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Impact of Foreign Direct Investment on Agricultural Productivity in Nigeria

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Abstract

	This study was carried out to investigate the impact of Foreign Direct Investment on agricultural productivity in Nigeria between 2000 and 2022. The objectives of the study are to determine the impact of Foreign Direct Investment on the
	agricultural sector, to evaluate the relationship between Foreign Direct Investment and the growth of agricultural sector Data
Keywords: Foreign Direct Investment Economic growth Agriculture and productivity	were collected from Central Bank of Nigeria - Statistical bulletin and online data base, World development indicators for the period of 2000-2022 and was analyzed using Ordinary Least Square as the estimation technique using of E-View Software. The results revealed that Foreign Direct Investment had significant impact on agricultural sector during the pariod reviewed EDI
JEL Classification: G4, E23	had a negative yet significant impact to agricultural productivity
Corresponding author	in Nigeria. The study recommends that the government should emphasis on increasing Bank credit to farmers and reduce
Dr. Mustapha M. Abdullahi	interest rates in order to increase productivity of agriculture in
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1. Introduction

Nigeria's future (Ogbe, 2018) Agriculture has been a vital sector in Nigeria's economy since inception (independence) employing the most share of the labour force from 1960 to date, the lustiness of agriculture was steadily increasing before the discovery of crude oil in commercial Agriculture is Nigeria's past and

quantity which jeopardize the once giant sector of the economy (agriculture), This discovery of black gold (crude oil) lead to the slow and gradual deterioration of Nigeria's once praised sector, with a land area of about 76,200,000 hectares of arable land (WB, 2019).

The country has potential of becoming one of the economic impact players globally due to it rich human and natural endowment, with which it can build a prosperous economy, reduce poverty significantly, and provide sound health care for her citizens. These all have not been achieved due to the decline of key productive sectors of the economy as a result of over dependence on oil. This has greatly affected the agriculture of Nigeria which has been the main source of resources of revenue earning to the economy. This continued deterioration of budgetary allocation to the sector, decline in agricultural output and the perception that if properly taken into consideration, the sector could bounce back to its position.

In an effort to stabilize the economy over the years the Nigerian government tried creating a suitable economic climate to attract foreign investment, foreign companies especially multinationals willing to invest in agriculture, appears to be the main beneficiaries of the policy but till date few multinationals corporations have taken advantage of the government's incentives, the government seeks to level-out the huge gaps that limits the sector from actualizing optimization by improving it finance, while the country cannot generate the huge financial deficit required for production at an optimal level, it sees Foreign Direct Investment as a reliable source of capital-pool to fund the decaying sector.

Nigeria as a country, given her natural and human resource base of about 190 million qualifies to be a major recipient of FDI in Africa, the country is indeed one of the top three leading African countries that consistently received FDI in the past decade just below South Africa and Egypt. However, the level of FDI attracted especially to agriculture is small compared to the resource base and potential need. The country's share of FDI inflow to Africa averaged around 20.68% between 1976 and 2007. The percentage of FDI inflow to the agricultural sector in Nigeria during the same period is less than 1%. Between 1980 and 1984, it was 2.46% which was the highest and stood at 0.37% (Ajuwon, 2013).

The agricultural sector of Nigeria seems to provide a reasonable amount of foreign exchange and employment for it citizens, in which development projects can be funded. These will further strengthen the food security in the country, However the lack of funding and proper progressive policies has crippled the sector to the point of not attaining the desirable outcome, These have forced the sector to perform at a suboptimal level limiting economic growth, these funds help to provide agricultural inputs like fertilizers, infrastructure, improve research facilities, and also help to strengthen the logistics required to efficiently produce agricultural commodities.

Even though agriculture still remains the largest sector of the economy the production hurdles have limited the performance of the agricultural sector, over the past 21-30 years it has been estimated that Nigeria has lost USD10 billion in annual export opportunity from groundnut, palm oil, cocoa and cotton alone due to a steady reduction in the production of these key relevant commodities (FMARD, 2008).

The Nigerian agro-economy stands to benefit substantially from the huge capital inflows from multinational corporations if the sector is more opened and liberalized, these inflows will trickledown to the grass-root sub-sectors due to FDI's spill-over effect, These will increase agricultural productivity in turn increasing total output (GDP),the increase in GDP will further boost investor confidence making multinationals to increase investment, this will cause a continuous expanding cyclical paradox. This is more demonstrated in fig. 1 below showing cyclical movement of FDI inflow on Agriculture.



Fig. 1. cyclical movement of FDI inflow on Agriculture

This study tries to evaluate the impact of foreign direct investment on agricultural sector in Nigeria and examine if it is a reliable tool that will ensure the sector to operate at an optimal level. It is on this note that the researchers' intent to ask the following research question: Does Foreign Direct Investment have impact on the growth of agricultural sector?

The objectives of the study are to evaluate the impact of Foreign Direct Investment on the growth of agricultural sector. It was also on this note that the following hypothesis was formulated:

 H_{01} : Foreign Direct Investment has no significant impact on the growth of agricultural sector.

One of the generally desired ways to improve agricultural productivity in developing economies like Nigeria is to source for funds through Foreign Direct Investment. According to Alfaro et al (2009) there is a widespread belief that FDI enhances the productivity of host countries and promotes economic development, this implies that Foreign Direct Investment may not only provide direct capital financing but also creates positive externality via the adoption of foreign technology and know-how. Agricultural sector plays a vital role in the general economy of Nigeria and has the potential to increase the overall growth prospectus which means that investing in the sector will enhance a self-sustaining and self-reliance economy. Since more than 70% of Nigerians live in rural areas with the agriculture as their source of livelihood. FDI will impose an indirect impact on growth through increased employment and income, allowing movement of capital inflows into the sector is the central role to eradicate poverty.

2. Literature review

2.1 Conceptual Review

2.1.1 Foreign Direct Investment

The term foreign direct investment is a substantial, lasting investment made by a company or government into a foreign concern. It refers to an ownership stake in a foreign company or project made by an investor, company, or government from another country. FDI is an investment made to acquire a lasting management interest (normally 10% of voting stocks) in business enterprises that operates in a country different from that of the investors, defined according to residency (World Bank, 1999).

2.1.2 Agriculture

This is the science or practice of farming, including cultivation of the soil for the growing of crops and rearing of animals to provide food, wool and other products, agriculture can also be defined primitively as merely growing and harvesting of plants and animals for use by people. The agricultural sector is the portion of the economy comprising agricultural produce, forestry and fishing, in Nigeria agriculture contributed an estimated 22.86 percent of GDP that in 2018 (WB, Agriculture and the developing world, 2018)), agriculture has over the years been in the scope light of economist, the fusion of agriculture and economics gave room to the creation of agricultural economics, which is basically the application of economic

principles like demand and supply in agriculture, there are two major types of agriculture which are: Commercial agriculture and Subsistence agriculture.

Commercial agriculture: commercial or industrialized farming occurs when a farm is set up for the sole purpose of producing crops and farm animals for sale, with the sole intention of making profit, in this type of agriculture, large quantities of crops and livestock are produced through industrialized techniques for the sole purpose of sale. The goal of industrialized agriculture is to increase crop yield, which is the amount of food that is produced for each unit of land. Crops and livestock made through this type of agriculture are produced to feed the masses and the products are sold worldwide.

Subsistence agriculture: This occurs when farmers grow food crops to feed themselves and their families. In subsistence agriculture, farm output is targeted to survival and mostly for local requirements with little surplus trade, the typical subsistence farm has a range of crops and animals needed by the family to feed and clothe themselves during the year. (Waters, 2007) said "Subsistence peasants are people who grow what they eat, build their own houses, and live without regularly making purchases in the marketplace".

2.2 Theoretical Framework

2.2.1. Harrod–Domar Growth Theory

The first growth perspective was developed by the hand work of Harrod (1947) and Domar (1959) which emphasizes on the importance of saving and capital accumulation. They emphasized that growth rate should be in line with population growth and growth in equipment to allow for full employment.

2.2.2 The Neoclassical Growth Theory

The second growth perspective began with the neoclassical work of Solow (1957), which argues that growth depends on the rate of technological

growth, the growth in capital and in labor force. Solow's model was criticized for three reasons.

2.2.3 The Theory of the Big Push

A "big push" of simultaneously industrial investments could launch a chain reaction of virtuous circles and complementary investments that would then ripple in many directions through the economic system. Large-scale investments in several branches of industry would lead to a favorable synergistic interaction between these branches and across sectors. If economic development was to get a start in the now lessdeveloped nations, Rosenstein-Rodan argued, it would have to come from a concerted and substantial "push" from government to create, effectively, an entire industrial structure in one huge and interlocked undertaking.

2.2.4 The Endogenous Growth Theory

The Endogenous growth explains why some countries are poor and why others are rich. The first factor explaining the phenomena is the development of ideas about a product or production process. Once this idea is developed, it is protected by the patent and copyright laws, so that no nation can copy, thereby enabling the initiator to become richer than other countries that cannot develop new ideas. The second reason is international trade. International trade enables a country to expand its market gaining maximally from its initiatives. Another factor is that of technology. The existence of technology enables a country to exclusively use its innovation to its advantage.

This is because if another country imports equipment and machineries to produce the commodities being produced by the innovator it will lack the technical – know how to produce. These explain why poor countries clamor for foreign investors. The newer alternative growth theory embraces a diverse body of theoretical and empirical work that emerged in the 1980s. This is the endogenous growth model. It distinguishes itself from the neoclassical growth by emphasizing that economic Growth is an endogenous outcome of an economic system, not the result of forces that impinged from outside. Essen (2001).

2.2.5 FDI Theories

2.2.5.1 Capital Arbitrage Theory

The theory states that direct investment flows from countries where profitability is low to countries where profitability is high. It means therefore that capital is mobile both nationally and internationally. But sometimes implication is that countries with abundant capital should export and countries with less capital should import. If there was a link between the long-term interest rate and return on capital, portfolio investment and FDI should be moving in the same direction.

International trade theory-the country will specialize in production of, and export those commodities which make intensive use of the country's relatively abundant factor.

2.2.5.2 Product-cycle Theory

New products appear first in the most advanced economy in respond to demand conditions. The maturing product stage is described by standardization of the product, increased economies of scale, high demand and low price, the standardized product stage is reached when the commodity is sold entirely on price basis.

2.3 Empirical literature

Gbenro (2023) the agricultural sector in Nigeria holds substantial prominence within the broader framework of the nation's economy. Throughout the years, the agricultural sector has experienced limited growth potentials due to inadequate financial support allocated to the industry. The insufficient funding of the agricultural sector can be attributed to the government and financial institutions' apparent neglect of the sector. As such, exploring FDI for agricultural job creation in Nigeria becomes inevitable. Therefore, the

study employed DOLS to assess nexus between FDI and employment in agricultural sector in Nigeria from 1990 to 2021. The findings from the study are summarized as follows; both agricultural gross production (AGP) and government expenditure on agriculture (GEA) contribute a significant negative impact on employment in agricultural sector in Nigeria. Meanwhile, FDI contributes an insignificant impact on employment generation in agriculture in Nigeria. Against these findings, the study makes the following recommendations; the Nigerian policymakers should establish a conducive and supportive ecosystem that can effectively facilitate the expansion prospects and influx of foreign investments in the agricultural industry. So that the prevailing agricultural landscape would possess the necessary attributes to foster and stimulate international investment.

Also, it is imperative for the Nigerian policymakers to prioritise the expansion of the agricultural sector by augmenting the allocation of funds from the national budget towards this crucial domain.

A study carried by Yassin (2018) examined the impact of foreign direct investment (FDI) inflows on domestic agricultural production in Sudan over the period of 1976-2016 using error correction model, autoregressive distributed lag bounds test and Granger causality, the findings showed a crowd out effect of foreign direct investment (FDI) on Sudan's domestic agriculture and the results confirmed the co integration relationships between FDI and agricultural output,

In a study conducted by Akinwale (2018) using multiple regression economic model to analyse FDI to agricultural output in Nigeria, his study found a bi-directional relationship between foreign direct investment and agricultural productivity, he also emphasized the need for government to prioritize the development of the sector through increased budgetary allocation in encouraging multinationals to invest in the sector.

3. Methodology

The main type of data used in this study is secondary; sourced from various publications of Central Bank of Nigeria, such as; Statistical Bulletin and Annual Reports. The models used in this study are estimated using data on Foreign Direct Investment (FDI) and some macroeconomic indicators, which includes: Agricultural share of Gross Domestic Products (AGP), Exchange Rate (ERT), Bank credit to farmers and Interest rate (IRT), The regression analysis of the ordinary least square (OLS) is the estimation technique that is being employed in this study to determine the relationship between and impact of the Direct Foreign Investment on economic growth proxy by Gross Domestic Product (GDP).

3.1 Model specification

The model for the study is formulated thus:

AGP= f (FDI, IRT, ERT, BCF)

Linearizing the equation gives

 $LNAGP_{t} = \beta_{0} + \beta_{1}LNFDI_{t} + \beta_{2}LNIRT_{t} + \beta_{3}LNERT_{t} + \beta_{4}LNBCF_{t} + \mu_{t}$

where: t = Time/period $\beta_0 = Intercept$ $\beta_1,...., \beta_4 = Estimation Coefficients$ LN= logarithm function AGP = Agricultural Contribution to GrossDomestic Product FDI = Foreign Direct Investment to agriculturalSector IRT = Interest rate RET= exchange rate $BCF= Bank credit to farmers; \mu = Error Term$

3.2 Estimation Techniques

The ordinary least squares method (OLS) is used for estimation. OLS is simple and widely used in empirical work. If the model's error term is normally, independently and identically distributed (N.I.I.D.), OLS yields the most efficient unbiased estimators for the model's coefficients.

3.3 Source of Data

The data used for this study were obtained from a secondary source. Time series data on foreign direct investment to agricultural sector and its contribution to GDP for the period of 2000-2022 were obtained from the Central Bank of Nigeria (CBN) statistical bulletin, World Development Indicators for various years.

4. Data Presentation, Analysis and Discussion *4.1 Descriptive Statistics*

The summary below shows the descriptive statistics of all the variables included in the model. These variables include agricultural productivity, Foreign Direct Investment, Interest rate, Exchange rate and credit availability. The mean, standard deviation and skewness of the (AGP, FDI, LNIRT, RET and LNBCF) are summarized below. See Appendix section for complete table.

4.2 Unit Root Test

From the 2, Table, it can be seen that ADF statistic for all the variable are greater than there corresponding critical values, this means that all the variables are stationary, This variables AGP is stationary at levels I(0). While FDI LNIRT, RET, and LNBCF are stationary at first order of integration I(1). A variable is considered to be stationary if the T-statistic is greater than critical value at 1%, 5%, and 10%, respectively.

4.3 Ordinary Least Square Result

The result on table 3 result shows that there is a negative relationship between foreign direct investment, interest rate, exchange rate and agricultural productivity as indicated by coefficient value of the variables (-51290.88), (-7949.275), (-539.5570).

On the other hand, there is positive relationship between bank credit to farmers and

agricultural productivity as indicated by the coefficient value of the variables (81954.78) and (16259.56). This implying that one increase in foreign direct investment will lead to decrease agricultural productivity by (51290.88), and one unit increase in interest rate will decrease

agriculture productivity by (7949.275), and one unit increase in exchange rate will decrease agricultural productivity by (539.5570).

	AGP	FDI	LNBCF	LNIRT	RET
Mean	185761.7	1.396755	5.454938	2.483744	198.9996
Median	221128.0	1.523782	5.542068	2.484907	153.8625
Maximum	316727.0	2.900249	8.810700	3.020425	425.9792
Minimum	24398.00	-0.039522	3.714277	1.791759	101.6973
Std. Dev.	113104.0	0.828587	1.319728	0.274022	100.3166
Skewness	-0.313724	0.103491	0.568294	-0.924323	1.062442
Kurtosis	1.411993	2.033470	2.854636	4.347921	2.699514
Jarque-Bera	2.793980	0.936313	1.258256	5.016285	4.413531
Probability	0.247340	0.626155	0.533057	0.081419	0.110056
Sum	4272519.	32.12536	125.4636	57.12610	4576.991
Sum Sq. Dev.	2.81E+11	15.10424	38.31700	1.651935	221395.4
Observations	23	23	23	23	23

Table 1. Descriptive Statistics Table

 Table 2. Stationarity Test Table

Variable	ADF -statistic	Critical values	Order of integration
AGP	-3.458208	-4.571559	I(0)
		-3.690814	
		-3.286909*	
FDI	-7.336656	-3.788030***	I(1)
		-3.012363	
		-2.646119	
LNIRT	-3.940124	-3.788030***	I(1)
		-3.012363	
		-2.646119	
RET	-4.522022	-4.498307	I(1)
		-3.658446	
		-3.268973*	
LNBCF	-3.940124	-3.788030	I (1)
		-3.012363	
		-2.646119*	

***, and * indicated critical value at 1%, and 10% level of significance.

On the other hand, one increase in bank credit to farmers will increase the agricultural productivity by (81954.78). From the result

above foreign direct investment, interest rate, exchange rate and bank credit to farmers are statistically significant as indicated by their probability value (0.0785), (0.0954), (0.0528), and (0.0026) therefore we reject the null hypothesis. From the result below F statistics value (21.32822) is found to be statistically, jointly, and simultaneously significant as indicated by probability of (0.000001).

The R-square which is the goodness of fit shows how well the variables FDI, RET, LNIRT, and LNBCF influence AGP, the R-square signified a good fit when it is above 0.5 and a poor when below the 0.5. Since our R-square is 0.825772 it shows that 82% of the variation in growth of the agricultural sector is caused by the independent variables FDI, RET, LNIRT, and LNBCF whereas the remaining 18% is caused by other factors other than the independent variables. This factor is represented in the equation as U (the disturbance or error term) the probability for FDI, RET, LNIRT, and LNBCF are 0.0785, 0.0954, 0.0528, and 0.0026, meaning that all the variables are statistically significant. The result shows that there is no autocorrelation because the Durbin-Watson statistic is greater than one (1.136508 in particular), The possibility of autocorrelation is that there are other factors that determine AGP which cannot be captured by the study. The probability of F-statistics are joint effect of the entire significant variable is 21.32822 which is very high and desirable.

Table 3. Regression Results	
Dependent Variable AGP	

Independent varia	able	Coefficient	P Value	T Statistics
Foreign direct i	nvestment on	-51290.88	0.0785*	-1.865378
agricultural produc	tivity (FDI)			
Interest rate (IRT)		-7949.275	0.0954*	-1.759755
Exchange rate (RE	T)	-539.5570	0.0528*	-2.072961
Bank credit to farm	ners (BCF)	81954.78	0.0026***	3.500592
Model summary				
No of observation	23			
R Square	0.825772			
F Statistics	21.32822			

NOTE: ***, **, and * denoted at 1%, 5%, and 10% level Significant respectively.

4.4 Diagnostic Test

4.4.1 Normality Test

From the figure 4.5.1, it can be seen that the residuals are normally distributed since the P-value is greater than 5%, we then reject the null hypothesis and accept the alternative hypothesis since the P-value gotten from the normality test is 0.131775 which is greater than 5% or 0.05.

4.4.2 Serial correlation

From the table below, it can be seen that there is no serial correlation among the residuals, since the P-value gotten from Breusch-Godfrey Serial Correlation LM Test which is 0.0726 which is greater than 5%, therefore we accept the null hypothesis and reject the alternative hypothesis.

4.4.3 Heteroskedasticity

From the table below, it can be seen that the P-value which is 0.2446 is great than 5% therefore we reject null hypothesis of heteroskedasticity and accept the alternative hypothesis of no heteroskedasticity.

Table 4. Serial correlation and Heteroskedasticity ARCH tests				
Breusch-Godfrey Serial	Correlation LM Test	Heteroskedasticity Test: ARCH		
F-statistics	2.363278	F-statistic	1.498037	
Obs*R-squared	5.245000	Obs*R-squared	5.744355	
Prob. F(2,16)	0.1261	Prob. F(4,18)	0.2446	
Prob. Chi-Square(2)	0.0726	Prob. Chi-Square(4)	0.2191	



4.5 Result of Major Findings

From the result of various tests, that foreign direct investment has negative impact on agricultural productivity in Nigeria within the period, although the impact is statistically insignificant.

That other macroeconomic variable like interest rate, exchange rate, and bank credit to farmers have a significant relationship with agricultural growth or productivity, bank credit affects agricultural productivity positively while interest rate, and exchange rate affect agricultural productivity negatively in Nigeria.

5.1 Conclusion and recommendations

The main objective of this study was to test the hypothesis that FDI does not positively impact agricultural productivity and whether FDI inflows into the agricultural sector contributed to growth. The results are not consistent with the hypothesis. Therefore, the null hypothesis which states that FDI does not impact agricultural growth and other macro-economic variables like interest rate, exchange rate and bank credit to farmers, on agricultural productivity in Nigeria is rejected. The corresponding alternative hypothesis is then accepted which states that FDI have a positive impact to agricultural productivity in Nigeria and interest rate,

exchange rate and bank credit to farmers also have an impact on agricultural productivity.

Based on this study, a number of recommendations can be ascribed to serve as a guide to promote the productivity of agriculture in the Nigerian economy.

That Government should provide incentives like increasing security, giving tax breaks and proving favorable environment to attract foreign investors to invest their funds in Nigeria.

That the volume of credit made available to farmers should be increase to so as to boost

agricultural productivity. The government should allocate more funds to farmers.

That increase public investment towards capital development: There should implement policies to increase government spending on education and health. A functional educational system and adequate health services help to build an adequate human capital base, which in turn raises efficiency and productivity. A large pool of welleducated and skilled labour force will attract investment into the agricultural sector and the economy in general all things being equal.

That since interest rate has negative impact on agricultural output, which means that as interest rate reduce agricultural productivity in the country will also increase; it is therefore recommended that financial institutions should set low interest rate, so as to make borrowing of funds by farmers more attractable.

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