

The long-term response of FDI to insecurity and corruption: evidence from Nigeria

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Abstract

Nigeria is undoubtedly faced with unstable inflows of FDI at the present time, and that country has continued to contend with rising insecurity and a relatively high level of corruption. We employ the DOLS and ARDL estimation techniques to explore the long-term response of FDI to both insecurity and corruption using quarterly data from Nigeria over the period 1996-2020. A long-term relationship was found amongst insecurity, FDI and corruption (alongside market size, the presence of natural resources, inflation, and exchange rate) based on the bounds testing approach to cointegration. The results point to a long-term significant and positive influence of lower corruption and higher security on FDI. Also, the size of the market, the presence of natural resources and depreciation of the domestic currency have a long-run significant positive influence on inbound FDI, while inflation has a long-term significant and decreasing influence on FDI. Thus, policymakers and government are advised to employ measures to reduce both insecurity and corruption to encourage the inflow of FDI over the long term.

Key words

FDI, insecurity, corruption, Nigeria

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Introduction

The literature suggests that attracting FDI is crucial for economies in developing regions, including Nigeria. Promoting inward FDI is one way that countries with poor savings, investment, and sluggish per capita growth can escape the low-equilibrium

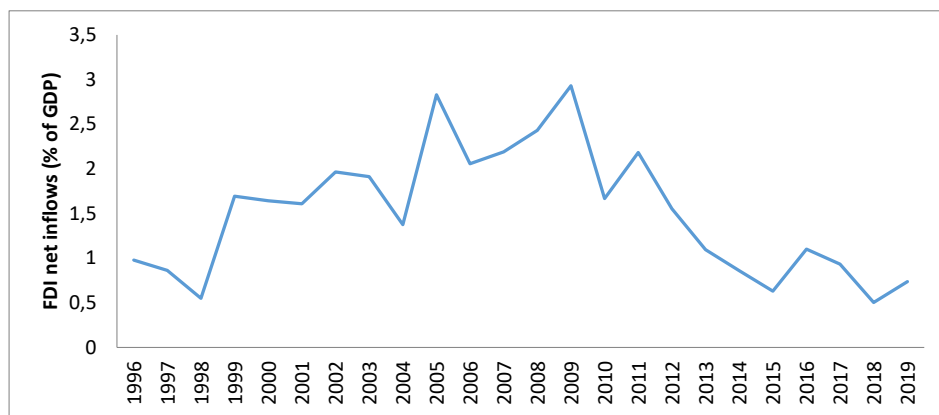
trap (Hayami, 2001). Some of the economic benefits which accrue from FDI to the receiving/host country are capital for domestic investment, foreign exchange earnings, job creation, international competitiveness, improvement in managerial skills,

transfer of technology, and increased access to foreign markets (Brooks and Sumulong, 2003; Crespo and Fontura, 2007; Nurudeen et al., 2011; Wafure and Nurudeen, 2010). Acknowledging the importance of foreign investment, various Nigerian governments took steps to woo FDI with the ultimate goal of achieving high levels of economic growth and development. Some of the steps taken included the creation of the Nigerian Investment Promotion Commission, the deregulation of the economy, the signing of an agreement relating to Bilateral Investment Treaties (BITs) during the 1990s, and the adoption of industrial policy in the 1980s. Others were the establishment of Export Processing Zones, the promotion of macro-economic stabilisation and political stability, and privatisation and trade liberalisation. In addition, since 2017, Nigeria's government

has been making efforts to lower bureaucratic barriers that are inimical to the growth of investment, and promoting the ease with which business can be done.

Despite the measures by governments taken over time to attract foreign investment, the available evidence suggests that inward FDI has remained largely low. In particular, statistics from the World Bank (i.e. World Development Indicators (WDI)) indicates that FDI net inflows (% in GDP) to Nigeria declined and fluctuated between 1996 and 2020. From 0.97% in 1996, FDI declined to 0.54% in 1998 before rising to 1.96% in 2002. Although the share of FDI in GDP dropped to 1.37% in 2004, it increased to 2.82% in 2005 and further to 2.93% in 2009. The fluctuation in FDI continued as its value declined to 1.66% in 2010, 1.09% in 2016 and 0.73% in 2019 (Figure 1).

Figure 1. Plots of FDI net inflows to Nigeria



Source: own elaboration based on data gathered from the WDI

Apart from the low inflow of FDI, Nigeria is confronted with two main problems (i.e. corruption and insecurity) which the government in power promised to address during their campaign and the inauguration of the incumbent President Muhammadu Buhari. Corruption is a serious challenge faced by the Nigerian state, and the creation of anti-graft bodies such as the ICPC and EFCC has done little to lower the level of corruption

in the nation (Abu and Karim, 2021; Abu and Staniewski, 2019, 2021). In fact, Transparency International (TI) continues to rank Nigeria highly in the rankings of corrupt nations using its index of perceived corruption (CPI). For example, the information in Table 1 indicates that the CPI of Nigeria has remained very low, not having reached or exceeded an average of 50 out of a maximum of 100 during the period under study.

Table 1. Corruption perception index (CPI) for Nigeria

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
CPI	27	25	27	26	28	27	27	26	25

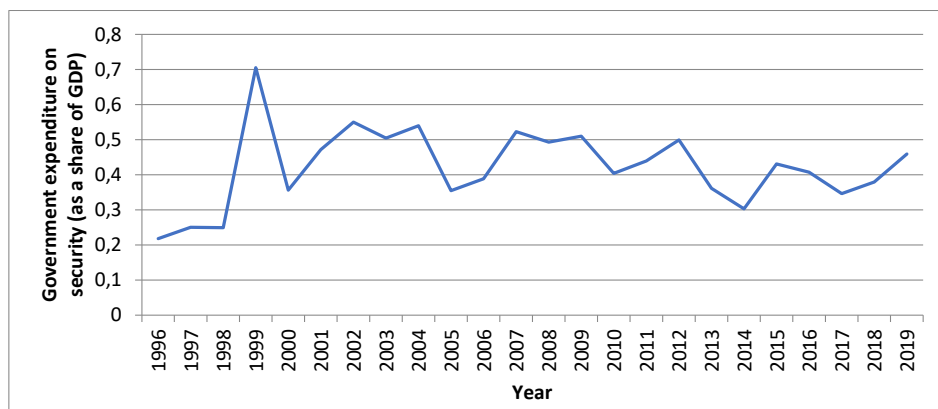
Source: Transparency International, 2020

Thus, Nigeria is not only perceived to be very corrupt; it has also been less successful in attracting FDI. This assertion coincides with the view put forward by certain authors that nations considered more corrupt attract lower FDI (Egger and Winner, 2005; Habib and Zurawicki, 2001, 2002; Tanzi, 1988; Wei, 2000).

In addition, Nigeria is witnessing rising insecurity in the form of insurgency, banditry, kidnapping, and cattle rustling, among others. Boko Haram insurgents have established themselves in the North East region of Nigeria, while bandits and cattle rustlers are terrorising the populace and causing mayhem in the North West. In addition, kidnappings are reported daily across the nation, and police posts/stations and government institutions have come under attack by unknown gunmen, mostly in the South East of the country. The oil rich Niger Delta region has had its fair share of insecurity as it experiences cultist activities and destruction and/or the occasional vandalism of petroleum pipelines, while conflicts among herders and farmers are reported almost daily in most parts of Nigeria. These activities have led to deaths, the displacement of many people from their means of livelihood and the destruction of physical

assets, resulting in fear and a rising level of risk/uncertainty associated with investments in the economy.

Unfortunately, most investors (whether local or foreign) will not risk investing in an environment not considered secure because their ultimate goal is obtaining high returns and a safe environment for their investment (Achumba et al., 2013; Ewetan and Urhie, 2014; Ifeoma et al., 2015; Olusegun, 2016). It has also been suggested that conflicts raise the level of uncertainty, which in turn reduces aggregate domestic investment and foreign capital (Busse and Hefeker, 2007). Rising insecurity has been blamed for falling domestic investment and industrialisation levels, declining inward FDI, and poor economic performance in Nigeria (Achumba et al., 2013; Ewetan and Urhie, 2014; Ifeoma et al., 2015; Purity and Anigbuogu, 2019). To check the rising insecurity and ensure that Nigeria is safe, the Federal Government (FG) has been allocating funds annually to equip and strengthen the police, military and other security personnel. However, the available information from the Central Bank of Nigeria (CBN) shows that the FG security votes (as a share of GDP) exhibited an unstable trend or movement during the period 1996-2019 (Figure 2).

Figure 2. Plots of government expenditure on security in Nigeria

Source: own elaboration based on data gathered from the CBN

The fluctuations and occasional declines in funds allocated to curbing insecurity may partly be responsible for rising insecurity in Nigeria. A steady rise of security votes is what is expected because higher funding facilitates the procurement of modern equipment and the recruitment of security personnel, among other things, leading to greater internal security. However, instability in security votes suggests a lack of commitment on the part of the government, inadequate equipment and security personnel and related items required to tackle insecurity, and consequently the promotion of insecurity.

Whereas the relationship between corruption and FDI has attracted the interest of researchers elsewhere, less attention has been paid to the empirical association between the variables in Nigeria. Only Zangina and Hassan (2020) have taken steps to explore the links between FDI and corruption, discovering that reducing corruption levels positively impacts FDI. The efforts of these authors notwithstanding, we are of the view that the literature can be extended by improving on their study in some ways. Firstly, our research considers insecurity, which Zangina and Hassan (2020) did not include in their analysis. Secondly, the quarterly data on Nigeria used in our research

makes it easier to obtain substantial observations ($n=88$) for analysis compared to that of Zangina and Hassan's 35 observations; hence, the possibility of generating better results. Thirdly, unlike the work of Zangina and Hassan, our study accommodates an additional control variable (i.e. exchange rate) which has been reported to be a core driver of inward FDI in Nigeria (Nurudeen et al., 2011; Wafure and Nurudeen, 2010). Lastly, both the ARDL approach and DOLS estimator (an alternative cointegration analysis technique) are employed for the purpose of ascertaining consistency including the robustness of generated results.

Thus, the main objective of this research is to explore the impact of both corruption and insecurity on FDI over the long term in Nigeria. Following the introduction, the second part reviews the relevant empirical literature. The third part contains the theoretical framework, the model, data and econometric techniques. The fourth part dwells on results and its discussion. The conclusion comes last.

1. Literature review

Several scholars have assessed the FDI-corruption connection using different techniques of estimation, but research on the

FDI-insecurity nexus is virtually non-existent for Nigeria. Also, studies on the FDI-corruption relationship focused more on the group of nations. Bénassy-Quéré et al. (2007) employed a panel regression estimator to explore the impact of institutional quality on bilateral FDI across economies. The findings suggest that corruption control has a strong and increasing impact on bilateral FDI. Similarly, Busse and Hefeker (2007) analysed the connections among institutions, political risks and FDI flows to 83 developing nations from 1984 to 2003 using fixed effects and the GMM estimators. The authors found that corruption (alongside other variables) is a strong predictor of FDI inflows. Furthermore, Dumludag (2009) attempted to validate the perception that institutional factors are important influencers of FDI inflows using a questionnaire administered to executives of 52 MNCs which operated in the Turkish economy during 2006, illustrating that less corruption promotes inward FDI.

Daude and Stein (2007) evaluated the institutional quality-FDI relationship for 152 countries adopting several estimation methods. Overall, institutions appear to have an increasing influence on FDI, but corruption does not. Also, Egger and Winner (2005) evaluated the influence of corruption on inward FDI in a group comprised of 73 countries for the period 1995-1999, using various estimation methods. Corruption was shown to impact inward FDI in both the short- and long term.

Habib and Zurawicki (2002) explored the influence of corruption on FDI in 89 countries. The Probit and OLS estimates imply that corruption deters foreign investment. Similarly, Habib and Zurawicki (2001) used the OLS to analyse the impact of corruption on local investment and foreign investment in 111 economies during the period 1994-1998, and reported that corruption impacts both forms of investments negatively. Also, the impact of corruption is higher on

foreign investment compared to local direct investment.

Mathur and Singh (2013) analysed the FDI-corruption-democracy relationships in 29 countries from 1980 to 2000. The empirical evidence illustrates that rising corruption discourages foreign investment. Furthermore, Jiménez (2011) used the GMM technique to investigate FDI-political risk linkage in a cross-country study over the period 1999-2006. Corruption turned out to be significant in explaining FDI.

Pajunen (2008) used fuzzy-set analysis to assess the effect of institutions on FDI for 47 economies during the period 1999-2003. The results imply that corruption (one of the components of institutions) is significantly related to FDI. Also, Voyer and Beamish (2004) examined the response of Japanese FDI to the level of corruption for 59 countries with a primary focus on 29,546 investments using the OLS method. They found corruption to have negatively impacted FDI. Moreover, Wei (2000) assessed the influence of corruption on FDI for 45 countries using the OLS and modified Tobit method. The results suggest that rising levels of corruption reduce foreign investment.

Certain studies reported that corruption may not be harmful to FDI. For example, Kolstad and Villanger (2004) discovered an insignificant influence of corruption on foreign investment in LDCs during the period 1989-2000, while Jensen (2003) found a similar outcome. Also, Ali et al. (2010) employed the random effects estimator to explore the institutional (inclusive of corruption) effect on FDI in a sample of 69 economies during the period 1981-2005. The results reveal that institutions do not have a strong influence on FDI in the primary sector, while it is crucial for FDI flow to services and manufacturing sectors. Using the individual component of institutions, corruption was not found to be a strong predictor of FDI.

In Nigeria, authors have shown less interest in the FDI-corruption relationship.

Interestingly, a study by Zangina and Hassan (2020) concluded that rising corruption negatively impacts FDI. Our research adds to the literature by including insecurity (which has become a common feature of the economy) as a potential factor that can affect FDI flows to Nigeria. In addition, quarterly data was used, which makes it easier to gather more observations (i.e. $n=88$). Finally, we apply two estimators (i.e. ARDL and DOLS) to explore the corruption-insecurity-FDI relationship, thus providing an avenue to check the robustness and consistency of the generated results.

2. Methodology

2.1. Theoretical framework

Theoretically, the influence of corruption on inward FDI can be explained via two main opposing views - namely the “grabbing hand” and “helping hand” hypotheses of corruption. Firstly, viewed from the angle of the “grabbing hand”, corruption in the host nation is considered an additional cost to MNCs (which can negatively impact their expected profits), and therefore deters prospective investors from investing in highly corrupt nations (Egger and Winner, 2005). Also, since corruption is seen to be morally wrong and acts as an arbitrary tax on investment, foreign investors tend to move away from countries where the level of corruption is high to nations that have been able to push corruption to very low levels (Habib and Zurawicki, 2001, 2002; Tanzi, 1988; Wei, 2000).

By contrast, aligning with the “helping hand” hypothesis proposed by Leff (1964)

and further echoed by Huntington (1968) and Lui (1985), authors such as Egger and Winner (2005) opined that corruption can promote or boost inward FDI to a country. They suggested that strict regulations including other administrative controls (which hinder investment growth) can be bypassed via corruption (for example, giving bribes to government officials), and therefore boost inward FDI to a country. Thus, corruption level (COC) in the host country can either foster or discourage FDI inflow (FDI).

Moreover, insecurity (INS) can have a lasting influence on FDI inflow. It has been claimed that MNCs are wary of both internal and external factors such as conflicts which affect the receiving country, as these factors can encourage political and economic instability (Busse and Hefeker, 2007). The authors further opined that conflicts raise the level of uncertainty, which in turn reduces aggregate domestic investment and foreign capital. Consistent with this view is the argument that capital flow can be influenced by the level of national or global risk/uncertainty (Jardet et al., 2022; Koepke, 2019). Additionally, scholars have emphasised that insecurity deters both domestic and foreign investment in Nigeria, because investors not only seek high returns on their investments but also prefer environments where these investments are safe (Achumba et al., 2013; Ewetan and Urhie, 2014; Ifeoma et al., 2015; Olusegun, 2016; Purity and Anigbuogu, 2019).

From the above, it can be posited that both corruption (COC) and insecurity (INS) tend to affect FDI. Therefore, we specify the FDI model as follows:

$$FDI_t = \beta_0 + \beta_1 COC_t + \beta_2 INS_t + \varepsilon_t \quad (1)$$

Beside the two interest variables (i.e. COC and INS), the size of the market of the receiving nation measured by GDP per capita (GDPC) can also influence inward FDI. Large market size signals high purchasing power and consumption potential for goods

or services by the residents of the host country, leading to the attraction of FDI which is market-seeking (Ali et al., 2010; Asiedu, 2002; Habib and Zurawicki, 2001, 2002).

In addition, inflation (a measurement of economic instability), for which the

consumer price index (CPI) acts as a proxy, can dictate FDI flows. Reducing inflation lessens uncertainty and raises the confidence of investors in the recipient economy, leading to higher inward FDI (Ali et al., 2010; Asiedu, 2002). Also, at high and unpredictable levels, inflation distorts information regarding market prices including incentive structure, thereby negatively impacting FDI (Obwona, 2001). Furthermore, rising inflation signals domestic economic issues including the inability and/or unwillingness of the monetary authority to achieve a balanced budget and/or restrict money supply (Schneider and Frey, 1985), all of which have the potential to discourage inward FDI.

Moreover, the presence of natural resources (NATUR) is likely to help an

economy to attract a high amount of FDI (Jensen, 2003; Zangina and Hassan, 2020). Significant deposits of resources such as minerals, fuel, gas and so on can encourage resource-seeking FDI to Nigeria.

Another potential driver of FDI is the exchange rate (EXC). For example, the depreciation of the host country's currency may increase FDI inflows because MNCs can easily acquire or merge with domestic companies in the receiving nation (Masayuki and Ivohasina, 2005; Wafure and Nurudeen, 2010). Also, Goldberg and Kolstad (1994) stated that exchange rate instability can hurt FDI. Yet, some studies have claimed that the impact of the exchange rate on FDI flows is ambiguous (Bénassy-Quéré et al., 2001). Considering the possible influence of all these factors, the FDI model is rewritten as:

$$\text{LOGFDI}_t = \beta_0 + \beta_1 \text{COC}_t + \beta_2 \text{LOGINS}_t + \beta_3 \text{LOGGDPC}_t + \beta_4 \text{LOGCPI}_t + \beta_5 \text{NATUR}_t + \beta_6 \text{LOGEXC}_t + \varepsilon_t \quad (2)$$

where LOG represents the logarithm. We use LOGFDI and LOGGDPC in line with related research (Brada et al., 2006; Busse and Hefeker, 2007; Egger and Winner, 2005; Mathur and Singh, 2013).

Based on the reviewed literature, we formulate the following null hypotheses:

H₁: There is no significant relationship between corruption and FDI in the long term

H₂: There is no significant relationship between insecurity and FDI in the long term

2.2. Data and econometric techniques

In conducting this research, we faced a major constraint, namely the unavailability of certain data for a substantial number of the years needed to analyse annual data (i.e. $n > 30$ or above). For instance, Governance Indicators data on corruption control used in this study are available from 1996 only, and the data on government spending on

internal security (a proxy for insecurity) from 1994. However, data for other (control) variables are readily accessible for a relatively longer period. The problem was addressed by the interpolation procedure laid out by Gandolfo (1981) which converts annual data (from 1996 to 2020) into quarterly data. Thus, we are left with larger observations (i.e. $n=88$ from January 1997 to April 2019) for analysis. During the interpolation process, the start year and the end year of the original data (i.e. 1996 and 2020) were eliminated. The procedure has been applied in prior and recent studies (Abu and Karim, 2021; Abu et al., 2019, 2021; Baharumshah and Rashid, 1999; Baharumshah et al., 2006). Smith (1998), cited in Abu et al. (2019) and Abu and Karim (2021), reported that series which are interpolated do not cause bias in the estimates generated even if the samples are small.

The data for the variables were derived from the WDI and Governance Indicators (GI) of the World Bank and the CBN. Specifically, the data on COC was gathered

from the GI and the data on INS from the CBN. The data on FDI, GDPC, CPI, NATUR and EXC were derived from the WDI.

COC ranges from -2.5 to +2.5, and a higher value indicates greater control over corruption (i.e. lesser corruption) and vice versa. INS is measured by Nigeria's FG spending on internal security converted from Naira to USD. The higher the level of government expenditure on internal security, the lower the level of insecurity (i.e. greater level of internal security), and vice versa. FDI is the net inflow of FDI in USD. GDPC is captured by the real GDP per capita in USD. INF is proxied by the index of consumer price. NATUR

is measured by the percentage share of aggregate natural resource rents in GDP. Lastly, EXC is the rate of conversion of the local currency (i.e., Naira) to USD.

2.3. Unit root test

A major requirement of time series is that they are stationary before their inclusion in regression analysis. This lessens any chance of the generation of misleading results. Hence, two unit root tests - Dickey and Fuller's (1979) ADF test and Phillips and Perron's (1988) PP test - were applied to evaluate the stationarity status of the variables. The ADF equation is:

$$\Delta y_t = a + \rho y_{t-1} + \theta_1 \Delta y_{t-1} + \dots + \theta_k \Delta y_{t-k} + \varepsilon_t$$

y_t is the series, and the disturbance term. This equation is used to test the null hypothesis:

$H_0: \rho = 0$ (the series does have a unit root)

Versus an alternative hypothesis:

$H_1: \rho < 0$ (the series does not have a unit root)

To serve as a complementary test, the PP test is also employed. Where the PP/ADF statistic falls below the critical values of 10%, 5% or 1%, we will not reject H_0 . Conversely, if the PP/ADF statistic is above any one of these values, we would reject H_0 .

2.4. ARDL estimation technique

In evaluating the FDI impact of insecurity and corruption, we apply the ARDL estimation approach of Pesaran and Shin (1999) and Pesaran et al. (2001). This technique is flexible as it can be used whether the series under investigation is $[I(1)]$ or a mixture of $[I(1)]$ and $[I(0)]$. The technique is superior to the commonly used methods of cointegration of Engle and Granger (1987), Johansen (1988, 1991) and Johansen and Juselius (1990). The merits of ARDL have been advanced by several authors (Abu, 2017, 2019; Abu and Gamal, 2020; Abu and Staniewski, 2019).

Thus, the model ($p, k_1, k_2, k_3, k_4, k_5, k_6$) to be estimated is:

$$\begin{aligned} \Delta LOGFDI_t = & \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta LOGFDI_{t-i} + \sum_{i=0}^{k_1} \beta_{2i} \Delta COC_{t-i} + \sum_{i=0}^{k_2} \beta_{3i} \Delta LOGINS_{t-i} \\ & + \sum_{i=0}^{k_3} \beta_{4i} \Delta LOGGDPC_{t-i} + \sum_{i=0}^{k_4} \beta_{5i} \Delta LOGCPI_{t-i} + \sum_{i=0}^{k_5} \beta_{6i} \Delta NATUR_{t-i} \\ & + \sum_{i=0}^{k_6} \beta_{7i} \Delta LOGEXC_{t-i} + \delta_1 LOGFDI_{t-1} + \delta_2 COC_{t-1} + \delta_3 LOGINS_{t-1} \\ & + \delta_4 LOGGDPC_{t-1} + \delta_5 LOGCPI_{t-1} + \delta_6 NATUR_{t-1} + \delta_7 LOGEXC_{t-1} \\ & + \varepsilon_t \end{aligned} \quad (3)$$

The steps adopted in the execution of the ARDL process include conducting the bounds test for H_0 that no cointegration exists against H_1 that cointegration exists

amongst the variables under examination. The following equations are tested to achieve this objective:

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0, \text{ and } H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq 0$$

To determine whether cointegration exists, the Wald restriction test (which uses the F-statistic) is adopted to test the joint significance of the variables' coefficients. Next, the computed F-statistic is compared with upper-bound $[I(1)]$ and lower-bound $[I(0)]$ values. Where the F-statistic computed is higher than $[I(1)]$, H_0 is rejected. By contrast,

if the F-statistic computed is smaller than $[I(0)]$, H_0 is not rejected. Lastly, should the F-statistic fall between the two extremes, then no conclusion will be drawn.

After confirmation of cointegration, the long-run coefficients can be estimated via the model:

$$LOGFDI_t = \theta_0 + \theta_1 COC_t + \theta_2 LOGINS_t + \theta_3 LOGGDP_t + \theta_4 LOGCPI_t + \theta_5 NATUR_t + \theta_6 LOGEXC_t + \varepsilon_t \quad (4)$$

Also, the short-run coefficients can be estimated via the model:

$$\begin{aligned} \Delta LOGFDI_t = & \alpha_0 + \sum_{i=0}^p \alpha_{1i} \Delta LOGFDI_{t-i} + \sum_{i=0}^{k_1} \alpha_{2i} \Delta COC_{t-i} + \sum_{i=0}^{k_2} \alpha_{3i} \Delta LOGINS_{t-i} \\ & + \sum_{i=0}^{k_3} \alpha_{4i} \Delta LOGGDP_{t-i} + \sum_{i=0}^{k_4} \alpha_{5i} \Delta LOGCPI_{t-i} + \sum_{i=0}^{k_5} \alpha_{6i} \Delta NATUR_{t-i} \\ & + \sum_{i=0}^{k_6} \alpha_{7i} \Delta LOGEXC_{t-i} + \psi_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (5)$$

The coefficient (ψ) of the error-correction term that is lagged by a period (ECT_{t-1}) represents the adjustment speed needed to restore long-run equilibrium following a shock in the short term.

2.5. Diagnostic tests

After the estimation exercise, the conventional diagnostic/post-estimation tests are carried out to ensure that the results are not invalid. These tests are applied to see if residuals are homoscedastic and serially correlated, including checking if the model that has been estimated is specified correctly.

2.6. Stability test

The estimated ARDL model and parameters are subject to a stability test to determine

whether or not they are stable in the long term. This objective is achieved by the use of the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMQ) tests. If the CUSUMQ plots break outside the lower/upper bound, the parameters and model that have been estimated will be considered unstable (Green, 2003).

2.7. DOLS estimation technique

An alternative cointegration method, the DOLS estimator, is also employed to analyse the corruption-insecurity-FDI relationship. The use of the method allows one to check the robustness and consistency of the estimated results. The DOLS technique (Saikkonen, 1992; Stock and Watson, 1993)

estimates the long-term relationship. As with the ARDL method, the DOLS solves the problem of endogeneity bias, and it also provides more efficient results in finite samples (Alhassan and Fiador, 2014; Montalvo, 1995; Narayan and Narayan, 2004; Singh, 2015; Stock and Watson, 1993). The DOLS model is specified as:

$$Y_t = \alpha + \beta X_t + \sum_{j=-q}^q \theta_j \Delta X_{t-j} + \varepsilon_t$$

Y is the dependent/response variable ($LOGFDI$) and represents COC , $LOGINS$, $LOGGDPC$, $LOGCPI$, $NATUR$ and $LOGEXC$. q is lags and leads which are chosen via the AIC selection criterion.

3. Discussion of results

3.1. Results of the unit root test

The results (in Table 2) illustrate that variables such as $NATUR$ and $LOGEXC$ have no

unit root. However, $LOGFDI$, COC , $LOGINS$, $LOGGDPC$, $LOGCPI$ and are stationary at first difference.

Table 2. Results of the unit root test

Variable	ADF		PP	
	Level	1 st diff.	Level	1 st diff.
<i>LOGFDI</i>	-2.26	-5.22***	-2.06	-7.85***
<i>COC</i>	-1.67	-4.52***	-2.99**	—
<i>LOGINS</i>	-1.57	-4.07***	-1.15	-6.05***
<i>LOGGDPC</i>	-1.51	-4.51***	-2.29	-10.85
<i>LOGCPI</i>	-1.43	-5.58***	-1.20	-3.07**
<i>NATUR</i>	-3.30**	—	-3.29**	—
<i>LOGEXC</i>	-3.04**	—	-2.07*	—

*, ** and *** indicates the rejection of H_0 (no unit root) at 10%, 5%, and 1%, respectively.

Source: own elaboration

Hence, the variables are a mixture of $I(1)$ and $I(0)$, and the ARDL bounds testing approach to cointegration can be applied.

3.2. Results of ARDL bounds test for cointegration

The result (in Table 3) reveals that the F-statistic (i.e. 3.72) is above the upper bound (i.e. 3.28) at 5%. Thus, $LOGFDI$, COC , $LOGINS$, $LOGGDPC$, $LOGCPI$, $NATUR$ and $LOGEXC$ have a long-term relationship.

Table 3. Results of the bounds test for cointegration

Function = $f(\text{LOGFDI}/\text{COC}, \text{LOGINS}, \text{LOGGDPC}, \text{LOGCPI}, \text{NATUR}, \text{LOGEXC})$		
Critical value bounds		
F-statistic = 3.72**	I(0)	I(1)
10%	1.99	2.94
5%	2.27	3.28
1%	2.88	3.99

** indicates the rejection of H_0 (no cointegration) at 5%.

Source: own elaboration

3.3. Results of ARDL model estimation

The results (Table 4) indicate that COC has a positive and strong relationship with LOGFDI. An increase in COC (reducing corruption) by 1 point raises LOGFDI by 2.61% at 1%. Therefore, if the level of corruption is reduced by one unit, it will lead to an increase in FDI inflow to Nigeria by 2.61% over the long term. In addition, reducing insecurity (LOGINS) has a positive and significant relationship with LOGFDI. A reduction in LOGINS by 1% causes LOGFDI to increase by 0.48% at 10%. This indicates that raising internal security by 1% will result in an increase in inward FDI by 0.48% in the long-term. Furthermore, market size (LOGGDPC) has a significant and increasing impact on LOGFDI. An increase in LOGGDPC by 1% leads LOGFDI to increase by 5.51% at 1%. Thus, if market size

is increased by 1%, it will boost FDI inflow to Nigeria by 5.51% over the long-term.

Inflation (LOGCPI) has a reductive and strong influence on LOGFDI. An increase in LOGCPI by 1% reduces LOGFDI by 1.92% at 1%. The finding reveals that increasing inflation by 1% will lower inflow of FDI by 1.92% over the long-term. Also, the presence of natural resources (NATUR) is positive and significantly associated with LOGFDI. A percentage increase in NATUR leads to an 0.11% increase in LOGFDI at 1%. This means that a 1% increase in natural resources causes inward FDI to rise by 0.11% in the long run. Furthermore, the exchange rate (LOGEXC) has a strong and increasing effect on LOGFDI. An increase in LOGEXC by 1% increases LOGFDI by 1.09% at 1%. The finding shows that if the domestic currency (Naira) depreciates by 1%, it will lead to an increase in the inflow of FDI by 1.09% in the long run.

Table 4. Results of estimation of the ARDL model (lag length selected by AIC is 3,0,2,0,4,3,2). (D.V = ΔLOGFDI)

Short-run coefficients			Long-run coefficients		
Regressor	Coeff./Se	p-value	Regressor	Coeff./Se	p-value
$\Delta \text{LOGFDI}_{-1}$	0.50*** [0.08]	0.00	Constant	-8.95*** [1.43]	0.00
$\Delta \text{LOGFDI}_{-2}$	0.12* [0.07]	0.08		2.61*** [0.68]	0.00
ΔLOGINS	-0.36** [0.15]	0.01		0.48* [0.27]	0.08
$\Delta \text{LOGINS}_{-1}$	0.33** [0.16]	0.04		5.51*** [1.05]	0.00
ΔLOGCPI	0.99** [0.38]	0.01		-1.92*** [0.27]	0.00
$\Delta \text{LOGCPI}_{-1}$	-1.43*** [0.47]	0.00		0.11*** [0.02]	0.00
$\Delta \text{LOGCPI}_{-2}$	0.50 [0.40]	0.22		1.09*** [0.17]	0.00
$\Delta \text{LOGCPI}_{-3}$	2.37*** [0.48]	0.00			
ΔNATUR	0.01 [0.01]	0.18			
ΔNATUR_{-1}	-0.01 [0.01]	0.22			
$\Delta \text{LOGCPI}_{-2}$	-0.02* [0.01]	0.06			
ΔLOGEXC	0.83*** [0.07]	0.00			
$\Delta \text{LOGEXC}_{-1}$	-0.29*** [0.09]	0.00			
ECT_{-1}	-0.27*** [0.04]	0.00			
$R^2 = 0.99$					
Diagnostic tests results					
Serial Correlation: $\chi^2 = 3.87$		0.14			
Heteroscedasticity: $\chi^2 = 22.90$		0.29			
Ramsey RESET Test: F-stat = 0.51		0.47			

Values in () are standard errors. *, **, and *** indicates significance at 10%, 5%, and 1%, respectively. Δ is the first difference operator.

Source: own elaboration

The short-run results (Table 4) reveal that LOGINS has an increasing and strong impact on LOGFDI. A 1% increase in LOGINS lagged by one period causes LOGFDI to increase by 0.33% at 5%. This demonstrates that inward FDI is increased by 0.33% if internal security in the previous year rises by 1%. However, LOGCPI has a decreasing and strong impact on LOGFDI. An increase in LOGCPI lagged by one period by 1% reduces LOGFDI by 1.43% at 1%. The finding illustrates that FDI inflow is reduced by 1.43% if inflation in the previous year increased by 1%. However, LOGEXC has an increasing and strong influence on LOGFDI. A 1% increase

in LOGEXC leads to a 0.83% increase in LOGFDI at 1%. This suggests that FDI inflow increases by 0.83% following depreciation of the domestic currency by 1%. The error-correction term coefficient (ECT_{-1}) is significant and correctly signed at 1%. This means that almost 27% of the disturbance will be corrected during the fourth quarter of the year.

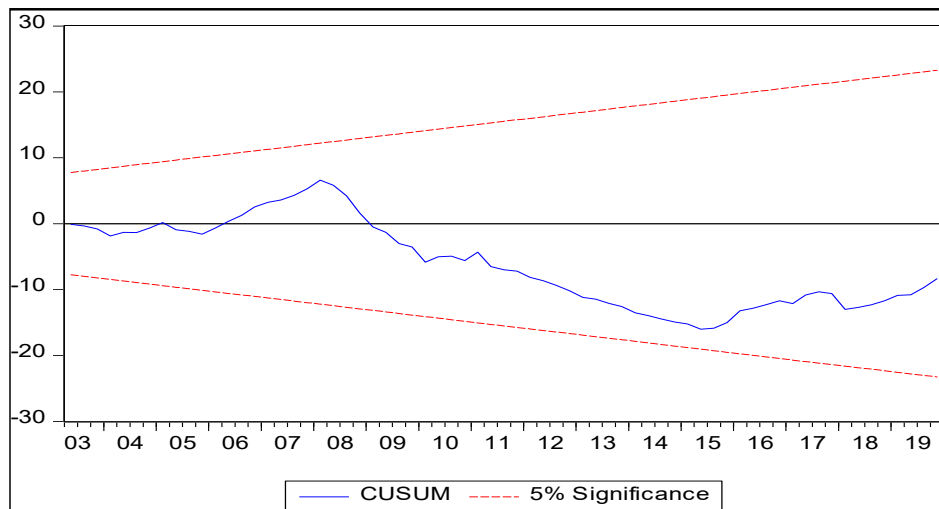
The results of diagnostic or post-estimation tests (Table 4) demonstrate that the estimates generated are free of problems of serial-correlation ($\chi^2=3.87$ and $\rho=0.14$), heteroscedasticity ($\chi^2=22.90$ and $\rho=0.29$) and misspecification (F-stat.=0.51 and $\rho=0.47$) at 5%.

3.4. Results of the stability test

The results of the CUSUM and CUSUMQ tests (Figure 3 and Figure 4) reveal that the

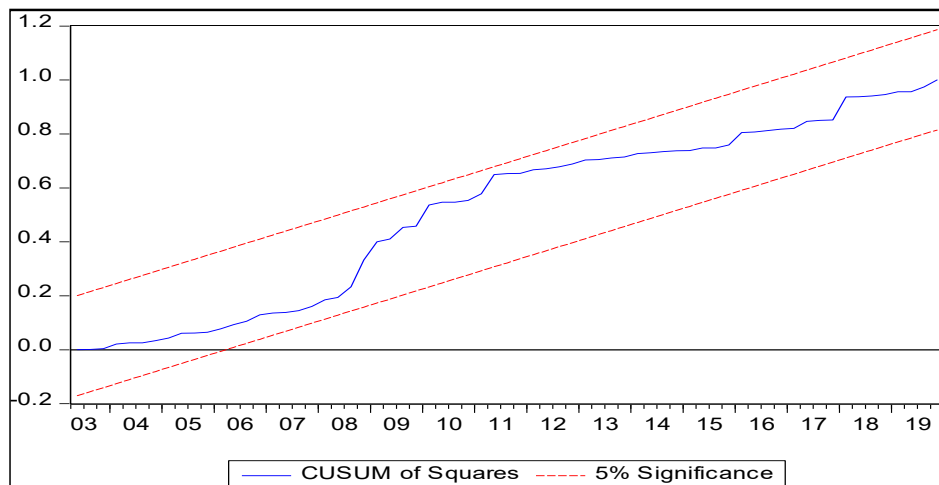
plots are within the boundaries, implying that the model and its parameters are stable in the long run.

Figure 3. Plots of cumulative sum of recursive residuals



Source: own elaboration

Figure 4. Plots of cumulative sum of squares of recursive residuals



Source: own elaboration

3.5. Results of DOLS model estimation

The results of DOLS (Table 5) indicate that FDI inflow increases by 2.92% following a reduction in the level of corruption by one

unit at 1%. Similarly, improving internal security by 1% raises inward FDI by 0.67% at 5%. Moreover, an increase in market size by 1% causes FDI inflow to increase by

5.76% at 1%. Furthermore, raising inflation by 1% causes FDI inflow to fall by 2.42% at 1%, while an increase in natural resources by 1% raises inward FDI by 0.07% at 1%. Lastly, inward FDI rises by 1.33% following a 1% depreciation in the domestic currency at 1%.

Table 5. Results of DOLS model estimation (D.V = LOGFDI)

Regressor	Coeff./Se	p-value
Constant	-10.55*** (1.71)	0.00
COC	2.92*** (0.77)	0.00
LOGINS	0.67** (0.32)	0.04
LOGGDPC	5.76*** (1.23)	0.00
LOGCPI	-2.42*** (0.32)	0.00
NATUR	0.07*** (0.02)	0.00
LOGEXC	1.33*** (0.17)	0.00
R ² = 0.96		

** and *** indicates significance at 5% and 1%, respectively. Values in () denotes probability values.

Source: own elaboration

In sum, the results reveal that lower corruption, higher internal security (decline in insecurity), larger market size, the presence of natural resources, and depreciation all have a long-term strong and increasing influence on FDI, but the impact of inflation in the long term is significant and negative.

The positive influence of corruption control on FDI is consistent with the outcome of past studies (Bénassy-Quéré et al., 2007; Busse and Hefeker, 2007; Habib and Zurawicki, 2001, 2002; Mathur and Singh, 2013; Voyer and Beamish, 2004; Wei, 2000; Zangina and Hassan, 2020). In fact, Zangina and Hassan (2020) found that lower levels of corruption corresponded with an increase in FDI inflows to Nigeria. Thus, reducing corruption will not only boost confidence among foreign investors, but will also reassure them that by doing legitimate business in Nigeria they will not incur extra costs in the form of bribery which add to their costs of production and reduce their level of profitability.

The positive influence of less insecurity means that increased government spending on internal security leads to lower levels of

insurgency, banditry, kidnapping, farmer-herder conflicts, and so on. All of these will reduce the risks and uncertainties associated with investment, and consequently boost FDI inflows to Nigeria.

The positive connection between market size and FDI lends credence to the findings of related studies (Bénassy-Quéré et al., 2007; Bevan and Estrin, 2004; Brada et al., 2006; Busse and Hefeker, 2007; Habib and Zurawicki, 2001, 2002; Mathur and Singh, 2013; Wafure and Nurudeen, 2010; Wei, 2000). Interestingly, Wafure and Nurudeen (2010) discovered a positive influence of market size on FDI inflow to Nigeria. Thus, large market size signals that Nigerians have higher purchasing power (and demand) for goods and services produced by MNCs, leading to higher inflow of market-seeking FDI.

The negative association between FDI and inflation supports the works of Brada et al. (2006) and Busse and Hefeker (2007). The negative influence of inflation suggests that greater economic instability creates uncertainty that deters foreign investors from conducting business in Nigeria, causing inward FDI to decline.

Moreover, the positive connection between FDI and natural resources supports past studies (Jensen, 2003). Similarly, Zangina and Hassan (2020) discovered an increasing influence of natural resources on FDI to Nigeria. Thus, the presence of natural resources provides Nigeria an opportunity to attract more resource-seeking FDI.

Furthermore, the positive link between depreciation and FDI is consistent with prior studies (Masayuki and Ivohasina, 2005; Nurudeen et al., 2011). In particular, Nurudeen et al. (2011) discovered that exchange depreciation boosts FDI flowing to Nigeria. This is in line with the assertion that depreciation reduces the dollar price of domestic firms, resulting in higher FDI to Nigeria as foreign investors take advantage of the low prices via mergers and/or the acquisition of domestic firms.

Conclusions

This study adopts DOLS and ARDL estimation techniques to explore the response of FDI to both rising insecurity and corruption with respect to Nigeria over the long term based on quarterly data from 1996 to 2020. There is evidence of a long-term relationship amongst the variables based on the cointegration test. The estimation results reveal that less corruption, greater security, large market size, the presence of natural resources and domestic currency depreciation all have long-term increasing impacts on FDI. However, inflation influences FDI negatively over the long term. The positive influence of controlling (less) corruption on FDI provides empirical support for the validity of the 'grabbing hand' hypothesis in Nigeria. In addition, the positive impact of greater security on FDI gives credence to claims that insecurity deters foreign investors and lowers FDI inflows.

Thus, Nigerian policymakers are encouraged to take steps to further reduce corruption through a sustained increase in funding

for anti-graft agencies (i.e. EFCC and ICPC). In addition, the government should monitor the activities of these agencies, because recent revelations suggest that recovered funds can be re-looted or mismanaged by those delegated to fight corruption. Also, the government is encouraged to continuously seek the cooperation and support of international community to expose, arrest, and punish those found to be involved in such corrupt activities, including the repatriation of stolen funds kept in foreign banks to Nigeria.

Furthermore, the government should increase its funding of the police, military and the defence sector to curb rising insecurity. This will lower kidnappings, killings and the number of displaced persons, the destruction of property, and the high risks associated with investment in the country. Moreover, since market size encourages FDI inflows, efforts should be made to raise Nigeria's income and the purchasing power of its citizens. This goal can be achieved via higher government spending on socio-economic infrastructure including roads, healthcare and so on. Also, Nigeria's apex bank (CBN) is advised to intensify efforts to check soaring prices (inflation) due to its damaging influence on investment spending. Besides, given that continuous depreciation has brought untold hardship to many Nigerians, steps should be taken to ensure stability in the exchange rate. These measures, among others, can boost the FDI flowing to Nigeria over the long term.

This research undoubtedly adds to the literature because it is the first to unravel the impacts of both high insecurity and corruption on FDI inflows to Nigeria over the long term by applying robust methods of estimation on Nigerian quarterly data. However, the limitation of our study lies in the lack of adequate datasets for variables such as insecurity for substantial periods of time, and its measurement in the form of kidnappings/abductions, deaths or killings, and so on.

Thus, future research can improve on our study by employing larger datasets and employing other measures of insecurity such as the number of deaths/killings, kidnappings and displacement, among others, for analysis.

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