Accentuating the Impact of Corruption on Foreign Direct Investment Inflows to West Africa

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Abstract
The study investigates the impact of corruption on foreign direct investment (FDI) inflows to West Africa. The research model is formulated using corruption as independent variable along with 9 control variables. Statistical analyses viz descriptive, correlation and regression are conducted on a panel of 16 countries with data from 2008 to 2017. The result of the fixed effects panel regression reveal that corruption have no statistical significant impact on FDI inflows to West Africa. The study recommends that multinational corporations should continue to extend FDI strategy and implementation to West Africa.

Key words: *•Foreign Direct Investment •Corruption •West Africa •Fixed effects panel regression •Control variables*

1.0 Introduction

The relevance of corruption control in less-developed economies as a catalyst for foreign direct investment (FDI) inflow is central to the current debate about sustaining the attractiveness of multinational corporations to West Africa. Most of the arguments on FDI inflow center on the possible impact on transference of new capital, managerial capacity, competitive products, updated technologies, creation of employment, access to foreign markets, improved standard of living, and corruption. Transparency International describes corruption as the abuse of the entrusted power by individuals for either financial or non-financial gain. Corruption would arise when private agents offer bribes to circumvent public policies and processes for competitive advantage. Corruption takes place where government institutions having great authority, exercise discretion deprived of respect to interpretation and application of regulations. Overall, previous empirical studies point to the fact that corruption discourages FDI flowing to host-countries because it heightens uncertainty and risk to international business. However, the argument that corruption limits FDI appears punctured by data on FDI inflows from UNCTAD and level of corruption perception available at World Bank Governance Indicators (WGI). Data from these institutions show that FDI inflows to West Africa for example continue to increase in spite of extremely weak control of corruption. Thus

the opinionated assertion that corruption dissuades FDI seems overrated. In addition, no study has been carried out on West Africa. These are the gaps in literature this study intends to fill. The findings of this study will be beneficial to policymakers and potential investors to West Africa in understanding the role corruption and other indicators play in investment decisions of multinational corporations. Therefore, this paper specifically investigates if corruption have any impact on FDI inflows to West Africa by putting forward this research question; *Does corruption impact FDI inflows to West Africa?* Answering this question necessitates the formulation of a null hypothesis– H_0*: Corruption have no significant impact on foreign direct investment (FDI) inflows to West Africa*. The remainder of this paper is organized as follows. Section 2.0 reviews related literature. Section 3.0 describes the methodology. Section 4.0 presents data analyses and discusses the results. Section 5.0 contains the conclusion and recommendation.

2.0 Literature Review

Conceptual framework and empirical review

Foreign direct investment

As a significant component of international business and economy, FDI is conceived as any investment where investors commonly referred to as multinational corporations (MNC) from a country (home-country) invest in a foreign country (host-country) to create, own and control an entity called an affiliate. FDI assume various forms for instance it may include (1) MNC taking up equity stake of an enterprise in a foreign country through mergers, greenfield investments or acquisitions, (2) reinvested share of earnings paid to the MNC in the affiliate, or (3) short or long-term borrowing and lending of funds between the MNC and the affiliate. With FDI, host-countries and their domestic economies receive from the home-countries the prospects of economic growth generally (Antwi, Mills, Mills & Zhao, 2013; Sothan, 2017) but more specifically, new capital and new modes of financing, managerial capability, access to more competitive products, better market networks (Shawkatul, Prosannajid, & Abdul, 2014), improved job prospects and employment skills (Çolak & Alakbarov, 2017), improved and more efficient production processes, updated technologies and access to organisational capacities.

Corruption

Among the many identified variables that determine the trends of FDI inflows, corruption is considered to be one of the key influencers (Mosikari, Nthebe & Eita, 2018). Countries across Africa are faced with the dilemma of corrupt actions by agents in private, public and political spheres. Corrupt actions and practices are a way of life among public sector agents. Duyne Van (2001) explains that corruption is crookedness in the decision-making process in which a decision-maker agrees to turn from rules and standards that should guide his/her decision, in exchange for a reward in kind or monetary value. Corruption is a widespread phenomenon that occurs regularly in almost all countries but is worse in countries with weak legislature and the judiciary or wherever the rule of law is hardly observed, and adherence to formal rules does not exist (Hossain, 2016). Technically corruption entails bribery, cronyism, influence peddling, embezzlement, fraud, extortion, nepotism, appropriation of public assets for private use, and graft in which public officials either directly steal public funds or illegitimately benefit from public funds (Jan & Ali, 2017). Behaviorally, corruption is directly related to the discretionary freedom or power in the decision making process. Hossain (2016) acknowledges that the effects of corruption can lead to a reduction in the amount of investment, truncate economic growth, result in loss of job opportunities, and result in uneconomical use of scarce government resources. Portugal Ferreira, Costa Carreira, Li and Ribeiro Serra (2016) observe that corruption could be either arbitrary or pervasive. The latter being institutionalized corruption may be a necessary end in itself if MNC are to secure needed documentations or contracts. This

view supports the grease the wheels theory that corruption would speed up efficiency where bureaucratic regulations are cumbersome. They also stressed that it is extremely rare for arbitrary corruption to thrive because where corruption is uncertain, multinational corporations would seek alternative entry modes to FDI such as forming strategic alliances and joint ventures. Since corruption is behavioral in nature, it is difficult to measure numerically. However, previous studies on the subject have used various indices that are largely based on observed responses from experts, citizens, think-tanks, enterprises and non-governmental organisations. These observed responses are often carried out by reputable international organisations for example Transparency International's Corruption Perception Index (CPI), the World Business Environment Survey (WBES), the corruption index of the International Country Risk Guide (ICRG), the World Bank's Control of Corruption index (WB), the World Bank's Country Policy and Institutional Assessment (CPIA) and the Worldwide Governance Indicators (WGI).

Empirical review

Previous studies on the subject have thrown up mixed findings.

Empirical review on negative impact of corruption on FDI inflows

Amarandei (2013) studied the impact of corruption on FDI during 2000 to 2012 in 10 Central and Eastern European countries. It was revealed that a negative significant relationship exists between corruption and inward FDI and concludes that investment decision by foreign direct investors relies on the impact of market stability and potential, as well as predictability and reliability of the regulatory system. Canare (2017) study using a panel of 46 countries drawn from Asia and the Pacific with data from 2006 to 2013 showed that decreased FDI inflows stem from corruption because of the added costs and risks borne by investors. Hossain (2016) study of 48 countries drawn from South and South-East Asia, Latin America, the Caribbean and Africa with data from 1998 to 2014,employed three panel estimation methods viz random effect model (REM), feasible general least squares method (FGLS) and panels corrected standard errors (PCSE). The methods collectively revealed that corruption is negative and statistically significant. The study recommended that rent seeking and unfavorable business environment must be pursued by policymakers if unending flow of investment across borders is to continue. Jan and Ali (2017) employed pooled OLS to study data from 1996 to 2016 derived from 7 countries in southern Asia and found that corruption has negative significant impact on FDI that is validated by the low perception the United States and Japan have about countries in south Asia vis-à-vis the extent to which multinational corporations are willing to extend FDI to Asia. Quazi (2014) found that the locational advantage that attracts FDI to 9 countries in Eastern Asia and 7 countries in Southern Asia is impeded by corruption. This was evident in their analyses of data from 1995 to 2011 which was negative and statistically significant. In an attempt to examine the level to which home-country corruption influence corruption of host-country and FDI inflows, Portugal Ferreira, *et al*. (2016) used data for 2008 from 28 home-countries and 49 host-countries and found that host-country institutionalized or pervasive corruption negatively impacts overall FDI flows. Kurul and Yalta (2017) investigated the impact of six institutional factors - control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and voice and accountability on FDI. Using a panel of 113 developing countries with data from 2002 to 2012, the study found that countries that make efforts to control corruption positively attract more FDI.

Empirical review on no negative impact of corruption on FDI inflows

Conversely, there are previous studies that have not found any negative impact of corruption on FDI. Bayar and Alakbarov (2016) in their study of 23 emerging market economies utilizing data from 2002 to 2014 investigated the interaction between control of corruption, rule of law and FDI. While the results suggest that there is long-run relationship between the variables, control of corruption and rule of law have no statistically significant impact on FDI. Udenze (2014) advocated that corruption is an institutional phenomenon. This opinion is corroborated by findings from 73 countries using data for 8years (2005 to 2011) that showed corruption in low and middle income countries in Sub-Saharan Africa have no statistically significant relationship with FDI. In two separate studies, Abotsi & Iyavarakul (2015), and Abotsi (2016) opine that regardless of whether there are positive or negative outcomes, the tolerable level of corruption is equally vital. With data from 1996 to 2013, and sample of 50, 43 and 39 countries drawn from Africa, Europe and Asia respectively, the studies found that corruption below a certain threshold is seen as grease in the wheel of commerce meaning that it has a positive impact on FDI inflows. This is the reason Asia attracts relatively more FDI than Africa even though Asia's tolerable corruption level is higher than Europe but lower that Africa. The reasons for this outcome are (i) different social customs amongst countries in the way gift-exchange is looked at. In developing countries gift-exchange for business transactions is not considered to be a corrupt practice unlike in developed counties where gift-exchange is a corrupt practice. (ii) The presence of sound policies on corporate tax, market and trade regulations, trade openness and labor market arrangements. Ravi (2015) also has similar findings and commented that the degree of institutionalized corruption would provide no impact on FDI. The results of Ravi (2015) comparative study of China and India using data from 2004 to 2014, show that despite China's stringent policies to curtail corruption, FDI inflows were low when compared with India that attracted high levels of FDI receipts despite high level of corruption. Using a sample of 175 countries and data compiled by Heritage Foundation Research Centre and Transparency International in 2015, Gasanova, Medvedev & Komotskiy (2017) discovered that countries with low level of protection from corruption like China, India and Russia showed high FDI inflows. The researchers argue that the unattractiveness of FDI to host-countries with low corruption is permissible by the existence of highly skilled and expensive labour force, expensive social burden and high taxes.

Control variables

In addition to the independent variable, the following control variables– voice and accountability, market size, gross domestic product growth, population, inflation, natural resource, exchange rate and real interest rate are included in the study. Although these control variables are not of theoretical interest, they are included because previous studies have found them to be potentially important influencers of FDI as representing different motivations for FDI. Furthermore, the variables are expected to ensure the statistical adequacy of the research model.

3.0 Methodology

Theoretical framework

The eclectic paradigm in FDI literature asserts that FDI is influenced by the collective and individual need for ownership, location and internalization (OLI). This paper opines that of these three, location factor is paramount for MNC and corruption may not significantly affect MNC entry rates to West Africa. So, location and corruption are not closely bound up. There are two main theories surrounding the impact of corruption on FDI which are founded on whether corruption has positive or negative effects on FDI. The first theory is 'sand in the wheels theory' which argues that corruption is not good for countries' economies because it

creates uncertainty, raises costs, reduces productivity and credibility thus deterring FDI and in turn decreases a country's locational attractiveness (Bardhan, 1997). The second theory is 'grease the wheels theory' supported by Leff (1964) and Leys (1965) which argues that corruption is not an obstacle for business expansion activities instead it could be an efficient lubricant, which greases the wheels against rigid economic regulation and red tape. Corruption would serve as an incentive to speed up permitting of new companies and procedures that would otherwise not happen. Furthermore, the level of corruption in the home-country serves as an impetus for MNCs to spread FDI to other countries (Cuervo-Cazurra, 2006).

Population, sample, data description and sources

The dataset used for the empirical analyses is from panel countries in West Africa and runs from 2008 to 2017. The population of the study consists of 16 countries namely Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo. For the purpose of representativeness these constitute the study sample. In order to isolate the impact of corruption (COR) on FDI inflows, 9 control variables (Table 1) viz voice and accountability (VAA), market size (MS), gross domestic product growth (GDPG), population (POP), inflation (INF), natural resource (NR), exchange rate (EXR) and real interest rate (RIR) are included in the econometric model. Controlling these variables is motivated by evidence from previous studies like Udenze (2014), Abotsi & Iyavarakul (2015), Abotsi (2016), Bayar & Alakbarov (2016), Epaphra & Massawe (2017), Canare (2017), Kurul & Yalta (2017), Mosikari, *et al.* (2018). Data relating to the variables are obtained from United Nations Conference for Trade and Development (UNCTAD) annual statistical reports and World Bank's governance and development indicators database.

Model specification

We express a functional relationship between the dependent, independent and control variables thus:

$$FDIIF=f(COR,VAA,MS,GDPG,POP,INF,NR,EXR,RIR) \quad \text{.....equation (1)}$$

This can be transformed into econometric model as:

$$FDIIF_{it}=B_0+B_1COR_{it}+B_2VAA_{it}+B_3MS_{it}+B_4GDPG_{it}+B_5POP_{it}+B_6INF_{it}+B_7NR_{it}+B_8EXR_{it}+B_9RIR_{it}+\varepsilon_{it} \quad \text{.....equation (2)}$$

Where, FDIIF is the dependent variable, COR is the independent variable, VAA, MS, GDPG, POP, INF, NR, EXR, RIR are control variables, B_0 is the intercept of the regression, $B_1 \ldots B_9$ are the slope coefficient, ε is the error term, *i* is fixed effects by country, and *t* is fixed effects by year. The *a priori* signs are COR*(-)*; VAA*(+)*; MS*(+)*; GDPG*(+)*; POP*(+)*; INF*(-)*; NR*(+)*; EXR*(-)*; RIR*(-)*.

Test of normality

To check for normality of data, shapiro-wilk (Table 2a) and skewness/kurtosis (Table 2b) tests are conducted. The tests reveal problem of normality which is corrected by conducting panel correction standard error regression.

Hausman, Post estimation and Heteroscedasticity tests

Flowing from the fact that the study utilizes panel data, it is necessary to estimate the appropriateness of a choice between random-effects (Table 3) and fixed-effects (Table 4) panel regression by running a Hausman specification test. This test basically enables the detection of any violation of the random effects assumption that the explanatory variables are not correlated to the unit effects. To decide between random and fixed effects, if the *p*-value < .05, it is

significant so the test rejects the null (H_0: random effects would be consistent and efficient) and the alternate (H_1: random effects would be inconsistent) is accepted. The result of the test in Table 5 supports the use of fixed effects panel regression. In addition, post estimation and heteroscedasticity tests are conducted and the results show that the error term is not constant because the test was significant. This is corrected using panel standard error regression.

4.0 Data Analyses and Discussion of Results

Descriptive statistics

Descriptive analyses are employed to ascertain the statistical properties of the variables in the empirical analyses and the results are presented in Table 6. The summary statistics show that the data give rise to high magnitude of standard deviations (σ) that are widely dispersed away from the mean ($\bar{x}$), suggesting that the variables are worth including in the regression model. The analyses reveal that FDI inflows has $\bar{x}$ and σ of 873.86 million US dollars and 2095.39 US dollars respectively, with minimum and maximum values of -38 million US dollars and 20279 million US dollars. COR has $\bar{x}$ and σ of 38.25% and 10.24% respectively, with minimum and maximum values of19% and 69%.VAA has $\bar{x}$ and σ of 41.59% and 11.70% respectively, with minimum and maximum values of 21% and 70%. MS has $\bar{x}$ and σ of 33963.09 million US dollars and 99124.45 US dollars respectively, with minimum and maximum values of 827 million US dollars and 568499 million US dollars. GDPG has $\bar{x}$ and σ of 4.6% and 3.85% respectively, with minimum and maximum values of -21% and 21%. POP has $\bar{x}$ and σ of 20.64 million and 39.82 million respectively, with minimum and maximum values of 0.49 million and 195.88 million. INF has $\bar{x}$ and σ of 113.83% and 28.06% respectively, with minimum and maximum values of 0% and 232.26%. NR has $\bar{x}$ and σ of 14.37% and 12.48% respectively, with minimum and maximum values of 0% and 57.37%. EXR has $\bar{x}$ and σ of 898.83 US dollars and 1817.48 US dollars respectively, with minimum and maximum values of 0 US dollars and 8959.72 US dollars. RIR has $\bar{x}$ and σ of 3.56% and 7.27% respectively, with minimum and maximum values of -42.31% and 24.5%.

Correlation results

A Pearson's correlation was run to assess the degree of association between the variables. The focus of this sub-section is on variables that have statistically significant relationship. From the correlation matrix in Table 7, FDIIF has strong, positive, statistically significant relationship with MS ($r(158) = .61$ $p < .001$) and POP ($r(158) = .70$, $p < .001$), weak, inverse, statistically significant relationship with COR ($r(158) = -.23$, $p = .003$). COR has weak, positive, statistically significant relationship with RIR ($r(158) = -.20$, $p = .010$), and weak, inverse, statistically significant relationship with VAA ($r(158) = -.19$, $p = .015$), MS ($r(158) = -.24$, $p = .002$), POP ($r(158) = -.25$, $p = .002$) and NR ($r(158) = -.30$, $p < .001$). VAA has weak, inverse, statistically significant relationship with NR ($r(158) = -.18$, $p = .027$). MS has strong, positive, statistically significant relationship with POP ($r(158) = .96$, $p < .001$). INF has weak, positive, statistically significant relationship with NR ($r(158) = .17$, $p = .040$) and EXR ($r(158) = .16$, $p = .040$). Interestingly, except for MS that has a strong relationship with POP, all other indicators have weak association hence there is no problem of multicollineriality.

Regression results

Table 8 summarizes the results of the fixed effects regression that examine the impact of corruption and other control variables on FDI inflows. 56.9% of the variation in FDI inflows is explained by the variables captured in the study and 43.1% of the variation is due to other variables not captured in the study. Furthermore, the regression model fitness is significant *p*-value < 0.01 hence the model is good. We find that four variables which are VAA, POP, NR and EXR turned out statistically significant results at less than 5%. MS is statistically

significant at 10% while COR, GDPG, INF and RIR are not statistically significant. GDPG, POP, NR and RIR turned out the correct *a priori* signs. The result of COR turned out a coefficient of 2.94 and *z*-score of .33, and is not statistically significant. Therefore the null hypothesis (H_0) which states that *corruption have no significant impact on foreign direct investment (FDI) inflows to West Africa* is accepted. The results although consistent with Udenze (2014), Ravi (2015), Bayar & Alakbarov (2016) and Gasanova, *et al*. (2017), is quite telling from results of previous studies as we believe that the reason for the absence of statistical significance is because of systematic differences produced by different estimation techniques in measuring a multidimensional phenomenon as corruption. The results from the control variables reveal that VAA has statistically significant and negative impact on FDI inflows with a coefficient of -8.68 and *z*-score of -2.22 indicating that a 1% increase in voice and accountability will lead to 8.68% decrease in FDI inflows. POP and NR have positive and statistically significant impact on FDI inflows with coefficients of 46.53 and 17.32, and *z*-score of 3.78 and 2.52 respectively indicating that 1 unit increase in population is associated with 46.53 million US dollars increase while 1% increase in natural resource is associated with 17.32% increase in FDI inflows. Thus population and natural resource attract FDI inflows to West Africa. In addition, population is the most attractive factor for FDI inflows to West Africa. EXR has a positive and statistically significant impact on FDI inflows with a coefficient of .26 and *z*-score of 7.73 indicating that a 1% increase in exchange rate is associated with .26% increase in FDI inflows. MS has a negative and statistically significant impact on FDI inflows with a coefficient of -253.48 and *z*-score of -1.77 indicating that a 1 unit increase in market size is associated with 253.48 million US dollars decrease in FDI inflows. So, market size is not an attraction for FDI inflows to West Africa.

5.0 Conclusion and Recommendation

Using panel of countries in West Africa from 2008 to 2017, this paper empirically investigates whether corruption measured by the World Bank's control of corruption index has an impact on FDI inflows to West Africa by controlling for voice and accountability, market size, GDP growth rate, population, inflation, natural resource, exchange rate and real interest rate. The study concludes that corruption have no significant impact on FDI inflows to West Africa which can be explained by certain factors such as the existence of social customs that do not see gift-exchange for business transactions as corrupt practice, institutionalization of corruption in home-countries, availability of labour, increasing population, availability of natural resource and attractive exchange rate regimes. We recommend that since corruption is behavioral in nature, it is completely at the discretionary freedom of the giver and the receiver thus its occurrence should not dissuade locational decision of multinational corporations in extending FDI strategy and implementation to West Africa. It should be noted that the findings of this study are based on data from 16 West African countries thus any generalization to other settings should be treated with care. It is possible that increasing (i) the sample size, (ii) the area of the study viz a comparative analysis between under-developed economies and developing economies, and or (iii) time frame, could turn out different results, therefore these aspects should be studied. Overall this paper expands the extant literature on FDI by providing new empirical evidence in West Africa context.

Conflicts of Interest: The authors declare no conflicts of interest.

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APPENDIX

Table 1: Description of variables

Variable	**Abbrev.**	**Definition**	**Expected sign**
Dependent variable			
Foreign direct investment inflow	*FDIIF*	Foreign direct investment inflow (in millions of US$)	n/a
Independent variables			
Corruption	*COR*	Perceptions of the extent to which public power is exercised for private gain, including petty and grand forms of corruption. The original scale ranging between -2.5 (weak) to +2.5 (strong) is transformed using [$x = (a + 2.5)*20$] where x is the value of the transformed variable and a is the value of the original scale	-
Control variables			
Voice and accountability	*VAA*	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, association, and media. The original scale ranging between -2.5 (weak) to +2.5 (strong) is transformed using [$x = (a + 2.5)*20$] where x is the value of the transformed variable and a is the value of the original scale.	+
Market size	*MS*	Current GDP (in millions of US$)	+
Gross domestic product growth	*GDPG*	Growth rate of GDP (in %)	+
Population	*POP*	Population (in millions)	+
Inflation	*INF*	Consumer price index measuring consumer price inflation within a country	-
Natural resource	*NR*	Natural resource are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents, divided by GDP (% of GDP)	+
Exchange rate	*EXR*	Local currency unit per US dollar	-
Real interest rate	*RIR*	Real interest rate in %	-

Source: *Authors' description of research variables*

Table 2a: Shapiro-Wilk W test

Variable	W	V	Z	Prob>z
FDIIF	0.40516	73.156	9.764	0.0000
COR	0.89896	12.427	5.732	0.0000
VAA	0.94471	6.800	4.360	0.0000
MS	0.33630	81.625	10.014	0.0000
GDPG	0.85799	17.466	6.506	0.0000
POP	0.43291	69.743	9.656	0.0000
INF	0.74507	31.353	7.837	0.0000
NR	0.87973	14.792	6.128	0.0000
EXR	0.49649	61.925	9.385	0.0000
RIR	0.83445	20.360	6.855	0.0000

Source: *Authors' summary of shapiro-wilk W test*

Table 2b: Skewness/Kurtosis tests

			---------joint---------	
Variable	Pr(skewness)	Pr(kurtosis)	adj chi2(2)	Prob>chi2
FDIIF	0.0000	0.0000		0.0000
COR	0.0000	0.0011	29.28	0.0000
VAA	0.0006	0.9061	10.36	0.0056
MS	0.0000	0.0000		0.0000
GDPG	0.0000	0.0000	57.65	0.0000
POP	0.0000	0.0000		0.0000
INF	0.0000	0.0000	51.19	0.0000
NR	0.0000	0.0020	32.01	0.0000
EXR	0.0000	0.0000		0.0000
RIR	0.0006	0.0000	39.22	0.0000

Source: *Authors' summary of skewness and kurtosis tests*

Table 3: Random-effects GLS regression

Random-effects GLS regression				Number of obs		= 160
Group variable: id				Number of groups		= 16
R-sq	within	= 0.0000		Obs per group:	min	= 10
	Between	= 0.8724			avg	= 10.0
	Overall	= 0.5534			max	= 10
				Wald chi2 (9)		= 57.36
Corr(u_i, X)		= 0 (assumed)		Prob> chi 2		= 0.0000
FDIIF	Coef.	Std. Err	T	P>|t|	[95% Conf.	Interval]
COR	10.20837	19.56865	0.52	0.602	-28.14548	48.56222
VAA	.0223153	15.77427	0.00	0.999	-30.89468	30.93931
MS	-125.4693	221.4905	-0.57	0.571	-559.5828	308.6441
GDPG	23.32838	29.02826	0.80	0.422	-33.56597	80.22273
POP	38.44309	8.436417	4.56	0.000	21.90802	54.97816
INF	3.418969	4.325387	0.79	0.429	-5.058634	11.89657
NR	30.94755	12.61089	2.45	0.014	6.230666	55.66444
EXR	.1839344	.0959402	1.92	0.055	-.0041049	.3719736
RIR	-8.801517	17.40218	-0.51	0.613	-42.90916	25.30613
_cons	-270.1546	2129.318	-0.13	0.899	-4443.541	3903.232
sigma_u	491.32817					
sigma_e	1003.4718					
Rho	.19337654	(fraction of variance due to u_i)				

Source: *Authors' summary of random-effects GLS regression results*

Table 4: Fixed-effects within regression

Fixed-effects (within) regression				Number of obs		= 160
Group variable: id				Number of groups		= 16
R-sq	within	= 0.4199		Obs per group:	min	= 10
	Between	= 0.8329			avg	= 10.0
	Overall	= 0.4954			max	= 10
				F(9, 135)		= 10.86
Corr(u_i, Xb)		= -0.9927		Prob> F		= 0.0000
FDIIF	Coef.	Std. Err	t	P>|t|	[95% Conf.	Interval]
COR	59.34803	31.55464	1.88	0.062	-3.057336	121.7534
VAA	29.83357	23.76109	1.26	0.211	-17.15855	76.82569
MS	562.5424	479.1977	1.17	0.242	-385.1631	1510.248
GDPG	-7.583466	22.43534	-0.34	0.736	-51.95367	36.78674
POP	-215.8441	26.31506	-8.20	0.000	-267.8872	-163.8011
INF	2.263025	3.444364	0.66	0.512	-4.548867	9.074917
NR	14.09113	12.27125	1.15	0.253	-10.17763	38.35989
EXR	.0456501	.1242388	0.37	0.714	-.2000561	.2913563
RIR	14.09113	12.27125	1.15	0.253	-10.17763	38.35989
_cons	-3707.286	4180.007	-0.89	0.377	-11974.05	4559.482
sigma_u	9926.5996					
sigma_e	1003.4718					
Rho	.98988435	(fraction of variance due to u_i)				
F test that all u_i=0:		F(15, 135)	=	10.92		Prob> F = 0.0000

Modified Wald test for groupwiseheteroscedasticity in fixed-effect regression model
Ho: sigma (i)^2 = sigma^2 for all i
Chi2 (16) = 10948.53
Prob>chi2 = 0.0000

Source: *Authors' summary of fixed-effects within regression results*

Table 5: Hausman specification test

	Coefficients			
	(b)	(B)	(b-B)	Sqrt(diag(V_b-V_B))
	Fe	Re	Difference	SE
COR	59.34803	10.20837	49.13966	24.75405
VAA	29.83357	.0223153	29.81125	17.76969
MS	562.5424	-125.4693	688.0117	424.9381
GDPG	-7.583466	23.32838	-30.91185	.
POP	-215.8441	38.44309	-254.2872	24.92607
INF	2.263025	3.418969	-1.155945	.
NR	14.09113	30.94755	-16.85643	.
EXR	.0456501	.1839344	-.1382843	. 0789352
RIR	14.09113	-8.801517	24.34673	.

b = consistent under Ho and Ha
B = inconsistent under Ha. Efficient under Ho
Test: Ho difference in coefficients not systematic
chi2 (9) = 115.29; Prob>chi2 = 0.0000

Source: *Authors' summary of Hausman specification test*

Table 6: Summary of descriptive statistics

Variable	Mean ($\bar{x}$)	Std. Dev. (σ)	Minimum	Maximum
FDIIF	873.86	2095.39	-38	20279
COR	38.25	10.24	19	69
VAA	41.59	11.70	21	70
MS	33963.09	99124.45	827	568499
GDPG	4.6	3.85	-21	21
POP	20.64	39.82	0.49	195.88
INF	113.83	28.06	0	232.26
NR	14.37	12.48	0	57.37
EXR	898.83	1817.48	0	8959.72
RIR	3.56	7.27	-42.31	24.5

Source: *Authors' summary of descriptive statistics*

Table 7: Correlation matrix

		1	2	3	4	5	6	7	8	9	10
1	***FDIIF***	1.00									
2	***COR***	-.23**	1.00								
		.00									
3	***VAA***	-.02	-.19*	1.00							
		.98	***.02***								
4	***MS***	.61**	-.24**	.08	1.00						
		.00	***.00***	***.32***							
5	***GDPG***	.04	-.01	.08	-.015	1.00					
		.65	***.95***	***.33***	***.95***						
6	***POP***	.70**	-.25**	.13	.96**	.02	1.00				
		.00	***.00***	***.11***	***.00***	***.84***					
7	***INF***	.10	-.06	-.08	.04	-.01	.04	1.00			
		.20	***.44***	***.32***	***.59***	***.94***	***.64***				
8	***NR***	.08	-.30**	-.18*	-.08	.07	-.09	.17*	1.00		
		.30	***.00***	***.03***	***.33***	***.39***	***.28***	***.04***			
9	***EXR***	.15	-.11	-.11	-.11	.02	-.11	.16*	.07	1.00	
		.06	***.17***	***.15***	***.16***	***.82***	***.16***	***.04***	***.37***		
10	***RIR***	.01	.20**	-.02	.01	-.08	-.01	.10	-.04	-.01	1.00
		.92	***.01***	***.83***	***.90***	***.33***	***.93***	***.23***	***.61***	***0.86***	

*****Correlation is significant at 0.01; *Correlation is significant at 0.05 (2-tailed)***

Source: *Authors' summary of correlation results*

Table 8: Linear regression, correlated panels corrected standard errors

Fixed-effects (within) regression				Number of obs		= 160
Group variable:	Id			Number of groups		= 16
Time variable:	Year			Obs per group:	Min	= 10
Panels:	correlated (balanced)				Avg	= 10.0
Autocorrelation	no autocorrelation				Max	= 10
				R-squared		= 0.5691
				Wald chi2 (9)		= 185.51
				Prob> chi2		= 0.0000
FDIIF	Coef.	Std. Err	z	P>|z|	[95% Conf.	Interval]
COR	2.937136	9.026919	0.33	0.745	-14.7553	20.62957
VAA	-8.677024	3.914525	-2.22	0.027	-16.34935	-1.004697
MS	-253.4763	143.3883	-1.77	0.077	-534.5121	27.55958
GDPG	21.00967	25.20436	0.83	0.405	-28.38997	70.4093
POP	46.53342	12.3047	3.78	0.000	22.41665	70.65019
INF	.6790315	3.202194	0.21	0.832	-5.597153	6.955216
NR	17.32483	6.884661	2.52	0.012	3.831141	30.81852
EXR	.2558249	.0330782	7.73	0.000	.1909928	.3206569
RIR	-5.514795	38.34862	-0.14	0.886	-80.67671	69.64711
_cons	1783.152	1144.678	1.56	0.119	-460.375	4026.679

Source: *Authors' summary of linear regression, correlated panels corrected standard errors*