

Macroeconomic Drivers of Foreign Direct Investment Inflows to Nigeria: Analysis of Shocks and Long-Run Causation

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This study seeks to underscore the extent to which macroeconomic vectors cause foreign direct investment inflows using cointegration, vector error correction, impulse response functions, and variance decomposition techniques against annual Nigerian data from 1986 through 2020. It also attempts to unravel how FDI inflows respond to macroeconomic shocks. The results indicate that, in the long-run, interest rate, inflation, exchange rate, level of economic activity and growth, and degree of trade openness of the economy significantly cause FDI inflows to Nigeria. Whereas the direction of causation is positive for inflation, exchange rate and trade openness of the economy, it was negative for level of economic activity and interest rate. FDI inflows responded to shocks in the above independent variables in different directions, some positively for a designated time, while some negatively at other periods. Generally, shocks in the independent variables jointly affected the shocks in FDI from the second through the tenth periods of innovations. Policy implications favor government action to lower interest rate, maintain mild inflation and moderate devaluation of the Naira against the currencies of trading partners, among others.

Keywords: foreign direct investment, macroeconomic factors, shocks, long-run causation, Nigeria

BACKGROUND OF STUDY

Foreign direct investment (FDI) is a type of cross-border investment that occurs when an investor from one country has a long-term interest in and a sizable amount of influence over a business from another economy, according to the OECD (2022). Such a link is demonstrated by an investor from one economy owning 10% or more of the voting power in a company located in another. Foreign direct investment, according to Marjanovi and Domazet (2021), is a type of capital investment in which a shareholder purchases assets in another nation with the goal of managing such assets. Inflow of foreign direct investment

(FDI) is the amount of money that overseas investors give to other international businesses (UNCTAD, 2020). These investments are typically linked to multinational corporations (MNCs), which want to establish production facilities outside of their home (domicile) country and to own and manage such facilities.

Marjanovi and Domazet (2021) posits that, increasing a nation's comparative advantages may be accomplished through foreign direct investment. Multinational corporations (MNCs) are the key players in the FDI phenomenon, and they are a vital source of economic growth, modernization, expansion in production, exports, employment, and income in their host nations. The inclination for many businesses to source goods and services from many places has expanded due to market globalization. Typically, FDI flow in and out of nations. The phrase "net inflow" refers to the amount of FDI that is either an inbound or an outward investment. The balance of FDI going in and FDI going out is known as net inflow. The word "FDI" generally refers to the net influx of investments into an economy, which may include both long- and short-term capital. (Study Corgi, 2022; Cywiski & Harasym, 2012).

Foreign Direct Investment (FDI) is recognized as a key type of international capital movement that has a significant impact on the economies of both the home country and the host country. From the perspective of the home nation, FDI is viewed as a practical method of capital and knowledge transfer as well as a method of supporting significant initiatives. Additionally, FDI is a way to participate in the global industrial cycle. However, depending on a variety of factors, such as the availability of resources and the status of the economy, the effects of FDI on host economies differ from one nation to the next (Guimón, 2011; StudyCorgi, 2022; Cywiski & Harasym, 2012). From a macroeconomic perspective, it is thought that FDI significantly contributes to the creation of jobs, expansion of total production, technology transfer, and access to the global market. Some scholars believe that FDI can enable the leakage of sophisticated technology to enterprises in the host economies, which supports the importance of FDI in technology transfer (Lipsey, 2002; Razin and Sadka, 2007; StudyCorgi, 2022).

In developing nations, foreign direct investment (FDI) is seen as a strategic way to obtain external financing (UNCTAD, 2019), transfer technologies (Osano & Koine, 2015), strengthen trade ties (Moran, 2014), and increase employment opportunities and wage levels (Peluffo, 2015). The endogenous growth model suggests a theoretical potential of FDI spill-over to residential industries and a favorable influence on economic growth (Freund & Pierola, 2012; Javorcik, 2015; StudyCorgi, 2022). Nigeria, as a developing country, behaves in manners that are consistent with the other developing nations in their perception of FDI. The policy makers think highly of the supposed virtues of FDI to host nations. This is why the Government of Nigeria has supported the advent of FDI to the economy over the years.

What is not yet clearly determined, beyond iota of doubt, is whether the acclaimed benefits of FDI have been realized or are realizable by the country. There are substantial literature showcasing studies that verify that FDI led growth in various developing and emerging economies. But the case for Nigeria reflects mixed and inconclusive results. Further still, what make FDI occur in Nigeria have not been met with robust empirical agreements. Whereas some forces like exchange rate and inflation have been given places of ascendancy, others have given pride of place to interest rates and rate of economic growth. Others yet extol trade openness and financial market performance. The enumeration can continue without an end in sight. What however is copiously missing, in their large numbers are studies that examine the effects of shocks to the avowed determinants to the FDI variable. This study aims at contributing to this missing segment of literature by analyzing the effects of innovations on such variables like exchange rates, inflation, interest rates, rate of economic growth, and trade openness to FDI inflows to Nigeria. It is also a key crux of this paper to analyze the long-run effects of the identified drivers on FDI.

Pursuant to the above, the rest of the paper proceeds with some theoretical outline of the pros and cons of FDI. This is followed by a brief look at some FDI theories that provide foundations to the study. The next is a review of some previous papers that have been carried out in this area of finance study. Methods employed in the analysis follows, while the actual data analysis continues naturally therefrom. The paper closes with the concluding remarks that summarized the findings, recommendations and global conclusions of the study.

THEORETICAL BENEFITS AND CONS OF FDI

It is important to start the discourse in this paper by reviewing the costs and benefits of FDI to host as well as home or parent nations. StudyCorgi (2022) found that FDI promotes developing countries through resource transfer, employment, balance of payment, and competitive effects. Foreign direct investment increases business productivity, creates jobs, and introduces new technologies and manufacturing processes, which boosts competitiveness and public investment (Grela, Majchrowska, Michałek, Mućk, Stażka-Gawrysiak, Tchorek & Wagner, 2017; Andrejovska & Glova, 2022). Multinational enterprises spend cash in the host country and transfer technology and expertise to local companies. Investment creates job prospects. FDI can boost or hurt balance of payment. Capital and export payments can improve things. FDI products can replace imports. More investment in an economy increases competition and improves domestic markets. Increased FDI may offer a country a larger voice in global summits (Guimón, 2011; Lipsey, 2002; Hanson, 2001; StudyCorgi, 2022).

Foreign direct investment costs emerging economies in four ways: competition, parity of instalment, overreliance on one industry, and national control and autonomy. Monopolistic multinational firms sometimes harm competition. Such enterprises may harm local newborn companies. Excess FDI earnings and FDI-imported inputs hurt the balance of payment. Overreliance on one industry, like the petroleum industry, is dangerous. Finally, excessive FDI may threaten a nation's sovereignty. Foreign investors may make crucial economic decisions (Lipsey, 2002; StudyCorgi, 2022). FDI is driven by both internal and external benefits, despite the lack of a theoretical framework. FDI also benefits and hurts the economy. Advantages outweigh drawbacks.

A CURSORY LOOK AT SOME FDI THEORIES

A lot of explanations have been proposed to account for the inspiration behind FDI. These theories include the O-L-I theories, the theory of internal and external advantages, the production succession hypothesis, and the theory of conversion scale on the international capital market. Raymond Vernon created FDI production cycle theory in the mid-1990s. After WWII, American firms invested in Europe. Vernon thought FDI follows four production cycle phases: invention, growth, maturity, and decrease. The first phase is creating new items for internal use and exporting the surplus. According to the product cycle hypothesis, export demand increases output, notably by home-country enterprises due to technical advantage. The host country learns about the technology as production rises. Thus, host firm companies start making comparable items, reducing demand and market share. FDI decreases when home-country enterprises focus on the local market (Vernon, 1996). Countries without technological advantages might nonetheless attract foreign direct investment. Asian corporations have actively invested in European and American markets (Russ, 2022).

Exchange rate theory on imperfect capital markets also explains FDI, Cushman (1985) examined how exchange rates affect FDI. He proved that actual exchange rate increases attract foreign direct investment. However, foreign currency appreciation hurts FDI. He finds that foreign exchange rate only affects FDI if one currency is involved, such the U.S. dollar. Exchange rate theory cannot explain FDI across economies with different currencies.

Internalization theory describes multinational firm growth and FDI incentive. Buckley and Casson established the notion in the mid-1970s. According to the thesis, multinational firms try to build an internal edge that may be leveraged in international markets. The internalization argument suggests that foreign direct investment cannot be undertaken if utilizing advantages locally outweighs operating overseas. The hypothesis states that global market flaws allow multinational firms to operate. Currency concerns, government favoritism of local companies, and information costs may be reasons. Multinational firms invest abroad at a higher cost (Russ, 2022; StudiCorgi, 2022).

Three ideas explain FDI within the eclectic paradigm. Ownership, location, and internalization benefits are represented as O-L-I. Ownership advantages are intangible assets that a corporation owns and may utilize to save costs or boost profits abroad. Technological advantages, monopolistic capabilities, and

economies of scale. Location advantages—economic, political, and social—determine the host country. Transportation, market size, manufacturing variables, and infrastructure are economic benefits. State trade and industrialization legislation are political benefits. Finally, cultural characteristics, society's view of immigrants, and distance between host and home nation are social advantages. Internalization is the company's internal advantage that may be used internationally. This advantage requires ownership and location advantages. Internalization helps corporations assess foreign agreement strategies. Enterprises that directly manufacture abroad receive more internalization benefits than those who have signed arrangements with local companies to make or sell their products. Eclectic paradigm indicates FDI relies on host nation difficulties and possibilities (Hosseini, 2005; StudyCorgi, 2022).

REVIEW OF SOME PREVIOUS EMPIRICAL STUDIES

Marjanović and Domazet's (2021) study aims to explain global FDI structure and theories through the interconnectedness of multinational corporations, their investments, and a country's economy as an end consumer. Since FDI is one of a country's success criteria in the global market, the research shows that every country should recruit as many as possible. Thus, economic policymakers must track global trends, align domestic laws, and promote a favorable investment atmosphere for overseas investors.

Using the Structural Vector Autoregressive model, Enache and Merino (2017) examined the dynamic link between foreign direct investments (FDI) and economic development in Romania from 2007 to 2014. The econometric model shows that FDI has its own trajectory, with less economic growth effect. Another key finding is that FDI has no systematic, predictive effect on economic growth. In the investigated period, net FDI inflows were affected by the lack of assurance on the sustained re-launch of economic development both domestically and globally, financial market fragmentation, and domestic structural changes. The researchers' topic contradicts the study's goal. Instead of FDI determinants, the article should focus on economic growth and FDI.

Bolivar, Casanueva, and Castro (2019) used social network analysis to examine the economic performance of nations based on their FDI partners. This new method moves away from studying nation attributes and FDI stock levels. Their research of FDI stocks from 229 economies illuminates the interactions of the global FDI network within its distinctive framework of country-level drivers, its after-effects, internal patterns, and link with the network of Bilateral Investment Treaties (BITs). The study found that size, openness, skill levels, and institutional stability not only affect FDI but also network structure and node power.

Dritsaki and Stiakakis (2014) used 1994–2012 yearly time series data to examine the link between foreign direct investments, exports, and economic development in Croatia. The bounds testing (ARDL) and ECM-ARDL econometric models are used. Exports cause growth both long-term and short-term. These findings suggest a new Croatian economic policy for sustained growth.

Fernández, Fernández & Martín's (2020) research uses yearly time series data from 1970 to 2016 to examine Spain's FDI, exports, and economic development. Autoregressive distributed lag (ARDL) bounds testing for long-term cointegration is used to analyze these relationships. The factors show a long-term association. The Granger causality test shows that FDI leads to exports. In addition, the results on the link between FDI and economic growth show no substantial Granger causality.

Erdogan and Unver (2015) employed panel regression and GMM to empirically investigate the influence of macroeconomic factors on FDI ratio. Market size, economic expansion, and development explained it. Financial openness, private sector credits, and secondary school enrolment are others. In accordance with economic theory, the lag of 1 per capita GDP variable is positive and statistically significant at 1%. Economic growth attracts FDI. GDP boosts FDI. All models exhibited positive and substantial GDPg coefficients. This study found that prior economic growth rates attract greater FDI. Erdogan and Unver (2015) found that FDI is statistically affected by social security, health, and corruption. Previous FDI levels strongly influence current FDI. Financial openness, market size, private sector loans, and labor force growth also impact FDI. Nations with high social security and health costs, which tend to be urbanized and elderly,

attract less investments than countries with low corruption. Capital market development and energy use also attract international investment.

Sunde (2017) examined South Africa's exports and foreign direct investment on economic growth. The paper evaluated the long-term link between economic growth, foreign direct investment, and exports using the ARDL bounds testing technique to cointegration. The ECM examined short-run dynamics, whereas the VECM Granger causality method examined causation. Economic growth, foreign direct investment, and exports were cointegrated. Foreign direct investment and exports greatly boost economic growth, according to the report. FDI caused exports unidirectionally. Exports and economic growth are linked. The paper supports South Africa's FDI-led growth paradigm.

Garang, Yacouba, and Thiery (2018) used time series ARDL procedure to explore the causation between FDI, unemployment, and GDP in Uganda from 1993 to 2015. They found no causalities between variables using World Bank data. Thus, there is no statistical evidence that FDI reduces unemployment and boosts economic growth in Uganda. The model's short- and long-term dynamics are not statistically significant. Based on this country-case assumption, the report suggests revitalizing domestic industries and re-strategizing FDI comprehensive policy frameworks to provide domestic businesses a competitive edge and attract FDI at a pace compatible with local industry growth.

Andrejovska, & Glova (2022) argued that investors can earn even in nations with higher taxes. Tax rate adjustments entice foreign investment. The study's major goals were to compare the Slovak Republic's tax competitiveness to the EU-27 and to assess foreign investors' investments in physical and intangible assets in Slovakia. First, they determined the average tax rate for various cross-border investments coming to Slovakia from all EU nations. They compare the computed effective average tax rate (EATR) to EU country EATRs to establish tax competitiveness. Finally, using cluster analysis to identify EU nations and assess tax competitiveness, they analyzed EATR and FDI. 2019 figures are compared for old (EU-15) and new (EU-12) EU member nations. The article found that the computed Slovak EART for cross-border investment was more lucrative for old EU member nations and more tax-competitive than investors' home countries. According to the authors, investors' tax burden is one of the most important variables, therefore a lower EATR value than in an investor's home country increases equity participation of FDI in Slovakia.

Tasinda, Ze & Imanche (2021) examined the effects of Chinese FDI, remittances, and foreign aid on HCG and brain drain. Nigeria, Kenya, Ghana, South Africa, and Morocco provided data from 2009 to 2018. ARDL modeling was used to analyze data collected from secondary sources. Panel unit and co-integration testing preceded modeling. Chinese FDI, remittances, and foreign aid had a beneficial long-term effect on HCG, but not short-term. Remittances, Chinese FDI, and international aid also have long-term detrimental effects on brain drain. This study provides practical and theoretical insights into how Chinese FDI, remittances, and international aid reduce brain drain and boost human capital.

Illa (2022) examined the influence of foreign direct investment (FDI) on international commerce in West African Economic and Monetary Union (WAEMU) nations using dynamic panel data from World Development Indicators for eight WAEMU countries from 2000 to 2015. The study also examined how financial development, urban population, and net imports affect trade flows. FDI boosts WAEMU nations' foreign commerce. Financial development and urbanization boost WAEMU nations' foreign commerce. Net imports boost international trade but not statistically.

Wiredu, Nketiah & Adjei (2020) examined the effects of trade openness (OPEN) and foreign direct investment (FDI) on economic development in four West African nations (Côte d'Ivoire, Ghana, Nigeria, and Senegal) from 1998 to 2017. Our regressors—FDI, trade openness, investment, and inflation—were linked to GDP growth using static panel regression (GDP). Levin-Lin-Chu unit-root test determined panel data stationarity. The statistical research shows that aggregated trade openness, investment, and inflation positively affect economic development, especially in emerging nations. Even if foreign direct investment (FDI) hurts economic development, static random influences did not change the results. Trade openness, investment, and inflation outweigh foreign direct investment.

Dutta, Haider & Das (2017) examined the 1976–2014 causal link between trade openness, foreign direct investment, domestic investment, and economic development. The study revealed unidirectional causation from foreign direct investment to growth, domestic investment to trade openness, and economic growth to

trade openness. Bakari & Tiba (2019) evaluated how trade openness, local investment, and foreign investment inflows affected economic development in 24 Asian nations from 2002 to 2017. The study employed fixed and random effect models. The analysis revealed that foreign direct investment and exports hurt growth.

Luo (2020) examined FDI's impact on China's worker income share using data from 2003 to 2017 from Shanghai and Shenzhen Stock Exchanges. Foreign firms' labor income share is comparable to domestic enterprises as China's reform and opening up and market-oriented reform continue. This suggests that foreign direct investment is decreasing or vanishing, while high-level control of foreign investors will increase worker income share of listed businesses in China.

Sapkota & Bastola (2017) explored how foreign direct investment (FDI) and wealth affect pollutant emissions in 14 Latin American nations from 1980 to 2010. We evaluate this region's Pollution Haven Hypothesis (PHH) and environmental kuznet curve (EKC) hypothesis. Panel fixed and random effects models that adjusted physical capital, energy, human capital, population density, and unemployment rate supported the PHH and EKC hypotheses. Estimating two models for high- and low-income nations does not change the PHH findings, however human capital's effects on pollution emission varies. FDI policies that encourage clean and energy-efficient companies might boost Latin American economic growth and environmental health.

It is evident from the above studies reviewed for the purposes of this study that there is a copious absence of studies that elaborately examined the effects of shocks to the macroeconomic correlates on FDI. Although, such studies may exist, but they are more recognized in their dearth than in their abundance. This is a major research issue that is addressed by this study alongside the long-run effects.

METHODOLOGY

The central research design follows the hypothetico-deductive finametric procedure. The study is first about long-run co-variations and effects. Thus, the application of such techniques as ADF unit root tests to examine the stationarity status and characteristics of the variables. This is all the more necessary to guide against and to make sure, the study is not analyzing estimation results with spurious contents. Johansen and Jusellius' cointegration trace and max-eigen tests and vector error correction modeling (VECM) and estimation were employed to determine the long-run properties and causality imperatives. The analysis of shocks was done using the impulse response function and variance decomposition analyses. These statistical methods are applied to annual Nigerian data from 1986 through 2020. The data set was sources from the Statistical Bulletins of the Central Bank of Nigeria (CBN) and Federal Bureau of Statistics (FBS), which published time series data. The collected data relate to FDI and its drivers, namely inflation, interest rate, currency rate, trade openness, and economic activity, from 1985 to 2020. Apart from the fact that all data are in ratios or rates of change, the were also casted in logarithms as suggested by the models.

The relevant model follows from the postulations that FDI is a function of exchange rate, inflation, interest rate, rate of economic growth, and trade openness [$\ln FDI_t = f(\ln EXR_t, \ln INF_t, \ln INT_t, \ln RGDP_t, \ln OPN_t)$]. The long-run representation of this functional expression would be:

$$\ln FDI_t = \alpha_0 + \alpha_1 \ln EXR_t + \alpha_2 \ln INF_t + \alpha_3 \ln INT_t + \alpha_4 \ln RGDP_t + \alpha_5 \ln OPN_t + \alpha_2 X_2 + v_t \quad (1)$$

while the VECM:

$$\Delta \ln FDI_t = \beta_0 + \sum \beta_i \Delta \ln FDI_{t-i} + \sum \gamma_j \Delta \ln EXR_{1t-j} + \sum \delta_k \Delta \ln INF_{2t-k} + \sum \delta_p \Delta \ln INT_{2t-p} + \sum \delta_q \Delta \ln RGDP_{2t-q} + \sum \delta_r \Delta \ln OPN_{2t-m} + \phi z_{t-1} + e_t \quad (2)$$

and where

$$z_{t-1} = (\ln FDI_{t-1} - a_0 - a_1 \ln EXR_{t-1} - a_2 \ln INF_{t-1} + a_3 \ln INT_{t-1} + a_4 \ln GDP_{t-1} + a_5 \ln OPN_{t-1}) \quad (3)$$

and the ais are the OLS estimates of the α 's in expression (1) above; and z, the “error-correction term”, is the OLS residuals series from the long-run “cointegrating regression” as in (1).

The above equations are estimated to determine the long-run equilibrium conditions and causality implications of the variables.

RESULTS AND ANALYSIS

Long-Run Relationships and Causality Between FDI and Its Determinants

The analysis of long-run relationships in this study took off from the test of stationarity of the variables. Use was made of the augmented Dickey-Fuller unit root test, whose results are summarized on Table 1. As can be deciphered from the Table, all the variables attained stationarity only at the first-difference, indicating that they are integrated at order 1. This allowed the study to employ Johansen Cointegration test to ascertain whether or not there is long-run cointegrating relationship between the variables.

TABLE 1
RESULTS OF THE AUGMENTED DICKEY-FULLER UNIT ROOT TESTS

Variable	Level t-stat	Prob	1 st Diff t-stat	Prob	Inference
LNINT	0.394490	0.7918	-5.999357	0.0000	I (1)
LNINF	-0.815667	0.3532	-4.196855	0.0002	I (1)
LNEXR	3.208020	0.9994	-3.423426	0.0013	I (1)
LNSMPR	-1.749203	0.0762	-5.130675	0.0000	I (1)
LNGDP	-0.218664	0.5978	-4.084715	0.0159	I (1)
LNOPN	-1.641147	0.0942	-8.446275	0.0000	I (1)
LNFDI	0.532361	0.8245	-2.909942	0.0053	I (1)

The results of the Johansen and Jusellius cointegration are summarized on Table 2. Panel A of the Table displayed the results of the trace statistic test of the variables in the typical VAR process. The null hypothesis of “at most 2” cointegrating equations is not accepted with trace statistic of 51.52[0.0217] against the critical value of 47.86[0.05] at 5% alpha level; suggesting that there is at least 3 cointegrating equations. Also, in Panel B that displayed the maximum eigen-value statistic test result, the observed max-eigen statistic of 35.226[0.0343] is greater than the critical value 33.876[0.05] and thus suggests the rejection of the null hypothesis of “at most 1” cointegrating, and that there is at least 2 cointegrating equations. Both the trace and max-eigen statistics lend credence to the existence of long-run equilibrium relationships among the variables in the series. This inference is only a first-order or necessary condition.

The second-order and sufficient condition is supplied by the result of the error-correction parameter in the error-correction model in the VAR process. Panel C of Table 2 depicts the result of the error correction parameter as -0.0443 with t-statistic of -2.5425. As can be verified, the error-correction parameter is negative and significant as *a priori* expected. This fulfils the second-order and sufficient condition that the variables are properly cointegrated at order 1; and that long-run relationships subsists between them. It further suggests that short-run errors are corrected in the long-run, without fail at a speed of 4.43% per annum. Though this adjustment rate is comparably low, but it does that adjustment job, nonetheless. More so, long-run causality jointly flowed from the independent variables (LNINT LNINF LNEXR LNGDP LNOPN) to LNFDI. Invariably, in the long-run, these variables cause FDI inflows to Nigeria.

But how does each of the explanatory variables relate with the FDI variable in the long-run. This is answered by the results of the estimates of the normalized cointegrating coefficients summarized in Panel D of Table 2. It is revealed that the degree of the long-run relationship between FDI and INT is a normalized beta-coefficient of -6.247 and t-statistic of -3.547, which is significant at 5% level. By implication, interest rate (INT) significantly and negatively relates with FDI, in the long-run. Since, as is noted earlier, interest rates significantly affect FDI inflows to Nigeria considerably. An increase in interest rate (INT) by 1%

reduces FDI inflows by 6.23%; where a reduction in interest rate increases FDI inflows. This suggests that FDI's hope to take advantage of low interest rate, in the future, as they come into the country.

TABLE 2
RESULT OF JOHANSEN COINTEGRATION TEST OF VARIABLES

Trend assumption: Linear deterministic trend
Series: LNFDI LNINT LNINF LNEXR LNGDP LNOPN
Lags interval (in first differences): 1 to 1

Panel A: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.788231	131.7631	95.75366	0.0000
At most 1 *	0.703201	86.74764	69.81889	0.0013
At most 2 *	0.531611	51.52131	47.85613	0.0217
At most 3	0.456941	29.52609	29.79707	0.0537
At most 4	0.295353	11.82050	15.49471	0.1657
At most 5	0.055921	1.668806	3.841466	0.1964

Panel B: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.788231	45.01548	40.07757	0.0128
At most 1 *	0.703201	35.22633	33.87687	0.0343
At most 2	0.531611	21.99522	27.58434	0.2206
At most 3	0.456941	17.70559	21.13162	0.1413
At most 4	0.295353	10.15169	14.26460	0.2022
At most 5	0.055921	1.668806	3.841466	0.1964

Panel C: Error Correction Parameter Estimates

Error Correction:	D(LNFDI)	D(LNINT)	D(LNINF)	D(LNEXR)	D(LNGDP)
CointEq1	-0.044329 (0.01743) [-2.54253]	-0.019828 (0.00254) [-7.80928]	-0.041328 (0.06049) [-0.68327]	-0.031621 (0.00837) [-3.77606]	-0.006594 (0.00394) [-1.67514]

Panel D: Long-run Cointegrating Coefficients

1 Cointegrating Equation(s): Log likelihood 57.90901

Normalized cointegrating coefficients (standard error in parentheses; t-stat in brackets)

LNFDI	LNINT	LNINF	LNEXR	LNGDP	LNOPN
1.000000	-6.247138 (1.76107) [-3.547]	1.033945 (0.30956) [3.341]	1.994200 (0.77818) [2.563]	-3.033439 (0.60959) [-4.976]	3.606873 (0.91438) [3.9944]

Inflation (INF) is also revealed to positively and significantly influence FDI inflows in the long-run with a beta coefficient of 1.0339 and t-statistic of 3.341, which is significant at 5% level. It is such that a 1% increase in inflation elicits a 1.04% increase in FDI inflows. Similarly, exchange rate positively and significantly causes FDI to occur in the country, in the long-run (beta coeff = 1.9942; t-stat = 2.563). A percentage increase in exchange rate (tantamount to devaluation) produces 1.99% increase in FDI inflows. The state or level of activities in the economy, as represented by the GDP growth is found to significantly but negatively influence FDI inflows to Nigeria, in the long-run (beta coeff = -3.033; t-stat = -4.976). As shown, 1% decrease in GDP causes 3.03% increase in FDI inflow to Nigeria, in the long-run when all variables are allowed to vary together. Finally, it is shown from Panel D of Table 2 that openness of the economy variable (OPN or NEXPR) positively and significantly causes FDI to occur in the long-run (beta coeff = 3.6068, t-stat = 3.9944). Invariably, as the economy opens further by 1%, FDI flows into the country by 3.61%. By implication, all the modeled variables are key long-run determinants of FDI inflows to Nigeria.

Analysis of Responses of FDI to Shocks

From Table 3, it is easy to see the estimated results of the impulse response function. FDI responded to shocks from itself and those to the explanatory in various ways. For instance, own shocks caused positive and significant changes in FDI only in the first period of innovation (coeff = 0.33, t = 8.31). It was only in this first period that unexpected and quite sudden FDI inflows positively and significantly occurred in the country. Apart from the first, third, fourth and ninth periods of innovation, FDI responded negatively to shocks from itself all through the remaining periods. This is reflected also in Figure 1. Interest rate (INT) rate shocks affected FDI such that it responded both negatively and significantly only in the second period of innovation (coeff = -0.156, t = 2.03). Generally, with the exception of the second period, response of FDI to innovations in INT was basically positive all through the ten periods.

Sudden changes in exchange rate (EXR) caused unexpected positive and significant inflow of FDI to the country only in the second period of innovation (coeff = 0.165, t = 2.17). For other periods, responses were not significant but were positive up until the fifth period, when they became negative till the ninth period. Shocks in GDP also affected FDI positively and significantly only in the second period of innovation (coeff = 0.173, t = 2.64). Responses of FDI to GDP shocks moved in alternate fashion, being positive in one period and negative in the other all through the innovation periods. Shocks in inflation (INF), though not significant in any of the periods were positive from the second through the fourth periods, but negative from the fifth through the ninth periods. Unexpected changes in the openness of the economy (NEXPR) variable started with negative response of FDI from the second through the seventh periods before it turned positive from the eighth to the tenth periods. These observed trends are confirmed by the impulse response graph of Figure 1.

TABLE 3
IMPULSE RESPONSE FUNCTION RESULTS OF THE VARIABLES

Response of LNFDI: Period	LNFDI	LNINT	LNINF	LNEXR	LNGDP	LNEXPR
1	0.332318 (0.04364)	0.000000 (0.00000)	0.000000 (0.00000)	0.000000 (0.00000)	0.000000 (0.00000)	0.000000 (0.00000)
2	-0.015901 (0.08588)	-0.156215 (0.07762)	0.097378 (0.08716)	0.164548 (0.07598)	0.173433 (0.06558)	-0.097111 (0.07167)
3	0.072606 (0.08725)	0.009149 (0.07688)	-0.025000 (0.10108)	0.103067 (0.08267)	-0.029665 (0.07282)	-0.098169 (0.09289)
4	0.004085 (0.08619)	0.101034 (0.07711)	0.060774 (0.09635)	0.140270 (0.08164)	0.056050 (0.06269)	-0.089285 (0.08209)
5	-0.012090 (0.08247)	0.110113 (0.07178)	0.013111 (0.08370)	-0.019654 (0.07969)	-0.038199 (0.06586)	-0.126957 (0.08088)
6	-0.113925 (0.07725)	0.125803 (0.06731)	-0.025879 (0.07408)	-0.005686 (0.07351)	0.000162 (0.06027)	-0.074153 (0.08205)
7	-0.015334 (0.07849)	0.149936 (0.07748)	-0.091931 (0.08044)	-0.087049 (0.07966)	-0.063354 (0.06145)	-0.014099 (0.08585)
8	-0.051825 (0.07863)	0.088280 (0.08249)	-0.082004 (0.08582)	-0.055209 (0.08464)	0.000649 (0.06613)	0.013523 (0.09526)
9	3.60E-05 (0.07808)	0.049099 (0.08689)	-0.114097 (0.08379)	-0.064783 (0.08432)	-0.033285 (0.06198)	0.026660 (0.09400)
10	-0.001067 (0.07503)	0.018673 (0.08586)	-0.083058 (0.07784)	0.002117 (0.08337)	0.006644 (0.06073)	0.027758 (0.09019)

TABLE 4
VARIANCE DECOMPOSITION TESTS RESULTS OF THE VARIABLES

VD of LNFDI: Period	S.E.	LNFDI	LNINT	LNINF	LNEXR	LNGDP	LNEXPR
1	0.332318	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.459521	52.41923	11.55675	4.490654	12.82257	14.24470	4.466094
3	0.488140	48.66538	10.27652	4.241840	15.82129	12.99273	8.002248
4	0.531966	40.98295	12.26020	4.876874	20.27465	12.05026	9.555067
5	0.559816	37.05329	14.93955	4.458554	18.43080	11.34671	13.77109
6	0.590254	37.05559	17.98105	4.202810	16.58822	10.20665	13.96568
7	0.625585	33.04827	21.75167	5.900993	16.70363	10.11191	12.48353
8	0.641710	32.06048	22.56478	7.241193	16.61490	9.610205	11.90844
9	0.658207	30.47355	22.00431	9.887644	16.76121	9.390238	11.48305
10	0.664308	29.91670	21.68105	11.27014	16.45581	9.228575	11.44772

From Table 4, which showed the variance decomposition test, the proportions of the effects of the shocks of the variables on FDI (and associated proportion of degree of responsiveness) are summarized. As expected, own-shocks claimed the total effects of shocks (100%) on FDI inflows, in the first period, 52% in the second year, 37% in the fifth year and 29.9% in the tenth period. There is a phenomenal and continuous decrease in the effects of own-shocks all through the period as depicted in Figure 2. The proportion of effects of shocks pertaining to interest rate was 11% in the second period, 14% in the fifth period, and 21% in the tenth period. This reflects an increasing trend as can be seen in Figure 2. For inflation, the proportion stood at 4.49% in the second period, 4.87% in the fourth period, 7.2% in the seventh period, and 11.27% in the tenth year. The increase is rather on a slow basis. Exchange rate, on its own decreased from 20.27% in period four to 16.61% in period 8, and 16.45% in period ten. The proportion of effects of GDP shocks on FDI inflows 14.24%, but reduced to 11.35% in the fifth year, and finally to 9.23% in the tenth period. The proportion shocks in respect of openness of the economy stood at 4.46% in the second year, 13.77% in the fifth year, and 11.45% in the tenth period. From the sixth year the effects started waning till the end of the period.

FIGURE 1
IMPULSE RESPONSE GRAPH OF VARIABLES

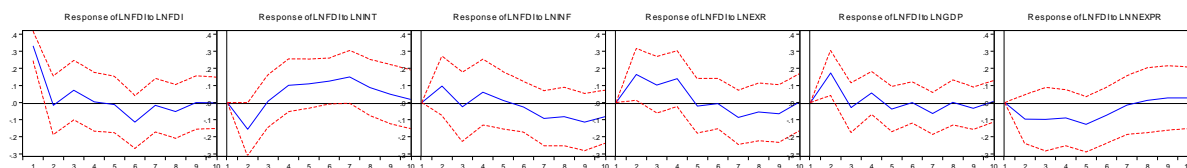
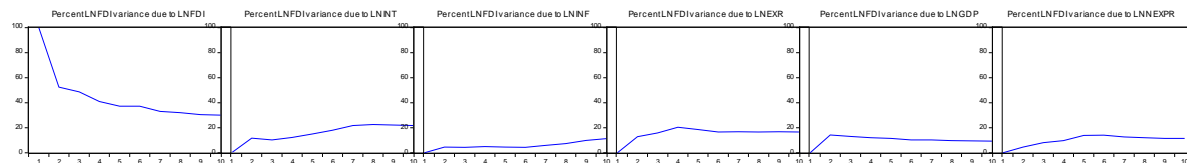


FIGURE 2
VARIANCE DECOMPOSITION GRAPH OF VARIABLES



CONCLUDING REMARKS

This study centered on long-run causation and shocks of nominated variables on FDI inflows. The key findings of the study can be summarized as follows:

- (i) Long-run equilibrium relationships are found to exist between FDI, INT, INF, EXR, GDP, and NEXPR.
- (ii) Short-run errors are corrected in the long-run, without fail at a speed of 4.43% per annum. Though this adjustment rate is comparably low, but it does that adjustment job, nonetheless.
- (iii) Long-run causality jointly flows from the independent variables (LNINT LNINF LNEXR LNGDP LNOPN) to LNFDI. Invariably, in the long-run, these variables cause FDI inflows to Nigeria. This is supported by the results of the normalized long-run cointegrating coefficients of the variables, which are all significantly related to FDI at conventional levels.
- (iv) With the exception of the second period, response of FDI to innovations in INT was basically positive all through the ten periods.
- (v) Responses of FDI to shocks in EXR were positive up until the fifth period, when they became negative till the ninth period.
- (vi) Responses of FDI to GDP shocks moved in alternate fashion, being positive in one period and negative in the other all through the innovation periods.

- (vii) Shocks in inflation (INF), though not significant in any of the periods, were positive from the second through the fourth periods, but negative from the fifth through the ninth periods.
- (viii) Unexpected changes in the openness of the economy variable started with negative response of FDI from the second through the seventh periods before it turned positive from the eighth to the tenth periods.
- (ix) Proportionately, own shocks dominated the responses of FDI inflows for the first and second periods, but started decreasing at a very fast rate to give innovations in the residuals of the other variables to takeover the center stage of FDI responses.

RECOMMENDATIONS

Policy implications from the results of this study would suggest that when government of Nigeria is considering attracting FDIs in a sustainable long-term fashion, it should work on the margin requirement and the stated lending and deposit rates of interest in such a manner to achieve reducing interest rate to enable reduction in cost of production. The monetary authorities should target mild inflation and mild devaluation of the Naira against the dollar and currencies of other major trading partners of the country, such as UK, China and Japan. Among other policy options, it should work on increasing the degree of openness of the economy to the outside world. If these are done, achieving sustainable long-term FDI inflows would be more guaranteed than otherwise.

CONCLUSION

The study reveals that in the long-run interest rate (LNINT), inflation (LNINF), exchange rate (LNEXR), level of economic activity and growth (LNGDP), and degree of openness of the economy (LNOPN) significantly cause FDI inflows to Nigeria. Whereas the direction of causation is positive for inflation, exchange rate and openness of the economy, it was negative for level of economic activity and interest rate. FDI inflows responded to unanticipated changes in the modeled determinants in different directions, some positively for a designated time, while some negatively at other periods. Generally, own shocks claimed the bulk of the responses in the first and second periods (basically more than 50% of the innovations), before other variables took over to jointly dominated the responses of FDI inflows in subsequent periods. It can thus be said that shocks in the independent variables jointly affected the shocks in FDI from the second through the tenth periods of innovations.

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