Full Length Research Paper

Foreign direct investment (FDI) and corruption: Is it a major hindrance for encouraging inward FDI?

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The study used panel data from 1998 to 2014 among 48 different countries to determine the relationship between foreign direct investment and corruption. For identifying the relationship, the study employed random effect model (REM), feasible general least squares method (FGLS) and panels corrected standard errors (PCSE). The results of the three panel estimation methods reveal that the variable of corruption is statistically significant at 1%, but negative relations between corruption and FDI results were determine by using REM, FGLS and PCSE estimation methods in three different regions (South and South-East Asia, Latin America, the Caribbean and Africa). It interprets that 1% decrease in the level of corruption may leads to about 8.15, 9.25 and 11.5% increase in FDI inflows by using REM, FGLS and PCSE respectively. Other control variables like gross domestic product per capital (GDPPC), gross domestic product growth rate (GDPG), population growth rate (POPG), urban population growth rate (UPOPG), trade openness, tele-density, gross school enrolment in primary (GSEP), agglomeration, bureaucracy (BURA), law and democracy are positively statistically significant as expected and risk and inflation are negatively statistically significant.

Key words: Random effect model, feasible general least squares, panel corrected standard errors, FDI, corruption.

INTRODUCTION

Beginning of the 1990s, world market integration approach and transition of the economic phenomenon focusing on the market facilitation and trade liberalization agendum assists uninterrupted flow of Foreign Direct Investment (FDI) that helps radical transformation of business and its environment. Foreign Direct Investment (FDI) promotes the continuous economic and social development by transferring technology, skill develop-ment, innovation and management efficiency of both developed and developing country. Various literature strongly agreed that multinational corporations (MNCs)

invest in specific locations mainly because of the host countries' strong economic fundamentals, such as a large market size, stable macroeconomic environment, availability of skilled labor and infrastructure, that influence the attractiveness of the country to FDI inflows (Dunning, 1993; Globerman and Shapiro, 1999; Shapiro and Globerman, 2003). One of the major hindrances the MNC face for operating the business is corruption. Corruption is one of the principal obstacles to economic and social development (Mauro, 1995). Corruption exists throughout the world in developed and developing

countries alike. In recent years, corruption has increasingly received attention because of

1. A series of high-level corruption cases in industrialized countries.
2. An increasing awareness of the costs of corruption throughout the world, and
3. Political and economic changes which many countries are undergoing (Lawal, 2007).

Corruption is perceived as detrimental to investment as it acts like a tax on investment by increasing the cost of doing business (Wei, 2000; Svensson and Fisman, 2000; Tanzi and Davoodi, 1998, 1997). Some scholars refer to corruption as "sand" that makes it more difficult and costly to conduct foreign operations in such aspects as obtaining licenses and permits (Habib and Zurawicki, 2002; Voyer and Beamish, 2004; Cuervo-Cazurra, 2008).

In the international business (IB) discipline, the study of corruption only recently gained prominence as firms from developed countries engaged in operations in emerging and transition economies (Rodriguez et al., 2006). Corruption varies widely across different locations both in its scope in an economy, and in the level of uncertainty it creates (Uhlenbruck et al., 2006).

Empirical studies have not consistently found that high corruption in the host country deters FDI. While some authors have found that high levels of corruption have a deterrent effect on FDI (Mauro, 1995; Lambsdorff, 1998; Cuervo-Cazurra, 2006; Voyer and Beamish, 2004; Woo and Heo, 2009; Wei, 2000), others have not found a relationship between these variables (Wheeler and Mody, 1992; Henisz, 2000). Furthermore, other authors have actually found that corruption can be positive as it facilitates transactions in countries with too many regulations (Leff, 1964; Huntington, 1968; Egger and Winner, 2005). One possible explanation for the inconsistency in these studies is that not all foreign investors are equal, and therefore are not equally affected by corruption abroad (Cuervo-Cazurra, 2006).

Corruption is worse in countries where institutions such as the legislature and the judiciary are weak; neither rule of law nor adherence to formal rules are rigorously observed; political patronage is standard practice; the independence and professionalism of the public sector has been eroded; and civil society lacks the means to bring public pressure against corruption in the government (Lawal, 2007). The institutional quality of the countries is a core determinant of their ability to attract FDI (Wernick et al., 2009).

For many years, North American and Western European countries have received a large share of FDI inflow. Nonetheless, there has been a significant shift of FDI inflows into developing countries since the 1990s. Economic reform, trade policy transformation and good governance assist to accelerate the FDI inflow in many developing countries. In 2010, for the first time developing and transition economies account for more than a half

of global FDI inflows. Developing and transition economic needs to accomplishing manifold tasks especially need to strengthening internal laws and legislation and enhance the quality of government institution that proliferate FDI especially from the different developed and industrial country. Corruption is obviously a major hindrance for FDI. Some expertise through their empirical work find out that corruption is deterring FDI. There are also diverse opinions about the relationship between corruption and FDI. The empirical study is to focus on determining the relationship between corruption and FDI.

LITERATURE REVIEW

The last decade has seen an upsurge in scholarly attention to the effects of corruption on various aspects of economic activities. Corruption makes hazardous effects on economic growth and development (Shleifer and Vishny, 1993; Mauro, 1995, 1996), productivity and also foreign investment (Mauro, 1995; Doh et al., 2003; Lambsdorff, 2003).

Many empirical studies provide support for the idea that corruption in the host country is negatively related to FDI (Wei, 2000a; Wei, 2000b; Habib and Zurawicki, 2002; Lambsdorff, 2003). Corruption is a double-edged sword, reducing both the volume and efficiency of investment, and thus, economic growth (Sarkar and Hasan, 2001). Countries with high levels of corruption are likely to show a poor performance in attracting FDI (Wei, 1998).

Corruption acts like a tax on investment. It has been confirmed by the different scholar like Mauro (1995), Wei (2000), Ades and Di Tella (1999), Campos et al. (1999), Smarzynska and Wei (2000), Habib and Zurawicki (2001) and Al-Sadiq (2009), among others, in which they find a negative relationship between FDI inflows and corruption in the host country. Habib and Zurawicki (2002) and Peter and Winner (2006) both found corruption to be detrimental to FDI. Dahlström and Johnson (2007) and Caetano and Calerio (2007) both found the impact of corruption on FDI to be negative and significant, but only for developing (and generally speaking more corrupt) countries. Many economists like Alemu (2012), Woo (2010) and Aparna and Kartikeya (2011) found that corruption deters FDI inflows.

Abed and Davoodi (2000) use a cross-sectional as well as a panel data analysis to examine the effects of levels of corruption on per capita FDI inflows to transition economies. They found out that countries with a low level of corruption attract more per capita FDI. However, once they control for the structural reform factor, corruption becomes insignificant. They conclude that structural reform is more important than reducing the level of corruption in attracting FDI.

Using a single source country, Voyer and Beamish (2004) use cross-sectional regressions to investigate the effects of the level of corruption on Japanese FDI in 59 (developed and emerging) host countries. They found out

that Japanese FDI is negatively related to the level of corruption especially in emerging countries. Further, their results show that in emerging countries where a comprehensive legal system is underdeveloped or does not exist to effectively reduce illegal activities, corruption serves to reduce Japanese FDI inflows.

Another classic study also investigates the relationship between corruption and investment by Mauro (1995). He utilizes a corruption index provided by Business International (BI) and runs a sample of 67 countries using Ordinary Least Squares (OLS) and Two Stage Least Squares (2SLS) methods. The strength of this study is that it controls for endogeneity by using an index of ethno linguistic fractionalization as an instrument and nine indicators of institutional efficiency. He demonstrates that high levels of corruption are associated with lower levels of investment as a share of Gross Domestic Product (GDP). For instance, if Bangladesh (score of 4.7) were to improve the integrity and efficiency of its bureaucracy to the level of Uruguay (score of 6.8), its investment rate would increase by almost five percentage points and its yearly GDP growth would rise by over half a percentage point.

Aparna and Kartikeya (2011) concluded that a 1% decrease in the level of corruption may lead to a 9% increase in FDI flows in emerging economies. Wei (2000) using a broader data set on foreign investment from 12 sources to 45 host countries in 1989 and 1990, and utilizing OLS, quasi fixed effects, and tobit estimation, finds that corruption in a host country has a negative effect on inward FDI from all source countries in a way that is statistically significant and quantitatively large.

Corruption creates hazardous effect on economic growth and business competitiveness. In the long run, the economy and its growth suffer due to corruption (Habib and Zurawicki, 2001). Corruption may increase MNCs' operational cost and of course business and economic risks. Corruption erodes economic freedom by introducing insecurity and uncertainty into economic relationships. Based on the studies done by Alemu (2012), Woo (2010) and Aparna and Kartikeya (2011), it is hypothesized that corruption deters foreign investors and thus, an increase in the perceived level of corruption may leads to a decrease in the net inflows of foreign investments. Therefore, the expected sign for the regression equation is negative.

Alternatively, there is also supporting empirical evidence about the reverse opinion. Akcay (2001) uses cross sectional data from 52 developing countries with two different indices of corruption to estimate the effect of the level of corruption on FDI inflows. He utilizes OLS with region dummies. The results fail to identify any significant effect of corruption on FDI. The most significant determinants of FDI are found to be market size, corporate tax rates, labor costs and the openness of the economy. Similarly, using fixed effects estimation and total inward FDI instead of bilateral FDI, Hines (1995) study did not find a negative correlation between total

inward FDI and the corruption level in host countries. By using the fixed effects estimation and total inward FDI instead of bilateral FDI, Hines (1995) study did not find a negative correlation between total inward FDI and the corruption level in host countries.

Using cross-sectional data, Alesina and Weder (1999) fail to produce a significant parameter estimate for the corruption variable on FDI in spite of trying a series of model specifications. Peter and Winner (2005) using a data set of 73 developed and less developed countries over the time period (1995 to 1999), found a clear and positive relationship between corruption and FDI. There is a positive short run as well as a positive long run impact of corruption on FDI. The contribution of the change in perceived corruption in the long run may account for up to 40% of the observed overall FDI growth between 1995 and 1999.

Henisz (2000) examines the effect of corruption on market entry using U.S. firm-level data, and employs the two-stage probit estimation technique on 3.389 overseas manufacturing operations by 461 firms in 112 countries. The results show little effect of corruption but some estimates point out that corruption increases the probability of investing in a foreign country. So from the earlier mentioned opinion, it is clear that there are diverse opinion about the relationship between FDI and corruption like Wei (1997), Mauro (1995), Woo (2010) and Alemu (2012) who are proponents of the view that corruption deters investment while Bardhan (1997) and Bellos and Subasat (2012) argue the reverse.

Model specification

FDI are very heterogeneous, changing from country to country. Based on this concentration, this study employs panel data from 48 different countries (Table 1) over the period of 1998 to 2014. To estimate the relationship between corruption and FDI, the work has employed panel data. Panel data studies are crucial to estimation of inter temporal relations, life-cycle and intergenerational models (Baltagi, 2005). Here the study mainly employs REM, FGLS and PCSE estimation methods to determine the relationship between corruption and foreign direct investment. To estimate the relationship, the study has constituted the following equation. The empirical research is mainly concentrates on the relationship between FDI and corruption which is based on the following regression equation.

$$\text{Log (FDI/POP)}_{it} = \beta_0 + \beta_1 \text{Corruption}_{i, t-1} + \beta_2 \text{GDPPC}_{i, t-1} + \beta_3 \text{GDPG}_{i, t-1} + \beta_4 \text{POPG}_{i, t-1} + \beta_5 \text{UPOPG}_{i, t-1} + \beta_6 \text{RISK}_{i, t-1} + \beta_7 \text{OPEN}_{i, t-1} + \beta_8 \text{INF}_{i, t-1} + \beta_9 \text{TELEDENSITY}_{i, t-1} + \beta_{10} \text{GSEP}_{i, t-1} + \beta_{11} \text{AGGLO}_{i, t-1} + \beta_{12} \text{BURA}_{i, t-1} + \beta_{13} \text{LAW}_{i, t-1} + \beta_{14} \text{DEMOC}_{i, t-1} + \eta_i + \epsilon_{i,t}$$

(1)

Where *i* is the country subscript, *t* is the time subscript, βs are unknown parameters to be estimated, € is the usual random disturbance term, and η is the unobserved

Table 1. List of the countries.

South and South-East Asia	Latin America and the Caribbean	Africa
Afghanistan, Bangladesh, Bhutan, Brunei, India, Indonesia, Combodia, East Timor, Laos, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka Singapore, Thailand, Vietnam	Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Guatemala, Ecuador, Mexico, Peru, Trinidad and Tobago, Uruguay, Venezuela	Cameron, Cote d'Ivoire, Egypt, Ethiopia, Ghana, Kenya, Malawi, Morocco, Senegal, South Africa, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe

country-specific effects. Here FDI refers to total FDI inflows of a host country receives at a time t divided by the host country's total population. Corruption that refers to the index ranges from 0 to 10, in which the lowest score (0) suggests that a high level of corruption prevails, whereas the highest score (10) implies the cleanest. Here the variables like GDP per capita (GDPPC), the growth rate of GDP (GDPG), and the growth rate of population (POPG) act as a proxy of the host country's market size.

GDP or population is generally used as a measure of host country demand (Al-Sadiq, 2009; Wei, 2000; Habib and Zurawicki, 2002). Here the growth rate of urban population (UPOPG) is used as a proxy for urbanization. Risk variable refers the index range from 1 (very safe) to 5 (very risky). Trade openness (OPEN) is the sum of exports and imports of goods and services measured as a share of gross domestic product. Inflation is used as a proxy of macroeconomic stability. Tele-density refers to the number of mobile and fixed line subscribers as a proxy for infrastructure availability. GSEP that refers to the gross enrolment at the pre-primary (GSEPP), primary (GSEP), secondary (GSES) and tertiary (GSET) level used as proxy for skill level. AGGLO assesses the prevalence of the foreign firms in the country that refers to the index range from 1(1 = rare and limited) to 7 (7 = prevalent and encouraged). Bureaucracy evaluates the bureaucracy in a host country that is proxy by the number of days to start a business. Law variable is used as a control variable that score range from 0 to 1. Democracy is also used as a control variable that score range from 0 (no democracy) to 100 (full democracy).

The most commonly used models in panel data analysis are fixed effects (FE) and random effects (RE) regressors in linear regression using ordinary least squares (OLS). Both models have assumptions such as normal distribution, homoskedasticity and no autocorrelation (Baltagi, 2005; Yaffee, 2005). To choose the most appropriate panel data estimation methods, first, the Hausman (1978) specification test provides information on the appropriateness of the RE model *versus* the FE model. The random effects model can be consistently estimated by both RE estimator or the FE estimator. In the random effects model, the individual-special effect is a random variable that is uncorrelated with the explanatory variables.

RE1: Unrelated effects

$E[c_{ij}X_i; z_i] = 0$

RE1 assumes that the individual-special effect is a random variable that is uncorrelated with the explanatory variables of all past, current and future time periods of the same individual.

RE2: Effect variance
a) $V[c_{ij}X_i; z_i] = \sigma^2_c < \infty$ (homoscedastic)
b) $V[c_{ij}X_i; z_i] = \sigma^2_{c,i}(X_i, z_i) < \infty$ (heteroscedastic)
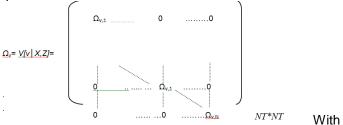
RE2a assumes constant variance of the individual specific effect.

RE3: Identifiability

a) $Rank(W) = K + M + 1 < NT$ and $E[W'_i W_i] = Q_{WW}$ is p.d. and finite. The typical element $w_{it} = [1\ x'_{it}\ Z'_i]$.
b) $Rank(W) = K + M + 1 < NT$ and $E[W'_i \Omega_{v,i}^{-1} w_i] = Q_{wow}$ is p.d. and finite. $\Omega_{v,l}$ is defined below.

RE3 assumes that the regressors including a constant are not perfectly collinear, that all regressors (but the constant) have non-zero variance and not too many extreme values.

The random effects model can be written as:

$Y = \alpha + x'_{it}\beta + z'_{i}\gamma + v_{it}$
Where $v_{it} = c_i + u_{it}$. Assuming *PL2, PL4 and RE1* in the special versions PL4a and RE2a leads to

$$\Omega_v = V[v \mid X,Z] = \begin{pmatrix} \Omega_{v,1} & \cdots & 0 & \cdots & 0 \\ & & & & \\ 0 & \cdots & \Omega_{v,1} & \cdots & 0 \\ & & & & \\ 0 & \cdots & 0 & \cdots & \Omega_{v,N} \end{pmatrix}_{NT*NT}$$

With typical element

$$\Omega_{v,i} = \begin{pmatrix} \sigma^2_v & \sigma^2_c & \cdots & \sigma^2_c \\ \sigma^2_c & \sigma^2_v & \cdots & \sigma^2_c \\ \vdots & \vdots & \ddots & \vdots \\ \sigma^2_c & \sigma^2_c & \cdots & \sigma^2_v \end{pmatrix}_{T*T}$$

Where $\sigma^2_v = \sigma^2_c + \sigma^2_u$. This special case under PL4a and RE2a is therefore called the equi-correlated random effects model. In the fixed effects model, the individual-special effect is a random variable that is allowed to be correlated with the explanatory variables.

FE1: Related effects

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FE1 explicitly states the absence of the unrelatedness assumption in RE1.

FE2: Effect Variance

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FE2 explicitly states the absence of the assumption in RE2.

FE3: Identifiability

Rank $(\ddot{x}) = K < NT$ and $E(\ddot{x}'_i \ddot{x}_i)$ is p.d. and finite

Where the typical element $\ddot{x}_{it} = x_{it} - \dot{x}_i$ and $\dot{x}_i = 1/T \sum_t x_{it}$

FE3 assumes that the time-varying explanatory variables are not perfectly collinear, that they have non-zero within-variance (that is, variation over time for a given individual) and not too many extreme values. x_{it} cannot included a constant or any time-invariant variables. Note, that only the parameters β but neither α nor γ are identifiable in the fixed effects model.

By considering every detail, the research work would prefer the RE estimator if the individual-specific effect really is an unrelated effect (RE1). This is usually tested by a (Durbin-Wu-) Hausman test. However, the Hausman test is only valid under homoscedasticity and cannot be included in time fixed effect. Since the data have been tested positive for heteroskedasticity the fixed and random effects estimators cannot be expected to be efficient.

This study also used other appropriate panel data analysis methods such as feasible general least squares method (FGLS) and regression with panels corrected standard errors (PCSE) because heteroskedastic models are usually fitted with feasible generalized least squares (EGLS or FGLS). Similarly, PCSE allow for panel-level heteroskedasticity and contemporaneous correlation of observations between the panels. However, the FGLS estimator also has various limitations. Although the GLS and FGLS methods are designed to improve on estimation efficiency when there is a non-scalar covariance matrix, it is said that the FGLS estimator is often not available, and if it is available, the model is bound to more restrictions (Chung-Ming, 2002).

Instead of assuming the structure of heteroskedasticity, the work may estimate the structure of heteroskedasticity from OLS. First, estimate $\tilde{\Omega}$ from OLS and, second, use $\hat{\Omega}$ instead of Ω.

$$\hat{\beta}_{FGLS} = (X'\hat{\Omega}^{-1}X)^{-1} X'\hat{\Omega}^{-1} y$$

There are many ways to estimate FGLS. But one flexible approach is to assume that

$$Var\ (u \mid X) = u^2 = \sigma^2 exp(\delta_0 + \delta_1 x_1 + \delta_2 x_2 + \delta_3 x_3 + \ldots + \delta_k x_k)$$

By taking log of the both sides and using $\hat{u}$ instead of u^2, the study can estimate

$$Log(\hat{u}^2) = \alpha_0 + \delta_1 x_1 + \delta_2 x_2 + \delta_3 x_3 + \ldots + \delta_k x_k + e$$

The predicted value from this model is $\hat{g} = log\ (\hat{u}^2)$. Then convert it by taking the exponential into

$$\hat{\omega}_1 = exp(\hat{g}_1) = exp(log\ (\hat{u}^2)) = \hat{u}^2.$$

Data sources

This study has employed panel data among 48 different countries from the three different regions like, South and South-East Asia, Latin America and the Caribbean and Africa over the period from 1998 to 2014. The study used FDI inflows that are measured in current U.S. dollars divided by the host country's total population as the dependent variable, and data come from United Nations Conference on Trade and Development (UNCTAD). Data on FDI are provided by several sources, such as Balance of Payments Statistics Yearbook and International Finance Statistics by the International Monetary Fund (IMF), European Union Direct Investment Yearbook by EUROSTAT, World Investment Report by UNCTAD, World Development Indicators by the World Bank, and International Direct Investment Statistics Yearbook by Organisation for Economic Co-operation and Develop-ment (OECD). Only the UNCTAD, OECD and EUROSTAT offer a sectoral breakdown of FDI flows and stocks. The drawback is that OECD and EUROSTAT only cover a very limited number of world countries, and thus the total direct investment received by any given country cannot be completely assessed. Moreover, the research work may demand in FDI inflows than FDI stocks because policy recommendations are usually formulated to boost FDI inflows rather than to accumulate FDI stocks for a given period. However, only UNCTAD provides a break down into two different categories: FDI figures for developed and for developing countries that really serve the study purpose. For getting contemplative judgment about the research it demands that FDI inflows data from UNCTAD.

Corruption is being treated as an independent variable. In this research the corruption variable is being treated as a test variable. The three most widely used cross-country corruption perception indices are the control of corruption measure from the World Bank's governance indicators database (WGI), the corruption index of the political risk services international country risk guide (ICRG), and the

corruption perception index of transparency international (TI index). The World Bank's governance indicators database is a statistical compilation of responses on the quality of governance given by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries, as reported by a number of survey institutes, think tanks, non-govern-mental organizations and international organizations (Kaufmann et al., 2010).

Langbein and Knack (2010) also argue that the WGI do not measure distinct concepts of control of corruption, rule of law, government effectiveness, rule quality, political stability, and voice and accountability as posited. The ICRG rating system comprises 22 variables, representing three major components of country risk: economic, financial and political. Lamsdorff (2004) also claims that the ICRG index does not really measure corruption; it indicates the political risk involved in corruption. Treisman (2000) also finds some ranking by ICRG puzzling. The Corruption Perceptions Index (TI index) ranks countries according to the perception of corruption in the public sector. The study has used the TI index for the main reason that it is free; others may require some fees or subscription. Nevertheless, the index is relatively reliable and powerful.

TI index include questions relating to the bribery of public officials, kickbacks in public procurement, embezzlement of public funds, and questions that probe the strength and effectiveness of public sector anti-corruption efforts (Transparency International, 2011). TI index ranges from 0 to 10, in which the lowest score (0) suggests that a high level of corruption prevails, whereas the highest score (10) implies the cleanest. Nowadays, the TI corruption index is a relatively common institutional measure in the literature, for example, among others Wei (2000), Gyimah-Brembong (2002), Ng and Yeats (1999), Sandholtz and Koetzle (2000) and Torrez (2002). In particular, the TI index has been used by various studies to investigate the effects of corruption on public investment and public infrastructure (Goldsmith, 1999; Blackburn et al., 2011), economic growth, the shadow economy (Pellegrini and Gerlagh, 2004; Buehn and Schneider, 2009) and foreign direct investment (Barassi and Zhou, 2012; Habib and Zurawicki, 2002; Fons, 1999) (Table 1).

For accomplishing the research purpose for different control variables data are accumulated from the manifold sources, the data on GDP per capita (measured in current U.S. dollars), the growth rate of GDP, the degree of openness, the inflation rate, and the illiteracy rate come from the World Bank's World Development Indicators. To capture the effects of political risk (RISK), the data have used from the Amnesty International and U.S (2014), an index ranking countries based on a scale of 1 (very safe) to 5 (very risky).

For measuring the growth rate of population (POPG), the study used data from World Development Indicators (WDI, 2014). GDP or population is generally used as a measure of host country demand (Al-Sadiq, 2009; Wei, 2000; Habib and Zurawicki, 2002). Large markets also provide a reasonable scope for investment and thus influence market-seeking FDI (Habib and Zurawicki, 2002) and also for measuring the growth rate of urban population (UPOPG), the study has also used the data from world development indicators. For another control variable, like agglomeration the data from the global competitiveness report was used, the index value from 1 to 7, 1 represent rare and 7 represent prevalent and encouraged. For the variable of Bureaucracy, the data is generally used were from the global competitiveness report. To determine the effect of law, the data cover from the World justice Project Rules of Law Index, Score range from 0 to 1 (with 1 indicating strongest adherence to the rules of law). GSEP is a proxy variable for human capital, the data covers from the world development indicators. Democracy index (DEMOC) scales from 100 (full democracy) to 0 (no democracy), data come from the Quality of Government Institute (Table 2).

Empirical evidence

According to the empirical evidence based on the three panel estimation methods reveal that the variable of corruption that is statistically negative and significant at 1% used REM, FGLS and PCSE estimation methods. This relevant exploration illustrates that decelerating the corruption of-course boost the confidence of the foreign investors and that enterprising the economic growth of the country. For instance, the evidence from the REM implies that keeping other factors constant, if a country is able to decrease the level of corruption by 1%, the inward FDI into the economy may increase by 8.1% points. The empirical results derived from using FGLS and PCSE estimation methods also verified that keeping other factors constant, a 1% reduction of corruption may increase the FDI inflow by 9.25 and 11.5% points, respectively. From this finding, it reveals that the sagacious policymakers should concentrate on constructive and commensurate policies that assists to eradicate corruption, and ensure conducive business environment that facilitate the unremitting flow of investment from the across border. Reduction of corruption can come with proper institutional support and uncontrollable eagerness of the government, and that can be attain by enhancing good governance and ensuring better economic institutions, including strengthening the effectiveness and predictability of the judiciary, enforceable contracts, and the rule of law, eliminating the root causes of corruption and rent seeking, and developing an environment where fair and predictable rules form the basis for social and economic interactions. The three panel estimation methods reveal that the variable of GDPPC is statistically significant at

Table 2. Descriptions of the variables.

Variable		Description	Source	Expected sign
Dependent	FDI inflow	Total FDI inflows a host country receives at time t divided by the host country's total population (that is, FDI per capita	UNCTAD	(+)
Test variable	Corruption	TI index ranges from 0 to 10, in which the lowest score (0) suggests that a high level of corruption prevails, whereas the highest score (10) implies the cleanest	TI	(-)
Control variable	GDPPC	Gross Domestic Product (in current US$) divided by population	WDI, 2014	(+)
	GDPG	Growth rate of GDP (annual %)	WDI	(+)
	POPG	Growth rate of Urban population (Annual %).	WDI	(+)
	UPOPG	Growth rate of urban population: urban population is the midyear population of areas defined as urban in each country and reported to the United Nations	WDI	(+)
	Trade Openness	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic Product.	WDI	(+)
	AGGLO	Assesses the prevalence of foreign firms in the country. Based on the item: "Foreign ownership of companies in your country is (1 = rare and limited, 7 = prevalent and encouraged"	Global competitiveness report	(+)
	Risk	Terror Scale: 1 (very safe) and 5 (very risky).	Amnesty International and U.S.	(-)
	SCH and Literacy	Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers	WDI	(+)
	Inflation	Inflation as measured by the consumer price index which measures annual % change in a fixed basket of goods	WDI	(-)
	Bureaucracy	Number of days to start a business.	Global competitiveness report	(+)
	Democracy	Index of Democratization. Index that could vary from 0 (no democracy) to 100 (full democracy).	Quality of Government Institute.	(+)
	Law	Score range from 0 to 1 (with 1 indicating strongest adherence to the rules of law)	World justice Project Rules of Law Index	(+)

1% by using REM, FGLS and PCSE estimation methods. The evidence from the REM implies that keeping other factors constant, if a country is able to increased 1% of GDPPC, the inward FDI into the economy may increase by 13.35% points (Table 3).

The empirical results derived from using FGLS and PCSE estimation methods also verified that keeping other factors constant, a 1% increase of GDPPC may increase the FDI inflow by 14.65 and 16.29% points, respectively. In all, the panel estimation model, the variable GDPG is 5% statistically significant. Keeping other factor constant, the evidence from the REM, FGLS and PCSE panel estimation model have found 1% increase in GDPG, the

FDI increased by 11.25, 12.33 and 15.27% respectively. By using REM, FGLS and PCSE estimation methods, 1% increase of POPG, FDI will increased about 7.57, 7.62 and 8.57% respectively. Here the other factor is remaining constant and also in every panel estimation model this variable is 1% statistically significant. The three panel estimation methods reveal that the variable of UPOPG is statistically significant at 1% by using REM, FGLS and PCSE estimation methods. Using REM, FGLS and PCSE estimation methods, 1% increase of UPOPG, FDI will increase about 5.28, 6.59 and 7.38% respectively. So from the GDPPC, GDPG, POPG and UPOPG, it can be articulate that market size facilitate for attracting the FDI

Table 3. Random effect model (REM), feasible general least squares method (FGLS) FGLS and panels corrected standard errors (PCSE).

FDI inflow	REM	FGLS	PCSE
Corruption	-0.0815*	-0.0925*	-0.0115*
	(0.0213)	(0.0211)	(0.0213)
GDPPC	0.1335*	0.1465*	0.1629*
	(0.0312)	(0.0395)	(0.0422)
GDPG	0.1125**	0.1233**	0.1527**
	(0.0213)	(0.0281)	(0.0369)
POPG	0.0757*	0.0762*	0.0857*
	(0.274)	(0.226)	(0.296)
UPOPG	0.0528*	0.0659*	0.0738*
	(0.288)	(0.315)	(0.393)
RISK	-0.0929*	-0.1072*	-0.1259*
	(0.362)	(0.276)	(0.457)
OPEN	0.0813**	0.0991**	0.01073**
	(0.233)	(0.257)	(0.431)
INFLA	-0.0685*	-0.0732*	-0.0982*
	(0.132)	(0.182)	(0.210)
TELE DENS	0.0739*	0.0805*	0.0941*
	(0.439)	(0.392)	(0.541)
GSEP	0.0692**	0.0784**	0.0860**
	(0.564)	(0.471)	(0.662)
AGGLO	0.0478*	0.0505*	0.0724*
	(0.492)	(0.523)	(0.605)
BURA	0.0128*	0.0115*	0.0148*
	(0.521)	(0.557)	(0.507)
LAW	0.0231**	0.0240**	0.0251**
	(0.466)	(0.434)	(0.472)
DEMOC	0.0472**	0.0595**	0.0787**
	(0.468)	(0.502)	(0.599)
Constant	0.6754	0.8966	0.1121
	(0.432)	(0.607)	(0.792)
Number of observation	768	768	768
Wald chi 2 (8)	107.69	187.85	217.34
Prob > chi 2	0.0000	0.0000	0.0000

*, ** and *** indicate 1, 5 and 10% respectively significance levels.

inflow that was acknowledge by Bandera and White (1968), Schmitz and Bier (1972), Wheeler and Mody (1992) and Pistoresi (2000). The empirical results derived from using REM, FGLS and PCSE estimation methods explain 1% decrease in risk; FDI will increase about 9.29, 10.72 and 12.59% respectively. Trade openness is observed to be positively and significantly associated to FDI inflows in studies such as Harms and Ursprung (2002) and Jensen (2003). From the evidence, 1% increase of openness was observe; FDI will increase

about 8.13, 9.91 and 10.73% from using REM, FGLS and PCSE estimation methods. With the reduction of inflation 1%, FDI will increase to about 6.85, 7.32 and 9.82% respectively by using the three different panel estimation models REM, FGLS and PCSE respectively. So from the evidence it is demonstrated that greater inflation volatility is consistent with higher inflation rates, and hence increase uncertainty and discourages long-term investment (Romer, 1990).

The empirical results derived from using REM, FGLS and PCSE estimation methods explain that with 1% increase in tele-density, FDI will increased to about 9.29, 10.72 and 12.59% respectively. Kok and Ersoy (2009), Sekkat and Veganzones-Varoudakis (2004), Asiedu (2002), Morrisset (2000) and Wheeler and Mody (1992) conducted a research work mainly concentrated on the influence of infrastructure on facilitating FDI. On the bases of their studies they have argued that MNCs seek such markets where they can achieve cost reduction and maximization of benefits, and such objective becomes easy to achieve where public goods are in better condition and supportive to investors.

From the three panel estimation methods, the variable of GSEP is statistically significant at 5% by using REM, FGLS and PCSE estimation methods. The evidence from the REM implies keeping other factors constant, if a country is able to increased 1% of GSEP, the inward FDI into the economy may increase by 6.92% points. The empirical results derived from using FGLS and PCSE estimation methods also verified that keeping other factors constant, a 1% increase of GSEP may increase the FDI inflow by 7.84 and 8.60% points, respectively. From the other distinctive empirical research work by Hanson (1996), Mody and Srinivasan (1998), Noorbakhsh et al. (2001), Globerman and Shapiro (2002) and Agiomirgianakis et al. (2006) they suggest that the effects of human capital on FDI are positive. From the Agglomeration variable 1% increase of agglomeration, FDI may increase about 4.78, 5.05 and 7.24% respectively by using the three different panel estimation models, like REM, FGLS and PCSE. From that finding, it is to be noted that strong agglomeration effects are found on FDI inflows (Li et al., 2010). Keeping other factor constant, by decreasing 1% bureaucracy, FDI will increase about 1.28, 1.15 and 1.48% respectively by using the REM, FGLS and PCSE estimation methods. Improving the law of 1%, FDI will increase about 2.31, 2.40 and 2.51% respectively by using REM, FGLS and PCSE estimation method. Democracy is one of the major ingredients for facilitating FDI. From the three panel estimation, the methods reveal that the variable of democracy is statistically significant at 5% by using REM, FGLS and PCSE estimation methods. The evidence from the REM implies that keeping other factors constant, if a country is able to increase the issue of democracy 1%, the inward FDI into the economy may increase by 4.72% points. The empirical results derived from using FGLS

and PCSE estimation methods also verified that keeping other factors constant, a 1% increase of democracy may increase the FDI inflow by 5.95 and 7.87% points, respectively. From the ealeir mention explanation it is confirm that corruption is one of the major hindrances for attracting FDI.

In the study literature review, the opinion made by Aparna and Kartikeya (2011) concluded that a 1% decrease in the level of corruption may lead to a 9% increase in FDI flows in emerging economies. It is confirm that corruption is one of the major hindrances for facilitating FDI along with the different macro-economic factors like market size (Bandera and White, 1968; Schmitz and Bier, 1972; Wheeler and Mody, 1992; Pistoresi, 2000; Asiedu, 2006; Mlambo, 2006; Zhang, 2008), human capital (Noorbakhsh et al., 2001; Dutta and Osei-Yeboah, 2010), infrastructure (Kok and Ersoy, 2009; Sekkat and Veganzones-Varoudakis, 2004; Asiedu, 2002; Morrisset, 2000; Wheeler and Mody, 1992), macroeconomic stability (Chakrabarti, 2001; Onyeiwu and Shrestha, 2004), financial development (Alfaro et al., 2004; Durham, 2004), institutional factors (such as political stability, adequate infrastructure and effective legal backing) (Schneider and Frey, 1985; Baniak et al., 2002) and facilitated Foreign Direct Investment (FDI).

Separately the study has also illustrated the influence of corruption on FDI in three different regions by using the three different methods. Table 4 illustrates the relationship between corruption and FDI by using REM, FGLS and PCSE estimate method in the South and South-East Asian countries. From the empirical evidence based on the three panel estimation methods reveal that the variable of corruption is statistically significant at 1% by using REM, FGLS and PCSE estimation methods. For instance, the evidence from the REM implies that keeping other factors constant, if a country is able to decrease the level of corruption by 1%, the inward FDI into the economy may increase by 9.65% points. The empirical results derived from using FGLS and PCSE estimation methods also verified that keeping other factors constant, a 1% reduction of corruption may increase the FDI inflow by 12.8 and 15.3% points, respectively.

Table 5 interprets that assuming other factor remain constant, the empirical research have found the same result in the case of Latin America and the Caribbean. For instance, the evidence from the REM, FGLS and PCSE implies that keeping other factors constant, if a country is able to decrease the level of corruption by 1%, the inward FDI into the economy may increase about 5.47, 12.8 and 15.3% points respectively.

Here it indicates that by reducing the existing corruption in Latin America and Caribbean region the FDI will be flourishing. According to the Index value of corruption, Africa is well ahead from the other two regions. If the countries from the Africa region control the corruption by introducing of good governance, consolidating and strengthening the effectiveness of the judiciary system

Table 4. Random effect model (REM), feasible general least squares method (FGLS) FGLS and panels corrected standard errors (PCSE).

FDI inflow	REM	FGLS	PCSE
Corruption	-0.0965*	-0.0128*	-0.0153*
	(0.289)	(0.341)	(0.445)
GDPPC	0.1256**	0.1489**	0.1693**
	(0.229)	(0.338)	(0.459)
GDPG	0.1125**	0.1233**	0.1527**
	(0.212)	(0.281)	(0.369)
POPG	0.0938*	0.1162*	0.1437*
	(0.296)	(0.356)	(0.492)
UPOPG	0.0722*	0.0971*	0.1121*
	(0.265)	(0.355)	(0.482)
RISK	-0.1129*	-0.1352*	-0.1695*
	(0.395)	(0.475)	(0.578)
OPEN	0.0104**	0.0123**	0.0154**
	(0.341)	(0.457)	(0.623)
INFLA	-0.0872**	-0.0102**	-0.0131**
	(0.105)	(0.226)	(0.352)
TELE DENS	0.0729*	0.0834*	0.0958*
	(0.349)	(0.541)	(0.730)
GSEP	0.0862*	0.1029*	0.1283*
	(0.667)	(0.732)	(0.854)
AGGLO	0.0688*	0.0826*	0.1027*
	(0.533)	(0.629)	(0.745)
BURA	0.0349*	0.0495*	0.0691*
	(0.422)	(0.552)	(0.689)
LAW	0.0341*	0.0562*	0.0730*
	(0.356)	(0.539)	(0.609)
DEMOC	0.0672**	0.0893**	0.1052**
	(0.574)	(0.783)	(0.932)
Constant	0.8654	0.1041	0.1439
	(0.542)	(0.747)	(0.982)
Number of observation	768	768	768
Wald chi 2 (8)	107.69	187.85	217.34
Prob > chi 2	0.0000	0.0000	0.0000

*, ** and *** indicate 1, 5 and 10% respectively significance levels.

and generating conducive business climate obviously attract the FDI from the different corner especially from the developed country that surely enhance the societal and economical interaction.

From the empirical evidence, Table 6 noted that by reducing 1% of corruption, FDI will increase to about 9.48, 12.27 and 16.89% by using the three noted panel estimation models, REM, FGLS and PCSE respectively, and that is also at a 1% significant level. It indicates that if the African countries are successfully decelerating

Table 5. Random effect model (REM), feasible general least squares method (FGLS) FGLS and panels corrected standard errors (PCSE).

FDI inflow	REM	FGLS	PCSE
Corruption	-0.0547*	-0.0698*	-0.0844*
	(0.201)	(0.291)	(0.324)
GDPPC	0.0656*	0.0708*	0.8943*
	(0.235)	(0.329)	(0.455)
GDPG	0.0725**	0.0794**	0.0807**
	(0.232)	(0.295)	(0.322)
POPG	0.0529*	0.0756*	0.0936*
	(0.251)	(0.325)	(0.472)
UPOPG	0.0543*	0.0691*	0.0847*
	(0.211)	(0.258)	(0.336)
RISK	-0.0854*	-0.0975*	-0.1150*
	(0.301)	(0.492)	(0.545)
OPEN	0.1022**	0.1335**	0.1678**
	(0.322)	(0.481)	(0.562)
INFLA	-0.0729*	-0.0955*	-0.1145*
	(0.258)	(0.329)	(0.398)
TELE DENS	0.0778*	0.0829*	0.1086*
	(0.355)	(0.478)	(0.592)
GSEP	0.0807**	0.1129**	0.1576**
	(0.705)	(0.835)	(0.929)
AGGLO	0.0753*	0.0896*	0.0960*
	(0.320)	(0.429)	(0.568)
BURA	0.0544*	0.0723*	0.0926*
	(0.412)	(0.578)	(0.692)
LAW	0.0426*	0.0688*	0.0876*
	(0.325)	(0.495)	(0.632)
DEMOC	0.0577**	0.0941**	0.1321**
	(0.326)	(0.566)	(0.893)
Constant	0.7884	0.1321	0.1509
	(0.328)	(0.576)	(0.874)
Number of observation	768	768	768
Wald chi 2 (8)	107.69	187.85	217.34
Prob > chi 2	0.0000	0.0000	0.0000

*, ** and *** indicate 1, 5 and 10% respectively significance levels.

Table 6. Random effect model (REM), feasible general least squares method (FGLS) FGLS and panels corrected standard errors (PCSE).

FDI inflow	REM	FGLS	PCSE
Corruption	-0.0948**	-0.1227**	-0.1689**
	(0.289)	(0.346)	(0.398)
GDPPC	0.0822**	0.1025**	0.1291**
	(0.382)	(0.435)	(0.589)
GDPG	0.0826**	0.0942**	0.1123**
	(0.293)	(0.348)	(0.399)
POPG	0.0766*	0.0891*	0.1032*
	(0.293)	(0.355)	(0.478)
UPOPG	0.0839*	0.0927*	0.1165*
	(0.285)	(0.348)	(0.472)
RISK	-0.0973*	-0.1147*	-0.1344*
	(0.332)	(0.543)	(0.592)
OPEN	0.0955**	0.1156**	0.1348**
	(0.315)	(0.457)	(0.554)
INFLA	-0.0788*	-0.0967*	-0.1244*
	(0.272)	(0.376)	(0.431)
TELE DENS	0.0768*	0.0882*	0.1029*
	(0.342)	(0.462)	(0.588)
GSEP	0.0745**	0.931**	0.1277**
	(0.692)	(0.833)	(0.104)
AGGLO	0.0677*	0.0827*	0.1093*
	(0.228)	(0.364)	(0.588)
BURA	0.0451*	0.0764*	0.0922*
	(0.317)	(0.544)	(0.725)
LAW	0.0522*	0.0748*	0.0928*
	(0.302)	(0.425)	(0.646)
DEMOC	0.0766**	0.0959**	0.1257**
	(0.304)	(0.545)	(0.823)
Constant	0.7254	0.0951	0.1272
	(0.359)	(0.582)	(0.829)
Number of observation	768	768	768
Wald chi 2 (8)	107.69	187.85	217.34
Prob > chi 2	0.0000	0.0000	0.0000

*, ** and *** indicate 1, 5 and 10% respectively significance levels.

corruption it influence to excel FDI and that augment the social and economical development. Anticorruption tools minimized the corruption and formulating accountability and ensues transparency.

According to Quah (1982), the consequences of corruption can be minimized if a government has an effective anticorruption strategy and implements it impartially.

Conclusion

The main finding of this work is that there is a negative relation between FDI and corruption. FDI facilitate ample amount of jobs, escalating management adroitness, technology transfer, advancing human capacity, and of course better governance. FDI also promotes proper institutional arrangement and generating conducive business climate. Reduction of corruption boosts the confidence of the investors; decelerate the business costs and amplifying transparence and accountability. The other variables are incorporate with GDP per capital (GDPPC), GDP growth rate (GDPG), POPG, UPOPG, trade openness, tele-density, gross school enrolment (GSEP), agglomeration, bureaucracy (BURA), law and democracy are positively statistically significant as expected and risk and inflation are negatively statistically significant as expected. So the government for each and every country needs to make a commensurate and concrete action to reduce corruption, and also to strengthen the capacity of the institution so that corruption would not prevail to ensure the economic emancipation and competitiveness.

Conflict of interests

The author has not declared any conflict of interests.

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