

EMPIRICAL EVALUATION OF MACRO-ECONOMIC DETERMINANTS ON FOREIGN DIRECT INVESTMENT IN NIGERIA

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Abstract: This study's main goal is to determine the effect that specific macroeconomic factors have on the amount of foreign direct investment (FDI) flowing into Nigeria. This study adopted the *ex-post facto* research design. Exchange rate, inflation rate, monetary policy rate, and gross domestic product growth rate are the macroeconomic variables used in this study. The repressors were these variables. The quantity of inflow between 1986 and 2020 was made up of FDI. The dependent variable chosen was FDI. Because the model variables were integrated in a mixed order of both level and first difference, this study used the Autoregressive Distributed Lag (ARDL) technique. The selected macroeconomic variables and FDI were bound by a long-run connection, according to the results of the ARDL bounds test for cointegration. The calculated short-run coefficients showed that GDP growth rate and monetary policy rate were the primary macroeconomic variables that considerably increased FDI inflow in Nigeria, whereas inflation and exchange rate were the major macroeconomic variables that significantly decreased FDI inflow. Long-term, the GDP growth rate and exchange rate had a beneficial influence on FDI influx whereas the monetary policy rate had a large and negative effect. According to these empirical findings, the researcher advises Nigeria's monetary authorities to support strong GDP growth, exchange rate stability, and efficient monetary policy rates in order to draw FDI into the country and create efficient foreign exchange policies that will draw in foreign investors.

Keywords: FDI, macroeconomic variables, economic size, exchange rate, inflation, monetary policy rate

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INTRODUCTION

Foreign direct investments (FDI) can play a key role in boosting global capital flows, which are essential for boosting domestic resources in developing nations' growth and development processes and bridging the savings and investment gap (Adebayo, Onyibor and Akinsola, 2021). It is clear that developing and less developed nations rely heavily on the financial support of their more developed counterparts in the form of FDI inflows that would help them reach and maintain a certain level of economic stability. By making investments in these nations, the economically developed nations may support and strengthen these less developed and growing economies. Through collaboration with the host nation, this financial aid can be directed toward various economic sectors. It is the responsibility of the host nation to provide an environment that is conducive to investment and free of risks and unfavorable economic regulations that can discourage potential investors from making investments there. It is also crucial to keep in mind that domestic private sector companies frequently lack the financial resources to carry out certain types of investments in their nation and frequently rely heavily on foreign businesses or individuals to complete these types of investments, which require significant capital outlay (Emenuga, 2019). Apart from the need for large capital investments to finance specific projects or ventures that require large capital investments, indigenous investors favor investments that produce income quickly and may even require less cash to complete. FDI is essential in this situation.

The introduction of FDI into any economy has a number of positive effects on the economy, including increased capital inflows that will strengthen the host nation's balance of payments, an increase in exports, a swift transfer of technology, new management techniques, and an increase in the employment rate (Karau and Ng'ang'a, 2019; Ndubuisi, 2017). Oloyode and Kolapo (2018) pointed out that since 1990, FDI has been a boom for developing nations, helping to promote industrialisation, growth, and development. In order to understand the dynamics of international business in the global economy in the years leading up to the millennium, it is interesting enough to compare the growth trends of trade and investment. FDI is on the rise, which supports the development process by increasing productive resources, bridging the technical divide, and overcoming capital constraints.

According to studies, nations with minimal investment risk and macroeconomic stability—including stable prices, rapid GDP growth, little fluctuation in exchange rates, moderate interest rates, and more—are more appealing to international investors.

A detailed examination of the situation in Nigeria, however, reveals a significant degree of macroeconomic volatility brought on by multiple shocks to the aforementioned macroeconomic variables. For instance, the recent drop in oil prices, which was brought on by the collapse in the price of a barrel of oil globally, has significantly reduced Nigeria's external reserves and GDP growth rate, both of which have led to a high rate of inflation and a decline in the purchasing power of the naira, which has resulted in exchange rate instability in the nation and is not favorable to foreign investors. According to an OECD analysis, domestic macroeconomic fluctuations are to blame for a significant decline in foreign direct investment in developing nations like Nigeria (OECD,2019). There have been numerous research done on the effects of macroeconomic factors on FDI in Nigeria. According to Emenuga (2019), real exchange rates, interest rates, inflation, and money supply (M3) shocks all have large and long-lasting effects on foreign direct investments. Inflation and prime lending were also discovered by Adebayo et al. (2021) to be inversely associated with Nigerian economic growth. Additionally, Onakoya (2016) discovered that the current money supply, interest rates, inflation, and exchange rates have prevented FDIs from entering Nigeria. According to Karau and Ng'ang'a (2019), debt servicing, the growth of financial and human resources, and exchange rates were key factors of foreign direct investment in Kenya. Among other studies on the topic are Ukachukwu and Odionye (2020), Lyas and Merve (2018, 2016), and Kwoba and Kibati (2016, all of which established a substantial association between macroeconomic dynamics and FDI but did not identify any specific factors that have the greatest influence. Although various studies have found that factors such as GDP, interest rates, inflation, and exchange rates had an impact on the rate of economic growth, it is noteworthy that these findings vary among the works.

The impact of macroeconomic variables and infrastructure spending on foreign direct investment (FDI) between 1981 and 2018 was examined by Wijaya, Astuti, Tarigan, and Edyanto (2020). The methodology for this investigation was quantitative. Gross domestic product, the exchange rate, the debt to GDP ratio, the inflation rate, interest rates, and infrastructure spending are among the variables utilized in this analysis. Cointegration and error correction modeling were used by the researchers as estimation methodologies. The findings indicate that every variable has a long- and short-term link with FDI.

In 2020, Artanta^o and Sipahi looked at the impact of a few macroeconomic factors on the flow of investments into Turkey.ry in the literature is how Nigeria

and other nations respond differently and at different times to the fluctuations in the macroeconomic environment. This explains why authors from various nations focused on a variety of macroeconomic indicators, producing a mixed bag. This study's main objective is to objectively examine how macroeconomic factors affect FDIs in Nigeria. This supports the necessity for empirical research on the effects of macroeconomic factors on FDIs in Nigeria.

THEORETICAL FOUNDATION

Eclectic theory is the foundation of this subject. Dunning (2000) asserts that corporations engage in foreign direct investment when a location's characteristics are combined with ownership and internationalization benefits to make the area desirable for investment. Nigeria's strong connectivity with the majority of the continent and the rest of the world has made her a popular location for foreign direct investment. This is because of her geographic location, particularly the Apapa Seaport and oil-producing zones, which are favored by the majority of investors as trustworthy and secure in all other aspects. Given the cost involved, transportation is one of the crucial elements of business.

EMPIRICAL ANALYSIS

Using annual time series data from 1981 to 2018, Adebayo, Onyibor, and Akinsola (2021) investigated the relationships between FDI inflows and specific macroeconomic indicators (gross capital creation, export, inflation, trade openness, and economic growth). To determine the relationships between FDI inflows and its deciding variables, the study employed the ARDL technique. Additionally, wavelet coherence techniques were applied. A robustness analysis was done on the ARDL long-run estimation utilizing FMOLS and the DOLS. The results of the ARDL long-run estimate demonstrated that trade openness and exports had a favorable effect on FDI inflows. The results of the FMOLS and DOLS agreed with those of the ARDL.

In a different investigation, Ukachukwu and Odionye (2020) looked at the effects of specific macroeconomic factors on foreign direct investment in Nigeria from 1981 to 2017. The Auto-Regressive Distributed Lag (ARDL) bound co-integration model was used by the researchers to analyze the short- and long-term effects of the chosen variables on FDI. The results of the bound co-integration test provided evidence of a long-term association between FDI and particular macroeconomic variables in the nation. The results of the ARDL model showed that both the foreign currency rate and the price of crude oil

had a considerable beneficial impact on FDI in the country over the long and short terms. The outcome also showed that both in the short and long terms, inflation has a considerable negative influence on FDI. The findings also showed that while real gross domestic product had a considerable short-term beneficial impact on FDI, its long-term impact was modest. The researchers suggested that the government create policies to promote price stability and stability in the macroeconomic environment in light of the empirical finding.

This study also concentrated on Foreign Direct Investment (FDI) inflows and how they relate to Turkey's economic metrics, such as the Real Effective Exchange Rate (REER) and GDP per capita of Purchasing Power Parity-GDP (PPP). The Central Bank of Turkey statistical bulletin was used to gather the study's data (1994 – 2018). Exchange rates, inflation, interest rates, and the government deficit were among the variables analyzed. The results showed that all the explanatory factors together had an impact on the inflow of foreign direct investment. In Turkey, FDI is significantly influenced favorably by the government deficit and exchange rates. Therefore, by paying closer attention to the highlighted macroeconomic policy variables, the government should develop solid policies that would enhance the attraction of Foreign Direct Investment Inflow in Turkey.

Emenuga (2019) investigated how macroeconomic factors affected FDI inflow into Nigeria between 1986 and 2017. The CBN Annual Report served as the source for information on FDI, GDP, government size (GOVT), exchange rate (EXR), inflation rate (INF), and interest rate (INT). The estimation of the error correction model (ECM) and the ARDL cointegration bound test were both used. According to the ARDL's findings, FDI in Nigeria was highly correlated with the exchange rate, interest rate, gross domestic product, and size of the government. The study found a long-term association between macroeconomic factors and FDI in Nigeria and suggested that the government of Nigeria should support economic policies that would draw in more foreign direct investment.

Meftah and Nassour (2019) looked at the variables that affect FDI. The study demonstrates that there is a long-term causal relationship between exchange rates and inflation with FDI using the vector error correction model. However, there are no factors that have an immediate impact on FDI. Additionally, the Granger causality test demonstrates that GDP and FDI have a causal relationship, whereas other variables do not. The findings of this study have significance for how policymakers should increase the flow of FDI by paying attention to macroeconomic factors.

In 2019, Karau and Ng'ang'a looked at how macroeconomic factors affected foreign direct investment in Kenya (FDI). For the years 1970 to 2010, the study used four macroeconomic variables: foreign exchange rates, tax rates, inflation rates, interest rates, and balance of payments. Meftah and Nassour (2019) examined the factors influencing FDI. Using the vector error correction model, the study shows that there is a long-term causal relationship between exchange rates and inflation with FDI. There are no elements that, however, immediately affect FDI. Furthermore, the Granger causality test shows that GDP and FDI are causally related while other variables are not. The results of this study have implications for how policymakers should improve FDI flow by taking into account macroeconomic issues.

Onyibor, Adebayo, and Akinsola (2021) the researchers investigated the relationships between FDI inflows and a few chosen macroeconomic indicators (exports, gross capital formation, trade openness, inflation, and economic growth) using annual data spanning from 1981 to 2018. They used Nigeria as a case study. To capture the relationships between FDI inflows and its deciding factors, the study used the ARDL technique. Additionally, wavelet coherence techniques were applied. Wavelet coherence's key innovation is its ability to gather data on dynamic correlation and/or causality between economic variables at various frequencies and over various time periods. Additionally, as a robustness check to the ARDL long-run estimation, the FMOLS and the DOLS are used. The results of the ARDL long-run estimate show that trade openness and exports have a favorable effect on FDI inflows. The results of the FMOLS and DOLS supported the ARDL conclusions. Further supporting evidence for the ARDL technique is provided by the outcomes of the wavelet coherence-based causality and wavelet correlation techniques. The wavelet coherence and wavelet correlation methods are utilized to investigate these dynamics for the first time, to the authors' knowledge. These findings led to the creation of policy directions.

Emenuga, (2019), looked at the effects of macroeconomic factors on the flow of FDI into Nigeria from 1986 to 2017. The CBN Annual Report served as the source for information on foreign direct investment (FDI), gross domestic product (GDP), government size (GOVT), exchange rate (EXR), inflation rate (INF), and interest rate (INT). Techniques for estimating the error correction model and the ARDL cointegration bound test were used. The results of the ARDL showed that foreign direct investment in Nigeria was highly influenced by the currency rate, interest rate, gross domestic product, and size of the government. The study found a long-term association between macroeconomic

factors and foreign direct investment in Nigeria and suggested that the government of Nigeria should support economic policies that would draw in more foreign direct investment.

Through the use of the Structural Vector Autoregressive (SVAR) model, Emel and Ilyas (2022) examined the effects of foreign direct investments (FDI) on the macroeconomic dynamics of the Turkish economy. The outcomes of the economic theory show that FDI has a favorable impact on domestic investment volume and economic growth. The findings also support the tenet of economic theory that local and international investments complement one another. It is acknowledged that FDI increased pricing pressure to some extent, but the monetary authority's measures offset this. While FDI does not considerably contribute to the decline in unemployment, it does greatly increase imports, particularly of capital goods.

Murtala, (2022) (2022) The majority of African nations experience difficulty luring in foreign direct investment (FDI), and Nigeria in particular is one of these nations. The impact of foreign direct investment on macroeconomic variables (exchange rate, inflation rate) in Nigeria was empirically explored in this study over a five-year period (2017-2021). The Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model is the one used in the study. Pre-diagnostic is a first condition for estimating GARCH, and this is where the econometric study began. The properties of the time series variables were investigated and tested using the Augmented Dickey-Fuller (ADF) unit root test. The outcome of this experiment showed that the variables: foreign direct investment, currency rate, and inflation rate were either stationary at either level I or first difference I(I) (0). The GARCH model found that while inflation has a negative impact on exchange rates, foreign direct investment (FDI) has a favorable impact. Based on this, the study suggested that in order to attract the FDI required to boost growth in macroeconomic variables, Nigeria should implement a proper regulatory framework that will be friendly to conducting business.

Between 1990 and 2021, Ugonma and John (2022) empirically examined the relationship between foreign direct investment (FDI) and economic growth in Nigeria. It is founded on the conventional FDI idea. Gross domestic product (GDP) was utilized as a proxy for the study's dependent variable, which was economic growth in Nigeria, while oil related foreign direct investment (OFDI) and non-oil related foreign direct investment (NFDI) were used as proxies for the study's explanatory variable, FDI. The study gathered and used secondary

data from the Central Bank of Nigeria's (CBN) statistical bulletin. A stationarity test was used in the investigation. The short-run analysis was conducted using the ordinary Least Square (OLS) method, and the long-run analysis was conducted using the Johansen co-integration test. In order to determine whether there is a causative relationship between the study's variables, the Granger causality test was also used in the study. Following are the findings: The relationship between NFDI and economic growth in Nigeria is positive and insignificant, while the relationship between OFDI and economic growth in Nigeria is negative and insignificant. The relationship between FDI and economic growth in Nigeria is positive and significant. The outcomes show the underlisted: There is a long-term relationship between FDI and economic growth in Nigeria, but there is no causal link between FDI and economic growth in Nigeria. In the short run, FDI significantly influences economic growth in Nigeria. Finally, the study offered several suggestions to help Nigeria's economy grow as a result of FDI influx and survival.

In a 2020 study, Ukachukwu and Odionye looked at the effects of specific macroeconomic factors on foreign direct investment in Nigeria from 1981 to 2017. It used the Auto-Regressive Distributed Lag (ARDL) bound cointegration model to look at how the chosen variables will affect FDI over the short and long terms. The results of the bound correlation test revealed evidence of a long-term association between foreign direct investment and particular macroeconomic indicators in the nation. According to the ARDL model's findings, both the short- and long-term effects of the foreign exchange rate and the price of crude oil on FDI in the nation were positive and significant. The outcome further demonstrated that inflation has a negative and considerable influence on FDI over the long and short terms. It also demonstrated that while real GDP has a short-term, positive, and large impact on FDI, such impact is negligible over the long term. In light of the empirical finding, the government must implement policies that result in price stability and macroeconomic environment stability in order to draw FDI to the nation.

Karau and Ng'ang'a examined the impact of macroeconomic factors on foreign direct investment in Kenya in 2019. (FDI). Four macroeconomic variables—foreign exchange rates, tax rates, inflation rates, interest rates, and balance of payments—were employed in the analysis during the period 1970 to 2010.

Equation 3.1 provides the functional relationship of the model.

$$FDI = f(GDP, EXR, INF, MPR) \quad (3.1)$$

The form of each variable is a logarithm. Based on its benefits over competing models, the ARDL model was chosen. In order to examine if the model variables have a long-term relationship, the ARDL model, which uses a limits test approach based on the error correction model (ECM), was applied. The key benefit of this strategy, which was used by Pesaran, Shin, and Smith (2001), is that it may be implemented regardless of whether the variables are I (0), I (1), or a combination of both. This enables the model to choose an adequate amount of delays to capture the cointegration amongst variables.

ANALYSIS AND FINDINGS

In order to prevent erroneous regression, the levels of stationarity of the model variables were first tested in this study. To do this, the Augmented Dickey-Fuller (ADF) test was run: Table 1 shows that, with the exception of inflation (INF), all explanatory variables are stationary after the first difference, indicating that only INF was integrated of order zero, I(0), while FDI, GDP, EXR, and MPR were all integrated of order one, I(1) (0). Since none of the variables integrated at order two, the variables reached stationarity at orders one and zero. As a result, the estimation was conducted using the ARDL bound test method advised by Pesaran et al. (2001) in situations where the variables are of I(0) and I(1). After twenty models were generated automatically, ARDL(3, 3, 1, 1, 2) was chosen based on Akaike information criteria (AIC).

Table 1: ADF test results

Variable	ADF test statistic		ADF critical values		Order of integration
	Level; I(0)	1 st diff., I(1)	1%	5%	
FDI	-2.651992	-10.57471	-4.252879	-3.548490	I(1)
GDP	-0.911181	-3.630261	-4.252879	-3.548490	I(1)
EXR	-2.545927	-6.012188	-4.252879	-3.548490	I(1)
INF	-4.683108	—	-4.252879	-3.548490	I(0)
MPR	-3.290941	-6.998435	-4.252879	-3.548490	I(1)

Source: Researcher’s analysis using e-views 9 output

An important condition necessary for testing ARDL bounds is that each of the variable be integrated of order one or zero or both. Since the variables are integrated of mixed order of I(0) and I(1), the study proceeded with the

ARDL bounds test. The null hypothesis for the bounds test is that the variables are not co-integrated as against the alternative that they are co-integrated. The decision rule is to accept the null hypothesis if the F-statistic is greater than the upper bound critical values at chosen level of significance. The result of the ARDL test is shown in Table 2:

Table 2: ARDL bounds test

<i>Test Statistic</i>	<i>Value</i>	<i>Signif.</i>	<i>I(0)</i>	<i>I(1)</i>
F-statistic	5.014388	10%	2.2	3.09
K	4	5%	2.56	3.49
		1%	3.29	4.37

Source: Researcher's analysis using e-views 9 output

Table 2 the F-statistic is 5.014388 which is greater than the upper bound, $I(1)$ of 4.37 at 1% level of significance. Thus, the null hypothesis was rejected and the study concludes that there is long run relationship in the model. This implies that there is a co-integrating relationship between FDI and selected macroeconomic variables (GDP, EXR, INF and MPR) in Nigeria.

Since there is long run relationship between FDI and selected macroeconomic variables, the results of the short run and long run estimates of the ARDL regression were presented in Tables 3 and 4 respectively:

Table 3: Short-run estimates and error correction mechanism (ECM)

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
DLOG(FDI(-1))	-0.370090	0.136507	-2.711137	0.0139
DLOG(FDI(-2))	-0.231565	0.127973	-1.809477	0.0862
DLOG(GDP)	0.287898	0.558323	0.515648	0.6120
DLOG(GDP(-1))	2.329688	0.633985	3.674673	0.0016
DLOG(GDP(-2))	1.997146	0.753959	2.648878	0.0158
D(EXR)	0.636800	0.199558	3.191052	0.0033
D(INF)	-0.178020	0.077095	-2.309099	0.0209
DLOG(MPR)	-0.444940	0.254382	-1.749104	0.0964
DLOG(MPR(-1))	0.430407	0.231901	1.855997	0.0790
ECM-1)	-0.974240	0.158035	-6.164721	0.0000
R-squared	0.824221			
Adjusted R-squared	0.772952			
Durbin-Watson stat	2.165346			

Source: Researcher's analysis using e-views 9 output

According to Table 3, the estimated coefficient of the past value of FDI is statistically significant and negative, indicating that the immediate past status of FDI had a negative impact on the current value of FDI. In other words, FDI's past worth is what defines its current value.

The calculated GDP lag one and EXR coefficients were positive and statistically significant, indicating that changes in the exchange rate and economic output draw foreign direct investment (FDI) into Nigeria. This is in line with the a priori anticipation that FDI will increase in the future since exchange rate depreciation makes it more affordable and desirable to invest in the host economy. In the case of GDP, which suggests that a consistent rise in economic output will speed up aggregate demand and, in turn, draw FDI. This finding is consistent with those made by Ukachukwu and Odionye (2020), Emenuga (2019), and Oloyede and Kolapo (2018), who found that economic growth and exchange rate depreciation drive foreign direct investment into Nigeria.

The MPR had a favorable and considerable impact on FDI as well as a negative and minor impact. The implication is that Nigeria's regular use of monetary policy manipulation to control macroeconomic processes has mostly failed to attract FDI. According to earlier empirical investigations, the government of the recipient country's inconsistent monetary policy is mostly responsible for this conclusion (Nwokoye and Oniore, 2017). Then it suggested that nations with contradictory monetary policies might not attract foreign investment.

As anticipated, inflation had a negative and considerable impact on FDI in Nigeria. This suggests that an increase in inflation would result in a drop in FDI as investment decisions become more challenging and unpredictable, and a consequent slowdown in FDI. This outcome confirms the findings of Ndubuisi (2017), who investigated the factors affecting foreign direct investment in Nigeria. Among other things, their findings indicated that inflation was a significant factor affecting FDI in Nigeria.

The ECM (-1) coefficient is (-0.97) and is properly marked. This rate of adjustment suggests that macroeconomic variables like GDP, EXR, INF, and MPR annually correct 97% of the FDI disequilibrium from the preceding year. The implication is that it will take around a year for certain macroeconomic dynamics to remedy any FDI disequilibrium. The coefficient of multiple determination is 0.772952, indicating that approximately 77.2% of the variations in FDI is explained by the explanatory variables (selected macroeconomic

variables) in the model. This further indicate a good explanatory power of the empirical model.

Table 4: Long-run estimates

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
LOG(GDP)	0.434280	0.167477	2.593069	0.0178
LOG(EXR)	0.689364	0.237791	2.899031	0.0092
LOG(INF)	0.040474	0.082118	0.492874	0.6277
LOG(MPR)	-1.639199	0.370498	-4.424315	0.0003
C	1.655344	1.479834	1.118601	0.2773

Source: Researcher's analysis using e-views 9 output

The long-run estimates from Table 4 shows that, GDP, exchange rate and inflation has positive and significant effect on FDI in the long-run while MPR had a negative effect on FDI. GDP, EXR and MPR had a statistically significant effect on FDI in the long-run while INF did not exert a significant effect on FDI in the long run in Nigeria.

Table 5: Diagnostic and stability tests

<i>Test</i>	<i>F-statistic</i>	<i>Prob.</i>
Breusch-Godfrey Serial Correlation LM Test:	2.021238	0.1631
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.840156	0.6128
Ramsey RESET Test	0.788954	0.4395
Normality Test	1.441281	0.4864

Source: Researcher's analysis using e-views 9 output

The results of the diagnostic tests, which are shown in Table 5, looked at serial correlation in residuals produced by the models, as well as the Ramsey model specification test, heteroskedasticity test, stability test, and normality test. The Breusch-Godfrey LM test for autocorrelation served as the foundation for the serial correlation tests of the residuals. The projected model The results of the second order tests show that the model contains no proof of serial correlation. Additionally, neither the Harvey Heteroskedasticity test nor the Ramsey reset test results reveal any sign of an omitted variable issue in the results. The normality test confirms that the residual was normality distributed in a similar vein.

CONCLUSION AND RECOMMENDATIONS

This study used the ARDL model to determine the effects of specific macroeconomic variables on FDI in Nigeria. According to the empirical results, GDP and exchange rates had positive, statistically significant effects on FDI over the long and short terms. Additionally, it showed that while inflation has a short-term, negative, and large impact on FDI, it eventually becomes positive and inconsequential. On the other hand, MPR has a short-term, negative, and large impact on FDI, although this impact is negligible over time. In conclusion, the researcher believes that the empirical data obtained in this study is sufficient to claim that macroeconomic factors significantly influenced foreign direct investment in Nigeria over the course of the study period.

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