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The Causal Link among Foreign Direct Investment, Inflation, and Exchange Rate in the Nigerian Economy

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Abstract

This paper studies the dynamic link among Foreign Direct Investment (FDI), inflation, and exchange rate fluctuation in Nigeria. Foreign Direct Investment is assumed to benefit a developing country like Nigeria, not only by supplementing domestic investment, but also in employment creation, transfer of technology, increased domestic competition, and other positive externalities. This is yet to be substantiated and provides the ground for this study on how this relates inflation and exchange rate in the Nigerian economy. Using time series data, data for the study were collected from world bank development indicators from 1985 to 2021. Pearson Correlation was used to test the hypothesis with aids of Autoregressive Distributive Lag (ARDL) model. The

findings revealed that there is a significant long run relationship between AGDP, FDI, FPI, CPS, MS, EXCH, and INF in Nigeria. The study indicates that economic growth in Nigeria is directly related to foreign investment inflow and economic growth in Nigeria. Specifically, MS FPI have bidirectional causality in the Nigerian economy. Inflation was also found to granger cause exchange rate in the economy. The paper thereby recommends among others that there is a need for the government to attract more foreign direct investment inflow into the Nigerian economy by ensuring that there is stability in macroeconomics and the political environment is achieved.

Keywords: Foreign Direct Investment, Economic Growth in Nigeria, Granger Causality, Foreign Portfolio Investment, Exchange Rate, Inflation, Money Supply

1. Introduction

Foreign investment inflow, particularly foreign direct investment (FDI) is perceived to have a positive impact on the economic growth of a host country through various direct and indirect channels. It augments domestic investment, which is crucial to the attainment of sustained growth and development. Consequently, many developing countries, Nigeria included, have offered generous incentives to attract FDI inflows and, in addition, undertaken macroeconomic reforms, often under pressure from Bretton Woods Institutions, also geared towards the same end creating an investor-friendly environment. Some foreign firms have taken advantage of the incentives to satisfy their various motives of ensuring stable monopolistic control over sources of raw materials for their parent companies, access to control of local markets, utilizing low-cost labour and realizing the possibility of higher returns and until the last five years, Nigeria also received very low proportions of global FDI inflows, in spite of its being blessed with enormous human and natural resources. This is perhaps because the economy was perceived by investors as a high-risk market for investment.

The foreign direct investor may acquire 10% or more of the voting power of an enterprise in an economy through; incorporating a wholly owned subsidiary or company, acquiring shares in an associated enterprise, through merger or an unrelated enterprise and, participating in an equity joint venture with another investor. Foreign direct investment incentives may be in form of low corporate and income tax rates, tax holidays, other types of tax concessions, preferential tariffs, special economic zones, investment financial subsidies, soft loan or loan guarantees, free land or land subsidies, relocation and expatriation subsidies, job training and employment subsidies, infrastructure subsidies, research and development support and derogation from regulations, usually for very large projects (1).

2. Literature review

Foreign investment is classified into direct and indirect foreign investment. The direct investment is referred to physical investments made by a company in a foreign country, typically by opening plants and buying buildings, machines, factories,

and other equipment in the foreign country. These types of investment are more beneficiary as they it generally considered long-term investments and help enhance host country's economy.

On the other hand, indirect investment occurs when the production process of firm is broken down into different stages and each stage of production is taken care by different economy while the outputs are subsequently transported to their final assembling location^[2,3].

The ability of a country to successfully attract foreign direct investment is hinged on broad categories of factors, which include the level country's macroeconomic performance, the quantum infrastructure and resources, the investment environment, as well as the quality of the government institution and market size,^[4]. In the same vein,^[5], affirmed that human capital determines foreign direct investment which justify that government expenditure on human capital, and institutional quality are some of the factors that propel economic growth via inflow of foreign direct investment.

^[6] posits that economic growth is a process by which a nation's wealth increases over time. However, it generally refers to an increase in the production of economic goods and services, compared from one period of time to another, which can be measured in nominal or real terms. In similar manner,^[7] opined that economic growth can be linked to a lot of factors, this is to say that any investment that improve the quality of existing physical and human resources, will also increases the quality of the same productive resources through invention, innovation and technological progress which help in stimulating economic growth. In addition,^[8] argued that economic growth is the expansion of a country's potential gross domestic product. Similarly,^[9] in his study opined that economic growth is increase in the gross domestic product, expressed in both absolute and relative terms. Based on the assertion, economic growth is systemic and hence, is a function of investment in either physical or human capital, implying that for any economy to grow, certain deliberate action must be taken to invest in both physical capital and human capital.

^[10], opined that there are three mechanisms through which economic growth can take place in an economy. First, investment in education, which facilitates human capital development which is inherent in the labor force, hence, triggering increase in labour productivity and thus transcend to growth towards a higher equilibrium level of output. Second, investment in human capital may increase the innovative capacity of the economy, create knowledge base technologies, enhance products and processes, which could promote growth in the economy, and third, facilitate the diffusion and transmission of knowledge needed to understand the process of new information and to successfully implement new technologies.

^[11], examined the nexus between economic growth, domestic and foreign investments in Nigeria within the period 1981 to 2018. The study employed autoregressive distributed lag approach in testing the long-and-short runs relationship. The results of the findings revealed that foreign investment has positive impact on economic growth in the long-and-short runs, while domestic investment assert a negative and insignificant effect on economic in Nigeria. In the same vein.

^[12], examined the nexuses between foreign direct

investment, economic growth and financial sector development in 45 African countries from 1980 to 2016. The study employed system generalized method of moments and found that foreign direct investment, and financial sector has a positive influence on economic growth.

^[13], explored the nexus between stock market returns and foreign portfolio investment in Nigeria, using a single linear regression analytical technique from the period 1990 to 2010. The result of the study shows that foreign portfolio investment has a positive and significant impact on stock market returns while inflation rate has positive but significant impact on stock market returns. Further research revealed that unidirectional causality exists between stock market returns and foreign portfolio investment in the economy, with the latter fostering stock market returns in Nigeria.

^[14], examined the nexuses between foreign private capital, foreign portfolio investment, economic growth and some macroeconomic indicators, spanning from 1986 to 2008. The study used vector Autoregressive model and structural vector Autoregressive. They revealed that both in the short-run and long-run foreign private capital, foreign portfolio investment impact asserts positive influence on the GDP.

^[15], analyzed the association between economic growth, the stock of foreign investment and the stock of domestic capital in Malaysia from 1970 to 2007. The study adopted generalized method of moments. The result affirmed that financial development has contributed positively to the growth of the domestic capital stock in Malaysia but insignificantly impact on economic growth. In the same vein^[16], explored the nexus between Foreign Portfolio Investment and economic performance in Malaysia using quarterly data covering the period from 1991 to 2006. The Granger causality and variance decomposition and impulse response technique

were used and it was revealed that economic growth causes changes in Foreign Portfolio Investment and its volatility and not vice versa.

3. Methodology

The study will employ annual secondary data time series spanning from the period of 1985 to 2021 and as such covers thirty years (36). These time-series data are sourced from the World Bank Development Indicators (WDI,2021). The country to consider for study based on data availability is Nigeria, and the justification for starting from 1985, is to examine the impact of foreign investment inflows on economic growth during military era and after military era, that is from 1985 to 1999 and 1999 to 2021.

Studies have used the endogenous growth theory to increase the information of economic growth dynamics in relation to the issues that are accountable for growth variances observed in developed and less developed nations. This study will adopt the endogenous growth AK model propounded by^[17] and modified by^[18]. The justification for embracing the model is that the model highlights the possible effects foreign direct investment on steady-state growth.

In the light of the theoretical foundation, this study followed the work of^[19] and^[20], which suggest that growth in the economy depends on extent of foreign direct investment inflows. The model for of^[19] is specified as:

$$RGDP = f(FDI, BOP, EXR)$$

Equation 3.7 is linearized as:

$$\text{Log}RGDP_{t-1} = \varphi_1 + \text{Log}\varphi_2 FDI_{t-1} + \text{Log}\varphi_3 BOP_{t-1} + \text{Log}\varphi_4 EXR_{t-1} + \varepsilon_{t-1}$$

Where RGDP represents real gross domestic product (a proxy for economic growth), FDI signifies foreign direct investment, EXR represents official exchange rate, φ_1 ,

$\varphi_2, \dots \dots \varphi_3$ is the parameter estimation and ε_t is the error terms.

From equation, the model is extended and specified to accommodate the current study as:

$$\Delta AGDP_t = \varphi_1 + \varphi_2 FDI_{t-1} + \varphi_3 FPI_{t-1} + \varphi_4 CPS_{t-1} + \varphi_5 MS_{t-1} + \varphi_6 EXCH_{t-1} + \varphi_7 INF_{t-1} + \varepsilon_t$$

4. Findings and discussion

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

	<i>AGDP</i>	<i>FDI</i>	<i>FPI</i>	<i>CPS</i>	<i>MS</i>	<i>EXR</i>	<i>INF</i>
Mean	4.144031	1.602494	-13.99055	9.599861	934.9050	120.3995	19.02256
Median	4.230061	1.374086	-1.828940	8.425299	176.6011	100.0000	12.55496
Maximum	15.32916	5.790847	36.02300	19.60353	3862.735	482.7327	72.83550
Minimum	-2.035119	0.195183	-149.9240	4.948032	2.315300	49.74991	5.388008
Std. Dev.	3.914264	1.240218	35.02979	3.514970	1230.565	81.06867	17.46307
Skewness	0.482414	1.724826	-2.397946	1.005256	1.080382	2.876270	1.784465
Kurtosis	3.288276	5.940375	9.123268	3.778270	2.724840	12.25552	4.861304
Jarque-Bera	1.563244	31.67495	93.26313	7.165450	7.314619	183.0829	24.97764
Probability	0.457663	0.000000	0.000000	0.027800	0.025802	0.000000	0.000004
Sum	153.3292	59.29229	-517.6505	355.1948	34591.49	4454.783	703.8345
Sum Sq. Dev.	551.5728	55.37305	44175.11	444.7804	54514481	236596.6	10978.52
Observations	37	37	37	37	37	37	37

Source: Author’s Computation (2022)

From table 1 above, during 1985 to 2021, the gross domestic product growth rate (GDP) has an average value of 4.144031; its median of value is 4.230061. It reaches maximum value of 15.32916 and its minimum value is -2.035119. The standard deviation (3.914264) indicates the dispersion of the data set on gross domestic product growth from its mean value. Skewness value of 0.482414 shows that the data set were positively skewed that is, they were not symmetrically distributed but were asymmetrically increasing to the right. The Kurtosis value of 3.288276 is greater than 3.0 indicating a high peakness than normal distribution. The Jarque Bera value of 1.563244 with probability value of 0.457663 is not statistically significant at 5% level of significance. Hence, the data set for real gross domestic product growth (GDP) are normally distributed.

Also, from the table 2, it is observed that during the period covered in this study, the average of foreign direct investment (FDI) is 1.602494, median of 1.374086. Its maximum value was 5.790847 and its minimum value of 0.195183. The standard deviation (1.240218) indicates the dispersion of the data set of foreign direct investment from its mean. Skewness (1.724826) shows that the data set were positively skewed that is, they were symmetrically distributed and were asymmetrically increasing to the left. The Kurtosis value of 5.940375 is less than 3.0 which measure the degree of peakness of a data set indicating a flatter than the peakness of normal distribution. The Jarque Bera value of 31.67495 with probability value of 0.000000 is statistically significant at 5% level of significance. Hence, indicating that the data set is not normal distributed.

Further, foreign portfolio investment (FPI) has an average of -13.99055, median of -1.828940. Its maximum value is 36.02300 and its minimum value of -149.9240. The standard deviation (35.02979) indicates the dispersion of the data set of foreign portfolio investment from its mean. Skewness (-2.397946) shows that the data set were positively skewed that is, they were symmetrically distributed and were

asymmetrically increasing to the left. The Kurtosis value of 9.123268 is greater than 3.0 which measure the degree of peakness of a data set indicating a higher than the peakness of normal distribution. The Jarque Bera value of 93.26313 probability value of 0.000000 is statistically significant at 5% level of significance. Hence, indicating that the data set is not normal distributed.

Furthermore, table 2 reported that credit to private (CPS) has an average of 9.599861, median of 8.425299. Its maximum value is 19.60353 and its minimum value of 4.948032. The standard deviation (3.514970) indicates the dispersion of the data set of trade openness from its mean. Skewness (1.005256) shows that the data set were negatively skewed that is, they were symmetrically distributed and were asymmetrically increasing to the left. The Kurtosis is 3.778270 greater than 3.0 implying that the degree of peakness of a data set. This indicates a high peakness than that of normal distribution. The Jarque Bera value of 7.165450 with probability value of 0.027800 is statistically significant at 5% level of significance. Hence, indicating that the data set is not normal distributed.

In the table 2, it is observed that, money supply (MS), exchange rate (EXR) and inflation (INF) have the averages values of 934.9050, 120.3995 and 19.02256 respectively. Median values of money supply (MS) and exchange rate (EXR) are 176.6011, 100.0000 and 12.55496 respectively. Jarque Bera values of 18.64570, 183.0829 and 24.97764 for that money supply (MS), exchange rate (EXR) and inflation (INF) respectively have probability value of 0.025802, 0.000000 and 0.000004 shows that money supply (MS), exchange rate (EXR) and inflation (INF) are not normally distributed as their probability value exceed 0.05 at 5% level of significance.

4.2 Test for Stationarity

Having understood the summary statistics and the trend of the variables, the study begins by testing for the order of

integration. This study applied the Augmented Dickey-Fuller (ADF) unit root tests to examine the stationarity of

the time series and test the null hypothesis of the unit root.

Table 2: Unit Root Test

Variable	ADF at Level (5%)	Prob.	ADF at First Differences (5%)	Prob.	Order of Integration
AGDP	-1.961423	0.3017	-10.90842	0.0000	I(1)
FDI	-3.863153	0.0054	-	-	I(0)
FPI	-3.897013	0.0050	-	-	I(0)
CPS	-2.269421	0.1871	-5.488673	0.0001	I(1)
MS	1.153993	0.9972	-4.283968	0.0018	I(1)
EXR	-6.718932	0.0000	-	-	I(0)
INF	-3.479405	0.0146	-	-	I(0)

Source: Author’s Computation (2022)

In order to determine the stationarity of time series data, the study employs Augmented Dickey Fuller (ADF) test. The result presented in table 2 above reveals that gross domestic product (AGDP), credit to private sector (CPS), and money supply (MS), are stationary at first difference while foreign direct investment (FDI), foreign portfolio investment (FPI) exchange rate (EXR) and inflation (INF) are stationary at level. Consequently, this implies that the variables use in this study are integrated in different order of I(0) and I(1) and the appropriate method (ARDL bound test) will be required to established for their cointegration.

Table 3: ARDL Bound Co-integration Results

Test Statistic				
F-statistic = 4.272262	K= 7			
Critical Value Bounds				
Significance	10%	5%	2.5%	1%
I(0) Bound	2.03	2.32	2.6	2.96
I(1) Bound	3.13	3.5	3.84	4.26

Source: Author’s Computation (2022)

The ARDL Bound Co-integration results in table 3 indicate a long-run relationship exists among the variables.

Table 4: Post Estimation Results

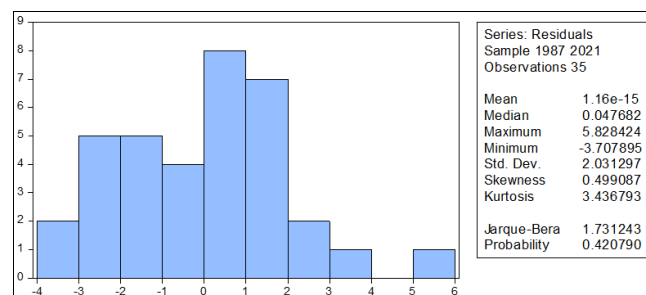
Test	F-stat.	(Prob.)
Serial Correlation (LM)	0.168527	(0.8461)
Heteroscedasticity Test (Breusch-Pagan-Godfrey)	0.548537	(0.8588)
Ramsey RESET Test	0.771354	(0.4757)

Source: Author’s Computation (2022)

The report revealed that serial correlation test with F-stat value of 0.168527 and prob.-value of 0.8461 is statistically in significant at 5% level of significant, indicating acceptance of null hypothesis of no serial correlation associated with model. Also, the heteroscedasticity test with F- stat value of 0.548537 and prob. value of 0.8588 is statistically in significant at 5% level of significant, indicating acceptance of null hypothesis of no heteroscedasticity associated with model. The Ramsey RESET test for stability of the model with F-stat value of 0.771354 and prob. value of 0.4757 is statistically in significant at 5% level of significant, indicating acceptance of null hypothesis of no misspecification associated with model.

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Source: Author’s Computation (2022)

Fig 1: Residual Normality Test

Fig 1 indicates that the residual term met the normality condition as Jarque Bera (1.731243) with probability (0.420790) is not significant at 5% level of significance, confirming the acceptance on null hypothesis of normality of error term.

4.3 Granger Causality

The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. Clive Granger argued that causality in economics could be tested for by measuring the ability to predict the future values of a time series using prior values of another time series. To examine the direction of causality among the variables, the effect was analyzed using granger causality test as shown in table 3 only the significant results are discussed. The test is carried out against the null hypothesis of no causality relations among the variables. The decision of accepting or rejecting the null hypothesis is based on the probability value at 1%, 5% and 10% level of significance. The null hypothesis is rejected if the relationship between any two given variables is found to be significant otherwise the null hypothesis accepted.

Table 5: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
MS does not Granger Cause FPI	35	6.32394	0.0051
FPI does not Granger Cause MS		3.40582	0.0465
INF does not Granger Cause EXR	35	4.09049	0.0269
EXR does not Granger Cause INF		2.05133	0.1462

Source: Author's Computation (2022)

From table 5, the granger causality test was conducted to show the variables influence each other. As observed in Table 5, there is bi-directional causal relationship running from money supply (GDP) to foreign portfolio investment (FPI). This implies that money supply has a significant influence on foreign portfolio investment (FPI) with corresponding feedback. Also, a unidirectional causal relation runs from inflation to exchange rate (EXR) without feedback response from exchange rate. This implies that inflation has influence on influence on exchange rate in Nigeria.

5. Summary

This study examined the relationship between FDI and Economic growth in Nigeria using the Granger Causality Test for the period from 1985 to 2021. An Autoregressive Distributed Lag (ARDL) model and Granger causality were employed for the analysis. The granger causality test revealed that; a bi-directional causal relationship exists between money supply (MS) and foreign portfolio investment (FPI) in Nigeria. Also, a unidirectional causal relationship runs from inflation (INF) to exchange rate (EXR) without feedback. This implies that inflation has significance influence on Exchange rate.

5.1 Conclusion

The recent motivation of interest in the link between foreign investment and economic growth stems mainly from the insights and techniques of neoclassical exogenous growth models, which have shown that there can be self-sustaining economic growth from outside. Building on this theoretical foundation, this study had been designed to achieve the research objectives. By employing a valid and reliable methodology which is the auto regressive distributed (ARDL) model, this study has significantly contributed to the theoretical and methodological knowledge in this area. The findings from this research also provide a useful guideline to investor's decisions in light of the current changing environment and also the researchers and students.

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