies to control corruption in order to boost foreign investors' confidence in their economies.

One of the limitations to this study is the assumption that foreign investors' choice of a country is based solely on 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.

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