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Deregulation and Macroeconomic Drivers of Foreign Direct Investment in Nigerian Agriculture (1970 -2009): An Econometric Analysis

****ONOJA, A. O. and *ACHIKE, A. I.**
***Department of Agricultural Economics and Extension, University of Port Harcourt, Nigeria.*
Corresponding Author's E-Mail: tonyojonimi@gmail.com
**Department of Agricultural Economics, University of Nigeria, Nsukka*
E-Mail: ifyachike@gmail.com

ABSTRACT

This study used secondary data from Central Bank of Nigeria and National Bureau of Statistics to ascertain the determinants of Foreign Direct Agricultural Investment (FDAI) in Nigeria from 1970 to 2009. After attempting modeling the determinants of FDAI with untransformed OLS regression model, autocorrelation was detected, hence Praise-Winston model was applied. The series' residuals were subjected to appropriate econometric tests and met the major requirements for running OLS models in addition to being cointegrated at I(0) using ADF and Philip Perron indicators. The model's fitness test indicated an R^2 of 60% with an F-statistic significant at $p<0.01$. The study showed that foreign exchange and the economic deregulation policy of Nigerian government which started in 1986 were the most significant macro-economic drivers of FDAI in Nigerian economy over the review period. The findings call for improved management of the foreign exchange regimes by the Central Bank of Nigeria; tightening of fiscal discipline through increased transparency and removal of other structural impediments against the successful implementation of the economic reforms by the government (especially poor power supply among others).

Key Words: Foreign direct investment, agriculture, deregulation of Nigerian economy and economic growth.

INTRODUCTION

Investment is of critical importance to economic development. This drives productivity and efficiency in production and enhances farm profitability. Given this important role, there has been significant research into the determinants of investment expenditure by farms and the factors that influence their investment behaviour (O'Toole, Newman & Hennessy, 2011). Idsardi, Cloete and van Schalkwyk (2008) observed that globalization and integration have led to ever increasing international capital flows to countries, including developing nations. Therefore, the role of Foreign Direct Investment (FDI) as an international expansion strategy to acquire interest in a foreign enterprise has

increased significantly. Foreign Direct Investment (FDI) may be a way to create profits for Multinational Enterprises (MNE's) but additionally it can create jobs, capital and it may provide access to know-how, technologies and lucrative export markets for host nations (Hunter and Bogram, 2003). Increased foreign direct investment in agriculture can make significant positive changes in agricultural growth and development of economies of developing countries. Experts (Travel Document Systems, TDS, 2009) held that "there is a growing Nigerian consensus that foreign investment is essential to realizing Nigeria's vast potential." Despite the prevailing view that agriculture is risky, investment in agriculture is experiencing remarkable growth. This is due to improved profitability projections, the interest of development agencies and governments to increase investment in the sector so as to achieve food security (Miller, Richter, McNellis & Mhlanga, 2010). Investment is essential for the growth of the agricultural sector. It is estimated that net investments of USD 83 billion a year must be made in the agriculture sector in developing countries if there is to be enough food to feed the world population of 9.1 billion in 2050. Focusing on sub-Saharan Africa (SSA), the figure is estimated at approximately USD 11 billion per year (FAO, 2009). The major sources of capital need to come from private investors as public investment cannot meet these needs, but it can be effective in stimulating and leveraging private investment in the sector. Investment funds have, in some instances, been structured towards altruistic aims of combating hunger and poverty. However, private sector investment fund managers are expecting to increasingly benefit from investments in the agricultural sector in the medium and long term since demand for food and other agricultural products is expected to continue to increase. Particularly high population growth and longer life expectancies, as well as increases of the purchasing power of the population in some emerging economies and bio-energy consumption will contribute to this increasing demand. (Miller, Richter, McNellis & Mhlanga, 2010).

The need to evaluate the performance drivers of Nigerian FDAI could be more appreciated when one examines the challenges facing Nigerian economy. Sanusi (2010) noted that in 1986, the government accepted the International Monetary Fund-sponsored Structural Adjustment Programme (SAP). The SAP aimed at removing cumbersome administrative controls and creating a more market-friendly environment underpinned by measures and incentives that would encourage private enterprise and more efficient allocation of resources. One might argue the SAP recorded some measure of success, Sanusi added. However, some of the gains of the SAP were eroded following the increased spate of policy reversals between 1988 and 1989. Up to 1990, the economy witnessed some gains which were associated with increased deregulation and liberalization in economic management. However, owing to policy slippages, there was a reversal of trends in major macroeconomic aggregates thereafter, resulting from policy reversals and inconsistencies. Generally, frequent policy inconsistencies and reversals that characterized that period created distortions in the economy and were further

compounded by external shocks, including the external debt overhang.
One of the top priorities of the Federal Government of Nigeria's economic programme was code-named "The Seven point Agenda". Under the previous leadership of late President Yar Adua and the current economic transformation programme of President Goodluck Jonathan sustainable growth and development in the real sector which includes the agricultural sector remained top priorities According to Olayemi (2008), the "sustainability issue" in the context of the Seven point Agenda revolved around eight set of strategies, one of which is the development of optimal investment policies. Nigeria had previously emphasized the creation of a conducive macro environment for private sector investment in agriculture, and increasing budgetary allocation to agriculture, among others (Manyong *et al*, 2005). Yet it is pathetic to note that currently private investment in Nigerian agriculture in both primary production and processing (value addition) is still very low (Olayemi, 2008). It was equally noted by Olayemi(2008) that enshrining a regime of macroeconomic and microeconomic policy stability can give both foreign and domestic investors more confidence in the agricultural sector and reduce the risk of investment. To worsen matter, the agricultural sector has not been able to fulfill its traditional role of feeding the population, meeting the raw material needs of industries, and providing substantial surplus for export. Indeed, the contribution of the sector to total GDP has fallen over the decades, from a very dominant position of 55.8 per cent of the GDP in 196070 to 28.4 per cent in 197180, before rising to 32.3, 34.2 and 40.3 per cent during the decades 198190, 19912000 and 20012009, respectively (Sanusi, 2010).

Given the above background, one will expect comprehensive research reports on agricultural investment patterns especially on foreign direct investment in the country since the domestic investment in this area was reported to be very unimpressive. Unfortunately, the contrary is the case, thus corroborating the assertion of Manyong *et al; (2005)* who indicated that available data on investment in Nigeria's agriculture were very scanty. This fact corroborated the assertion by Idsardi, Cloete & van Schalkwyk (2008) who noted that most empirical work in literature analyzed FDI determinants by pooling a group of countries that may be structurally diverse. The present study attempts to fill this knowledge gap. Against this backdrop this study was designed to identify the major determinants of Foreign Direct Agricultural Investment (FDAI) in Nigerian economy from 1970 to 2009 covering periods that could be classified into pre-deregulation and post deregulation eras.

Objectives of the Study
The broad objective of this research is to ascertain the major determinants of Foreign Direct Agricultural Investment in Nigerian agriculture. Specifically, the study was designed to:

1) identify the macroeconomic factors determining foreign direct investments in agricultural sub-sector of Nigeria from 1970 to 2009; and then,

2) ascertain the role of deregulation of Nigerian economy on the level of Foreign Direct Agricultural Investment drive in Nigeria (since its regime in 1986 to 2009 using 1978-1985 as a base).

Theoretical and Conceptual Issues

The International Monetary Fund (IMF) defined foreign direct investment (FDI) as a category of international investment where a resident in one economy (the direct investor) obtains a lasting interest in an enterprise resident in another economy (the direct investment enterprise) (IMF, 2003). If such investment(s) are in agricultural sector we refer to the investment as Foreign Direct Agricultural Investment (FDAI). World Bank (1993) indicated that Foreign direct investment appears attractive because it involves a risk-sharing relationship with investors from the home country. FDI appears particularly attractive when existing stocks are low. Low stocks of foreign-owned capital imply low flows of repatriated profits. Over time, however, success in attracting FDI will increase this counter flow, which could exceed the alternative flow of interest payments in the longer run. The benefits to the host country will depend on both the size of the package and the extent of other distortions in the economy. World Bank (1991, p. 95) pointed out that : " ... direct foreign investment in an economy with highly distorted policies is likely to generate net losses for the host country instead of welfare gains." Indeed, the theory of immiserizing growth might well apply most forcefully in the case of FDI simply because FDI that produces negative value added at world prices can be accompanied by the removal of resources in the form of repatriated profits. World Bank also suggested the possibility of some interaction between the incentive-disincentive package and other distortions in the economy on the efficiency of FDI. The empirical illustration, however, focuses solely on distortions in finance and trade (proxied by deregulation in this study). World Bank noted that in developing countries FDI raises the rate of economic growth in the absence of financial repression and trade distortions. However, financial repression as measured by the real deposit rate of interest and trade distortions as measured by the black market exchange rate premium can both cause FDI to be immiserizing.

Although many aggregate econometric studies have been conducted in many countries on the subject matter of this study a broad consensus on the major determinants of FDI has been elusive (Idsardi, Cloete and van Schalkwyk, 2008). However, many economic theorists (Dernburg and McDougall,1968; Samuelson,1981; and Samuelson & Nordhaus, 2005) agreed that aggregate investment were largely determined by output, interest rate, expectation of the investors (“business confidence” which can be proxied

by income expectation form agricultural activity in our case, i.e. agricultural GDP monetary value), state of technology and tax policy.

Chuang and Zepeda (2009), while quoting the empirical works of Rosegrant, Agcaoili-Sombilla, and Perez (1995) held that investments in agricultural research and development (R&D) could be largely influenced by government. Their study indicated strongly negative effects of reduced public investment in research and extension, and the crucial role of investment in increasing agricultural productivity. Government, therefore, can provide an environment conducive to investment, through guarantee of rights and law and policies encouraging investment (FAO, 1996).

Danilowska (2008) investigated the impact of macroeconomic determinants on the number and value of agricultural investment preferential credits in Poland. The study showed that the determinants are of an exogenous character and that the statistically significant variables in the case of these measures were the index of price relations of sold agricultural products to goods and services purchased by private farms ("price gap"), interest rate of central bank and real interest rate paid by farmers. Somewhat surprisingly, neither rate of GDP growth nor real effective exchange rate affected the scope of credits in Poland.

The drivers of FDI have been expounded in some previous literature on developing countries. The motivation of capital flows, including FDI, has long been a subject of research in economics. Various pull factorsrelated to host-country characteristics, and push factorsrelated to source country economic conditionshave been identified as contributing factors. While structural and macroeconomic conditions in recipient countries have received the most attention in the literature (see Blonigen, 2005), a large body of work has examined the relevance of external factors. An early related literature analyzed pull versus push factors in driving capital flows, particularly debt and portfolio flows in emerging market countries, emphasizing the relevance of external factors (Fernandez-Arias, 1996). Albuquerque, Norman & Luis (2005) found that the significance of global factors for FDI flows to developing countries grew over the previous two decades. External factors played an important cyclical component which affects FDI flows through different channels (Reinhart & Reinhart, 2008). Economic growth in advanced countries can affect FDI flows through both an income and substitution effect. During recessions, lower earnings in advanced countries can induce firms to reduce investment both at home and abroad through an income effect, resulting in procyclical FDI flows. Typical Solow-type arguments, however, suggest that a substitution effect could be at play. If firms allocate resources according to relative rates of return, a recession in advanced countries would increase the profitability and attractiveness of foreign investment, implying that FDI flows are countercyclical. Cyclical movements in interest rates in advanced countries have implications for financing FDI flows. Since a significant proportion of foreign operations of FDI are

funded in international financial markets; the cost of funding is particularly sensitive to changes in international interest rates. For instance, a recent study finds that low global interest rates and the resultant fall in borrowing costs during the 20032007 period contributed to almost 70 percent of the increase capital inflows, including FDI, into developing countries (World Bank, 2010). Countercyclical monetary policy in advanced countries during recessions contributes to lower funding costs of FDI by lowering interest rates in source countries. Moreover, beyond the direct positive implications of higher commodity prices for FDI, an underlying impetus to world commodity prices is low or negative world real interest rates (Frankel 2008). Hence, the effects of lower international interest rates work not only through the portfolio channels discussed above, but also through the commodity price channel. In the case of agricultural commodities or investment in agriculture, increase in world price of agricultural commodities can therefore be a driver to FDI in Agriculture.

Analytical Framework

Praise-Winsten Model and Correction of Autocorrelation

Autocorrelation is a common problem in modeling time series data. In the presence of autocorrelation the OLS estimates of the series are unbiased and consistent but inefficient. In addition the standard errors will tend to be underestimated, the overestimated and the confidence intervals too narrow. Therefore there is a need to ensure the elimination or avoidance of autocorrelation in models that will be used for policy making and forecasting. One of the tools used in doing this is the Praise-Winston Model (Praise & Winsten [1954] in Woodridge, 2008). Other methods include Corchrane-Orcutt 2-Step procedure, Cochrane-Orcutt Interative, Durbin's Two Step Procedure, Hildreth-Lu Procedure. In addition there are many maximum likelihood estimation (MLE) and Time Series procedures.

The underlying theory behind Praise-Winston Model is built on the following premise:
Consider the model : $y_t = \alpha + X_t\beta + \varepsilon_t$, …1.
Where y_t is the time series of interest at time t, β is a vector of coefficients, X_t is a matrix of explanatory variables, and ε_t is the error term. The error term can be serially correlated over time: $\varepsilon_t = \rho\varepsilon_{t-1} + e_t, \ |\rho| < 1$ …2
and e_t is a white noise. In addition to the Cochrane-Orcutt procedure transformation, which is

$$y_t - \rho y_{t-1} = \alpha(1-\rho) + \beta(X_t - \rho X_{t-1}) + e_t. \quad \ldots 3$$

for t=2,3,...,T, Prais-Winsten procedure makes a reasonable transformation for t=1 in the following form

$$\sqrt{1-\rho^2}y_1 = \alpha\sqrt{1-\rho^2} + \left(\sqrt{1-\rho^2}X_1\right)\beta + \sqrt{1-\rho^2}e_1. \quad \ldots 4$$

Then the usual least squares estimation is done.

Cointegration and Unit Root Test: Granger and Newbold (1974), Engle and Granger (1987), Gujarati (2006), Greene (2008) and Razzak (2007) cautioned that if one is dealing with time series data, he must be certain that the individual time series are either *stationary* or that they are *cointegrated*. If this is not so, one may be opened to the charge of engaging in spurious (or nonsense) regression analysis. A time series is said to be stationary in the above context if its mean and variance are constant over time and the value of the covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed. Even if two time series are non stationary, it is possible that there is a long-run stability or equilibrium relationship between them. If that is the case, such time series is said to be co integrated (De Boef, 2001). Use of OLS relies on the stochastic process being stationary. When the stochastic process is non-stationary, the use of OLS can produce invalid estimates. Granger and Newbold (1974) called such estimates 'spurious regression' results with high R^2 values and high t-ratios yielding results with no economic meaning.

METHODOLOGY OF STUDY

Study Area: Nigeria is in West African Sub-Region; bordering the North Atlantic Ocean, between Benin Republic, and Cameroon. Nigeria has a total land area of 923,773 square Kilometres populated by over 140,003,542 people (going by 2006 population census). Climate **v**aries - equatorial in south, tropical in centre, arid in north. Average rainfall hovers around 1282.2 mm varying from 500 - 1800mm. In 2007 agriculture contributed 42.08% to Nigerian's GDP. Out of this figure, crops, livestock, forestry and fishing contributed 37.54%, 2.64%, 0.53% and 1.37% to the country's economy respectively. Agricultural *Products*- include cocoa, palm oil, yams, cassava, sorghum, millet, corn, rice, livestock, groundnuts, cotton. Industry types include textiles, cement, food products, footwear, metal products, lumber, beer, detergents, car assembly (CBN, 2007 and Travel Document System, 2009).

Sampling and Data Collection Method: Secondary data, mainly time series data from Central Bank of Nigeria's Annual Report and Statistical Bulletin containing data from National Population Census, Nigerian Bureau of Statistics and other institutional data were used for this study. The data collected covered a period of 39 years (1970 2009). For the purpose of this study, two economic eras were delineated from the above period, the pre-Structural Adjustment or pre deregulation era (1970-1985) and the post-deregulation period (1986-2009) with the assumed structural break period to be 1986 when Nigerian economy was deregulated after welcoming the Structural Adjustment Programme, SAP. Till date, though there have been various economic reforms, deregulation is still in progress.

Data Analysis Technique:
Based on the analytical framework presented and the research objectives, the following methods were used in attaining the objectives of this research: First, data gathered on the model of foreign direct agriculture investment were subjected to Jarque-Bera normality test, multicollinearity and autocorrelation tests based on linear regression model. The model was diagnosed and tested for stationarity. When it was discovered that the model had significant presence of 1st order positive correlation the OLS model was modified to Praise-Winston Model to correct the autocorrelation and avoid the risk of running a spurious regression. This last model was then estimated and the residuals were tested for stability using Augmented Dickey Fuller (ADF) test and Philip Perron test (i.e. unit root test).

The Praise-Winston Model empirically used is presented as follows:
Consider the model : $y_t = \alpha + X_t\beta + \varepsilon_t,$ ….1b
Where y_t is the time series of interest at time *t*, β is a vector of coefficients, X_t is a matrix of explanatory variables including inflation (INFLTN), agricultural GDP or income from agriculture in millions of naira (AGRICINCM), foreign exchange rate of naira to 1 US dollar (FOREX), interest rate (INTRT), world price index of agricultural commodities (WPIAGR) and deregulation periods dummy (DERDUM, where 0 = No deregulation and 1 = presence of deregulation regime). y_t represent level of Foreign Direct Investment in Agriculture in millions of naira (FDAI), and ε_t is the error term. The error term can be serially correlated over time:

$$\varepsilon_t = \rho\varepsilon_{t-1} + e_t, \ |\rho| < 1 \quad \text{….2b}$$

and ε_t is a white noise. In addition to the Cochrane-Orcutt procedure transformation, which is

$$y_t - \rho y_{t-1} = \alpha(1-\rho) + \beta(X_t - \rho X_{t-1}) + e_t. \quad \text{…3b}$$

for t=2,3,...,T, Praise-Winston procedure makes a reasonable transformation for t=1 in the following form

$$\sqrt{1-\rho^2}y_1 = \alpha\sqrt{1-\rho^2} + \left(\sqrt{1-\rho^2}X_1\right)\beta + \sqrt{1-\rho^2}e_1. \quad \text{…4b}$$

Then the usual least squares estimation is done.

The equation can also be represented in a more simple form as follows:

$$FDAI_t^* = b_2 AGRICINCOME_t^* + b_3 WPAG_t^* + b_4 FOREX_t^* + b_5 INFLATION_t^* + b_6 INTR_t^* + vt_t \quad \text{.....5}$$

Where, FDAI = Foreign direct Agriculture investment (in Millions of naira) at year t.
AGRICINCOME = index of agricultural output at year t (1984=100) a proxy for 'expectation'.

AGRICPRICES = all Nigerian agricultural commodities world price index in Naira per tonne at year t (1985=100)
FOREX = foreign exchange rate (value of Nigerian Naira to US dollars) at period t.
INFLATION = Rate of inflation (%) at year t.
INTR = Interest rate (maximum bank lending rate) at year t.
* = Transformation sign (i.e. as shown in the)
b_i = coefficients or slopes of the estimated variables.
$\boldsymbol{vt}_t$ = stochastic error term.

RESULTS AND DISCUSSION

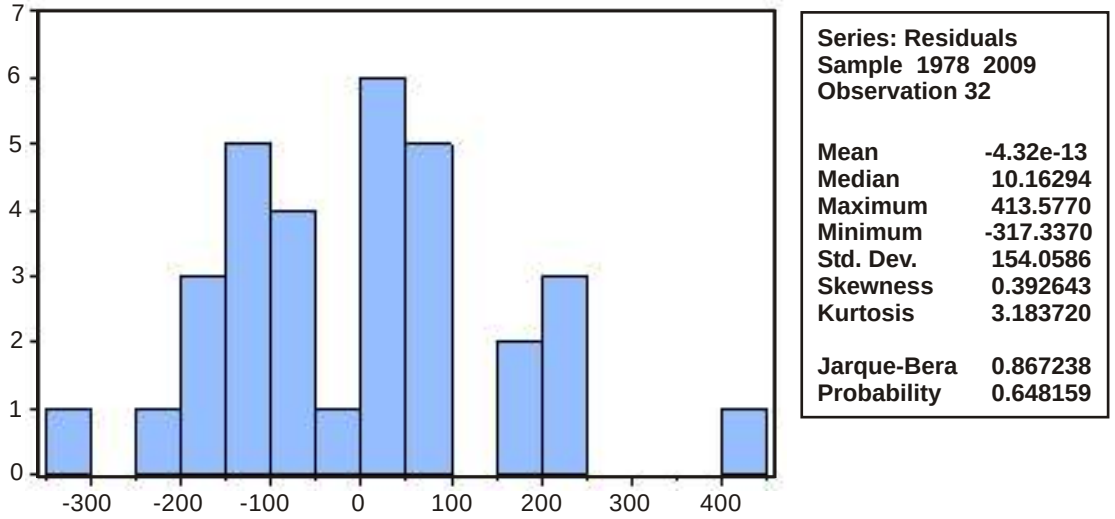

Figure 1. *Graph of the residual's distribution and Result of Test of Normality of the residual's distribution using Jarque Bera test.*

With this result, the researchers were satisfied that the residuals were normally distributed. The average VIF estimated for all the explanatory variables was 10.08 which still fell below the recommended value of 14 (Gujarati and Sangeetha, 2008) that would have lead us to conclude that tolerance level of multicollinearity in our model was high. Hence we concluded that there was no severe multicollinearity in the explanatory variables of the data used in our OLS model. The test for autocorrelation in the model gave a Durbin-Watson estimate of 1.113 (see Table 1 and 2) indicating that there was a significant 1st order positive correlation in the OLS model if applied as it were (See Appendix 1 note). The Breusch-Pagan test for serial correlation (LM Test) also confirmed this violation of assumption of OLS model as the statistic gave an F-statistic of 3.939 which was significant at $p<0.05$ (see Table 1).

Table 1. Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.939053	Prob. F(2,23)	0.0338
Obs*R-squared	8.164341	Prob. Chi-Square(2)	0.0169

With this result the researchers could not go along to use the untransformed OLS equation which gave the results in Appendix 1 since this will tantamount to applying a spurious regression for a very crucial policy making as this. The option out of this problem was then to adopt the Praise-Winsten model which will transform the variables so as to reduce the level of first order autocorrelation in the model following Praise, S. J. and Winsten, C. B. (1954) in Gujarati (2007), and Woodridge (2008). Initially E-Views package was used but the STATA software was applied in the transformation and the result of the model estimate improved remarkably with the Durbin-Watson Statistic increasing from 1.11 to 1.84 (See Table 2). At this level, the autocorrelation level cannot be viewed as much threat in our estimated model anymore. Hence we can go ahead with economic analysis of the results obtained.

However in order to be more sure that the time series variables used in the model was stable or devoid of unit root, we equally conducted two unit root tests (Augmented Dickey Fuller test and Philips Perron tests). Based on the econometric principle that if the residuals of the level form regression of OLS is stable the series are deemed to be I (0) or cointegrated, we estimated these two statistics to confirm whether the series are stable or not. The Augmented Dickey Fuller t-statistic estimated was -6.209 which is greater in absolute terms than the 1 percent level estimate which gave a critical value of -3.711 (at p=0.00). The counterpart test, Philips Perron test gave an estimated t-statistic of -8.650 against the critical t-value of -3.689 at p=0.00, indicating also that the series were I(0). We therefore concluded that there is a long-run relationship in the model's variables as the series are cointegrated. Since the series are cointegrated at I (0), the best approach to use in the estimation of the model will therefore be OLS model. Hence we applied

Table 2: Praise Winsten Model Results for the OLS Equation on Determinants of Foreign Direct Agricultural Investment (FDAI) in Nigeria (1978-2009)

Prais-Winsten	**AR(1)**	**regression**	**SSE**	**search**	**estimates**		
Source	SS	df	MS	Number if Obsvn		=	32
				F(6, 25)		=	5.96
Model	681309.4	6	113551.60	Prob	>	F =	0.01
Residual	475948.9	25	19037.95	R-squared	=	0.59	
				Adj	R-squared	0.49	
Total	1157258	31	37330.91	Root	MSE	137.98	
FDAI							
	Coef.	***Std. Error***	***t***	***P>|t|***	**Remarks**		
Infltn	1.81	1.78	1.02	0.32	NS		
lnintrt	151.80	134.90	1.13	0.27	NS		
lnforex	167.26	69.76	2.4	0.02	**		
lnagricincm	-23.72	62.20	-0.38	0.71	NS		
lnwpiagr	117.76	72.72	1.62	0.12	NS		
derdum	-305.38	181.60	-1.68	0.10	*		
Intercept	-445.18	755.06	-0.59	0.56	NS		
rho	0.72						
Durbin-Watson	***statistic***	***(original)***	***1.113***				
Durbin-Watson	**statistic**	**(transformed)**	**1.844**				

Note: (***) = Significant at p=<0.01; (**) = Significant result at p=<0.05 (*) = Significant result at p= <0.10, and "NS" = Not Significant.

the Praise-Winsten model with using the logged form of the independent variables. The detail results of this analysis could be found in Table 2.

The model fitness test showed that the model had an R^2 of approximately 60 percent, implying that about 60 percent of the variations of FDAI in Nigerian economy were explained by the independent variables included in our model. This is a fairly good fitting and implies that the variables we selected to explain the variation in the FDAI level in the country's economy (which was based on theory) explained a significant part of the model's determinants.

Only 40 percent of the variation in FDAI level in the economy over this period was not sufficiently explained by the model. The null hypothesis of no joint effects of the model's explanatory variables on the variation of the FDAI level in the economy was rejected at 1 percent significant level (p=<0.01). This is a sign of a good model fit. The signs of most of the parameters estimated conformed to theoretical expectations. For instance interest

rate, world prices of agricultural commodities and foreign exchange indicated positive signs affirming the fact that their increase could influence the rise in Foreign Direct Investment in Agriculture. These are in agreement with earlier findings of World Bank (1993), Brolingue (1995) and Reinhart and Reinhart (2008) who hypothesized that external factors and macroeconomic factors influenced the level of FDI in developing economies. With respect to the significant determinants of FDAI in the present study two factors appear to be the major determinants of growth in foreign direct investment in Nigerian agriculture over the period in review. These include foreign exchange rate and deregulation dummy. The slope coefficients of these variables were 167.26 and -305.38 respectfully. Both were significant at $p<0.01$ and $p = 0.10$ respectively. The negative sign of the slope coefficient of the deregulation dummy however, did not conform to our *a priori* expectation which presumes that deregulation of the economy could positively influence the level of foreign direct investment in agriculture in the country. This could imply that there are some structural defects in the implementation of the deregulation programme. It is not quite surprising when one notes that some structural flaws such as corruption have often been reported in the country's media. Moreover the entire handling of the deregulation process in Nigeria since the outset of the programme has been allegedly marred with lots of challenges and faults whose discussion is beyond the scope of this present study. Foreign exchange rate is one important macroeconomic variable that has the capacity of providing incentive to foreign investors as their own foreign currencies will be able to purchase more inputs and capital required for their agricultural investment in the host country given that the prevailing regime of foreign exchange rate is favourable to them in their intended or present host countries. Therefore foreign exchange regime expectedly exerted significant influence on FDAI in this study. The relevant conclusions from these findings are discussed in the next section.

CONCLUSION AND RECOMMENDATIONS

The study estimated the effects of some macroeconomics variables on the level of direct foreign investment in the country's agriculture over 39 years period covering two economic eras. The study showed that the most significant macro-economic drivers of FDAI in Nigerian economy were foreign exchange rate regimes and the economic deregulation policy of the Nigerian government which started in 1986. The model cannot say that it has exhausted all possible causes of FDAI in Nigeria. So, further studies using more complex models such as simultaneous equation and Vector Autoregressive Models, VAR is recommended to understand the dynamics of relationships in variables that actually drive direct foreign investment in Nigerian agriculture. The findings of this study have implications for Nigerian macroeconomic planning especially in the aspect of meeting up with the current federal government's goal of accelerating sustainable growth in agricultural investment. If food security and agricultural development expected from increased foreign investment in Nigeria has to be achieved, emphasis must be placed on putting in place enabling environment that can attract foreign investors. The findings also

calls for improved management of the foreign exchange regimes by the Central Bank of Nigeria, tightening of fiscal discipline, through increased transparency and removal of other structural impediments against the successful implementation of the economic reforms especially immediate solution to poor power supply and transport systems in the country among others.

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APPENDIX 1

Results of the OLS Regression before Correction for Autocorrelation

Dependent Variable: FDAI
Method: Least Squares
Date: 05/31/12 Time: 12:19
Sample: 1978 2009 Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCEPT	-80.59675	724.4441	-0.11125NS	0.9123
INFLTN	6.215117	2.026178	3.067409***	0.0051
LNAGRICINCM	-58.16762	56.31280	-1.032938NS	0.3115
LNINTRT	-45.07544	190.4219	-0.236714NS	0.8148
LNFOREX	159.1182	68.59549	2.319660**	0.0288
LNWPIAGR	190.3343	68.36925	2.783916**	0.0101
DERDUM	-330.6005	211.8126	-1.560816NS	0.1311

R-squared	0.917759	Mean dependent var	770.6129
Adjusted R-squared	0.898021	S.D. dependent var	537.2060
S.E. of regression	171.5524	Akaike info criterion	13.31829
Sum squared resid	735755.5	Schwarz criterion	13.63892
Log likelihood	-206.0927	Hannan-Quinn criter.	13.42457
F-statistic	46.49723	Durbin-Watson stat	1.113338
Prob(F-statistic)	0.000000		

Note: (***) = Significant at p=<0.01; (**) = Significant result at p=<0.05 (*) = Significant result at p= <0.10, and "NS" = Not Significant. It should be noted that four variables appeared to be significant determinants of FDAI in this regression. These include inflation, foreign exchange rate and world price index of agricultural commodities. Deregulation was not significant, while it became significant after transformation in the Praise-Winsten model. If we had gone ahead to make use of these as our results it would have been based on spurious regression because of the presence of autocorrelation (See the D-W Statistics =1.11).