

# Uncertainty and Foreign Direct Investment: A Case of Agriculture in Nigeria

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## Abstract

*Premised on economic uncertainty and political instability indicators, this paper examined the role of uncertainty as they affected the inflow of FDI into the agricultural subsector of the Nigerian economy given that such empirical work are limited. Employing secondary time series data which spanned 1970 to 2008, on an investment-cointegrated Error Correction Model, this study attempted to fill the gap. Following ADF test for stationarity and a Johenson cointegration test, we found a cointegrating relationship among the variables as affirmed by the error correction mechanism parameter. It was revealed that FDI positively impacted on agriculture not only in the short run but also in the long run. This will also engender domestic income diversification which will boost agricultural sector and stem the erstwhile neglect of the sector. Further, political instability adversely affected agricultural investments in the long run. An enabling environment should be provided to attract investment on short and long term basis. Also exchange rate fluctuation, high lending and inflation rates problems should be addressed.*

*Key words: Foreign Direct Investment, Economic Uncertainty, Political stability, Agriculture and Nigeria*

## 1. Introduction

Nigeria faces serious poverty challenges. Nearly seven out of every ten Nigerians live below the poverty line of \$1 per day (National Bureau of Statistics 2012). Poverty in Nigeria is concentrated in rural areas which accounts for more than two-third of the nation's poor. Development indicators of rural areas lag behind those of urban areas: incomes are lower, infant mortality rates are higher, life expectancy is shorter, illiteracy is more widespread, malnutrition is more prevalent and greater proportion of people lack access to clean water and improved sanitation services.

Endowed with abundant land and water resources, Nigeria's agricultural sector has potential for growth, especially, if the value chain of major commodities is fully exploited to remove all forms of wastes and eliminate glut in supply. Despite the huge potential of agriculture in Nigeria, the impact of the sector on poverty reduction through ensuring food security and self-sufficiency is still very low. Although several reasons could be deduced for this development, prominent among them are poor private investments in agriculture, inequitable access to assets and resources, and poor technology (including absence of processing, storage and marketing facilities) as well as inadequate electricity supply.

Further, productivity is low and in some cases stagnant. Farming system, mostly small scale, is still predominantly subsistence-based and for the most part depends on weather vagaries. The country vast irrigation potential remains largely unexploited. Most farmers produce mainly food crops using traditional extensive cultivation methods while commercial agriculture based on modern technologies remains underdeveloped; and the most limiting factor is access to investible fund. Investing in agriculture can be transformative, especially as agriculture is still the single largest employer of labour in Nigeria today and holds the promise of sustainable reduction in poverty. Further, the World Bank estimates that growth in the agriculture sector is twice as effective at reducing poverty compared to growth in other sectors. This enormous potential of agriculture can be harnessed to alleviate poverty among Nigerians through the provision of food,

incomes to the farmers, raw materials for industries, and generation of foreign exchange for the country. In addition to fuelling economic growth, investment in agriculture will also enable the country to withstand future shocks from changing global commodity prices, weather patterns, and financial crises.

Nigeria as a country, given her natural resource base and large market size (a population of about 160 million), qualifies to be a major recipient of FDI in Africa and indeed, is one of the top three leading African countries that consistently received FDI in the past decade. However, the level of FDI attracted especially to agriculture is small compared to the resource base and potential need. Nigeria'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% in 2007.

While there are many factors influencing FDI inflow into a country, frequent political and macroeconomic instability, bureaucratic bottlenecks and corruption forestall FDI inflows. This study attempts to answer the following questions:

- What is the relationship between economic uncertainty and inflow of FDI into the agricultural sector in Nigeria?
- What is the relationship between political stability and inflow of FDI into the agricultural sector of the Nigerian economy?

## 2. Literature Review

Theoretically, two main approaches have been used to assess FDI inflows: location theory, which deals with the reasons underlying the choice of host country for foreign investment, and industrial organisation theory concerned with successful competition between domestic producers and foreign firms. Hymer (1976) study provides insight into the role of multinational corporations (MNCs) as global industrial organisations. He argues that FDI is more than a process by which assets are exchanged internationally. It also involves international production. His submission is that FDI represents not simply a transfer of capital, but the transfer of a "package" in which capital, superior managerial, administrative and marketing skills, new and advanced technology, access to low-cost funding and research and development capabilities are all combined. This theory was earlier addressed by Caves (1971, 1974) and deepened by Kindleberger (1984).

Several studies have sought to grasp the existing link between FDI inflows and economic and political stability. For example, Wheeler and Mody (1992) used country risk indices to demonstrate that there exists a strong correlation between economic and political stability, and investment inflows. Sachs and Sievers (1998) study, point to political stability as one of the most important determinants of FDI distribution. According to Singh and Jun (1996), socio-political instability is a complex phenomenon whose effect is difficult to define, since the determination of the link between political instability and FDI most often vary with the political risk indicators used.

The effect of legal and regulatory environment on FDI is another issue. Crucial to inflow of FDI is a well functioning legal and regulatory framework where the rule of law prevails as well as transparency and consistency in enforcement. Also, physical infrastructure (electricity, roads and water supply) is important in attracting domestic and foreign investments. In addition, human capital is another key factor that encourages inflow of FDI.

Blomstrom et al (1994) observe that FDI inflows had a significant positive effect on the average growth rate of per capita income (PCI) for a sample of 78 developing and 23 developed countries. However, when the sample of developing countries was split between two groups based on level of PCI, the effect of FDI on growth of lower income developing countries was not statistically significant although it still has a positive sign. They argue that least developed countries gain marginally from multinational enterprises (MNEs) because domestic enterprises are too far behind technologically to be either imitators or suppliers to MNEs.

While there seems to be some agreement on the determinants of investments in both developing and developed countries, the literature identifies some additional risk and uncertainty factors that constrain investment in developing countries. These include inflation (Dornbusch and Reynoso, 1989; Serven and Solimano, 1993 and Oshikoya, 1994), large external debt (Borensztein, 1990; Faruqee, 1992), ownership, location, and internalization (Rivoli and Salorio, 1996), credibility of policy changes during macroeconomic adjustment (Rodrik, 1989), level and variability of the real exchange rate (Faruqee, 1992; Serven, 1998, Jenkins and Thomas, 2002), terms of trade effect (Oshikoya, 1994) and political instability (Bleaney, 1993; Garner, 1993; Root and Ahmed, 1979, Schneider and Fry, 1985); and infrastructure and institutions (Asiedu, 2002, and Ajayi, 2004).

There are a couple of survey-based studies of FDI in Africa mostly identifying the same set of obstacles constraining FDI inflow in the region. For instance, Hess (2000) assesses the investment climate in each of the SADC economies and highlights the most common factors constraining investment in this area. Among the prominent factors he identifies are unstable political and economic environment; lack of transparency; inadequate infrastructure; inefficient and cumbersome bureaucracy which breed corruption; underdeveloped financial sectors; and low productivity. He affirms that

the most important factor in attracting significant levels of FDI is a stable macroeconomic and political environment. He notes that investors require as much certainty as possible about an economy for them to be willing to invest in it.

Ngowi (2001) points out that it is difficult to determine the exact quantity and quality of each of the determinants of FDI in a location to attract a given level of FDI inflow. With respect to African countries, the study identifies high risk characterised by a lack of political, institutional and policy stability as well as predictability, poor access to world markets, price instability, high levels of corruption, small and stagnant markets and poor infrastructure as some of the important factors hindering FDI in Africa.

As indicated by Thomas and Worrall (1994), other forms of uncertainty emanate from risk of expropriation, and can be guaranteed only through signing bilateral and/or multilateral investment guarantees to protect foreign investors. Baker (1999) affirms the role played by the Multinational Investment Guarantee Agency to increase flow of FDI. The level of exchange rate becomes a determining factor, as indicated by Campa (1993), for the case of FDI inflow to USA, and also by Bacek and Okawa (2001) for Japanese FDI in Asia.

The expected sign for the measure of uncertainty is not clear from economic theory. Positive sign implies that firms invest more in a foreign market to diversify production, use a market as a shock absorber, or to compete with rival competitor, which is a strategic motive. Cushman (1985) argues that uncertainty affects FDI positively, as multinational firms tend to serve foreign market through FDI than through export when investors start to worry about uncertainty. On the other hand, the theory of investment and option value implies that firms lower investment when there is uncertainty, due to high sunk cost which further delays investment.

In Nigeria, significant scholarly effort has gone into the study of the role of foreign direct investment in the Nigerian economy. Oyaide (1979), Dinda (2009), and Abu (2010) provide an excellent documentation of works conducted under the aegis of the Nigerian Economic Society. However, previous empirical works have not addressed the roles of some of these uncertainty indicators and policies. The present study therefore, intends to fill this gap by focusing on uncertainty and FDI into agricultural sector in Nigeria.

### 3. Materials and Methods

#### 3.1 Data

This study is carried out in the context of Nigeria, for the period 1970-2008. Foreign direct investment into agriculture is measured by the ratio of net foreign direct investment into agriculture, forestry and fisheries to GDP (RAGRIC). Economic uncertainty indicators consist of the annual variability in consumer price index (INF) and the annual volatility in exchange rate of dollar (VRER). Political uncertainty indicators include Political freedom (POLI) and government commitment to bilateral and multi-lateral agreements proxy by the total number of Bilateral Investment Treaties signed by a host country and membership in Multilateral Investment Guarantee Agency (TBMAS). Other variables include investors' confidence proxy by the ratio of total external debt servicing of a host country to total export value (EDSEXP) and the size of non-oil export sector measured as the ratio of value of total non-oil export of goods and services to total export (NOEXP). Further, domestic market size, cost of capital, technology and infrastructure are proxy by GDP per capita (GDPPC) and real lending rate (RLR) measured as nominal lending rate minus inflation. Average rainfall (AVGRAIN) is included given the uncertainty associated with rain fed agriculture especially in poorly irrigated countries.

Data on GDP, net FDI into agric, INF, VRER, RLR, and rainfall were sourced from the Central Bank of Nigeria Statistical Bulletin. Data on political freedom was sourced from Freedom House website, while data on bilateral and multi-lateral agreements were sourced from Washington CIA data centre and MIGA respectively.

#### 3.2 Model Specification

In the traditional investment model, the desired capital stock ( $K_{it}$ ) depends on output ( $Y_{it}$ ) and real user cost of capital ( $IR_{it}$ ) in the host country.

$$K_{it} = f(Y_{it}, IR_{it}) \quad (1)$$

However, a multinational firms' investment is affected by other host country characteristics, which alter exchange rate, and demand. Therefore, this model is augmented based on the premise that both revenue and cost functions are subject to host country uncertainties and instabilities. Following the model developed by Goldberg and Kolstad (1995) [as contained in the work of Lemi and Asefa (2001); and Lemi et al (2002) ], which incorporates both the exchange rate and demand uncertainty, this study adapts the model by augmenting it with the Nigerian economy characteristics.

Foreign investors divide their production capacity across borders according to the distributions and correlations of exchange rate and demand shocks. The profit function of a source country firm that produces only for a foreign market, with a combination of domestic capacity and foreign capacity is given by:

$$\Pi(qd, qf, e, \sigma) = e (p (q) + \delta) q - qd - eqf \tag{2}$$

Where:

- $p (q)$  = Total demand in the host country for the product of affiliate firm
- $qd$  = Home capacity costs
- $qf$  = Foreign capacity costs
- $\delta$  = Demand shock
- $e$  = Exchange rate

Typically, the firm decides the level of production both in the domestic market and abroad before uncertainty is resolved. However, the model becomes more complex when other factors are taken into account. For example, foreign firms invest in a given host country not only to produce and sell products in the host country market, but also to export products either back to the parent firm’s country or to neighbouring countries. In that case, expected profit is a function of exchange rate and demand shock uncertainty and the correlation between the two. Therefore, level of production in the domestic market and abroad is a function of demand (price) and exchange rate uncertainties. As foreign firms cross boundaries, other factors pertinent for foreign investors include political instability and host country government policies; these factors are important because, in most cases, they treat foreign firms differently.

Other macroeconomic determinants of investment, such as total and skilled labour force, market size and potential, cost of capital, productivity (technology), infrastructure, size of export sector, investors’ confidence, and image of a host country in the international business community are commonly used control variables for the study of investment behaviour of multinational firms.

In assessing the role of economic uncertainty and political instability on FDI inflow to the agricultural subsector of the Nigerian economy; the rate of inflation and the exchange rate uncertainty, as well as political instability are expected to impede FDI inflow. Apart from these uncertainty indicators, host country economic policy parameters, investors’ confidence, market size and potential size of export sector, labour force availability and infrastructure facilities are factors in deciding whether to invest or not in a country. These control variables are expected to impact the inflow of FDI. Studies show that the inflow of FDI to African economies is enhanced by cheap labour and a large export sector (mainly to extract resources) (Nnadozie, 2000; Allaoua and Atkin, 1993). It is evident from similar studies that the role of communication infrastructure, and suitable policy environment is critical. By using proxy variables for the uncertainty indicators and other control variables, this study estimates FDI model for the agricultural subsector of the Nigerian economy as shown in equation 3.

$$RAGRIC_t = \beta_0 + \beta_1 INF_t + \beta_2 VRER_t + \beta_3 POLI_t + \beta_4 TBMAS_t + \beta_5 AVGRAIN_t + \beta_6 GDPPC_t + \beta_7 RLR_t + \beta_8 EDSEXP_t + \beta_9 NOEXP_t + \varepsilon_t \tag{3}$$

Where:

- $RAGRIC$  = Ratio of net FDI into agriculture (including forestry and fisheries) to GDP
- $INF$  = Annual variability in consumer price index
- $VRER$  = Volatility in exchange rate of dollar
- $POLI$  = Political freedom indicator
- $TBMAS$  = Total Bilateral Investment Treaties and Membership in Multilateral Investment Guarantee Signed
- $AVGRAIN$  = Average rainfall.
- $GDPPC$  = GDP per capita
- $RLR$  = Real lending rate defined as nominal lending rate minus inflation.
- $EDSEXP$  = Ratio of total external debt servicing to total export.
- $NOEXP$  = Ratio of non-oil export of goods and services to total export.
- $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$  are the intercept and relevant elasticities; and  $\varepsilon$  is the error term.

The a priori expectation for the variables are that GDPPC, TBMAS, NOEXP, AVGRAIN and POLI are expected to be positively related to foreign direct investment in agriculture while INF, VRER, RLR, and EDSEXP are expected to be negatively related to FDI inflow into agriculture. However, there is possibility of EDSEXP being positively related to inflow of FDI into agriculture if debt are injected optimally into the sector.

3.3 Estimation procedure-Cointegration and Error Correction Model(ECM)

The study utilises the cointegration and error correction model (ECM) approach. First, we proceed to the Augmented Dickey-Fuller (ADF) unit root test for stationarity to confirm the order of integration {I(0), I(1) or I(2)} and also, to avoid regressing non-stationary variables as this results in a spurious regression, identified by the rule of thumb were the goodness of fit indicator (R<sup>2</sup>) exceeds the serial correlation indicator (Durbin-Watson). Gujarati (1999).

The Augmented Dickey-Fuller (ADF) test constructs a parametric correction for higher-order correlation by assuming that the y series follows an AR(k) process and adding k lagged difference terms of the dependent variable y to the right-hand side of the test regression:

$$\Delta y_t = \alpha y_{t-1} + \delta x_t + \beta_1 \Delta y_{t-1} + \beta_2 \Delta y_{t-2} + \dots + \beta_p \Delta y_{t-p} + \varepsilon_t \text{ --- (4)}$$

Hence:

$$\Delta y_t = \alpha y_{t-1} + \delta x_t + \sum_{i=1}^k \beta_i \Delta y_{t-i} + \varepsilon_t \text{ --- (5)}$$

Where: y<sub>t</sub> is the variable considered, x<sub>t</sub> is a vector of exogenous variables, and ε<sub>t</sub> is a random error term.

The null hypothesis is that there exists a unit root in the time series (non-stationary time series), which is H<sub>0</sub>: α = 0, against the alternative hypothesis that the time series is stationary (no unit root) or I(0) which is H<sub>1</sub>: α > 0. In both tests, if the calculated statistic is less (in absolute terms) than the MacKinnon (1991, 1996) critical values, the null hypothesis is accepted and will therefore mean that there is a unit root in the series. The Akaike Information Criterion is used in selecting k after testing for first and higher order serial correlation in the residuals. The lagged variables serve as correction mechanisms for possible serial correlation.

Having confirmed the order of integration in the ADF above, the next step is to ascertain the existence of a cointegrating relationship among the variables, by employing the Johansen Cointegration test. This is followed by the error correction model estimation. The Error Correction Model has high potency in estimating both long and short run effects (parsimonious). Specifying equation 3 as an error correction model, we have:

$$\begin{aligned} \Delta RGDP_{t-1} = & \beta_0 + \sum_{i=0}^k \beta_1 \Delta INF_{t-i} + \sum_{i=0}^k \beta_2 \Delta VRER_{t-i} + \sum_{i=0}^k \beta_3 \Delta POLI_{t-i} + \sum_{i=0}^k \beta_4 \Delta TBMAS_{t-i} + \sum_{i=0}^k \beta_5 \Delta AVGRAIN_{t-i} \\ & + \sum_{i=0}^k \beta_6 \Delta GDPPC_{t-i} + \sum_{i=0}^k \beta_7 \Delta RLR_{t-i} + \sum_{i=0}^k \beta_8 \Delta EDSXP_{t-i} + \sum_{i=0}^k \beta_9 \Delta NOEXP_{t-i} + \sum_{i=1}^k \beta_{10} \Delta RGDP_{t-i} + \lambda ECM_{t-1} \text{ --- (6)} \end{aligned}$$

Where λ is the speed of adjustment parameter, ECM is the residual obtained from the estimated regressed equation 3.

4. Results and Discussion

4.1 The Pre-test: Unit Root Test and Cointegration Test

The results of the unit root test are presented in the table 1 below, using the Augmented Dickey Fuller (ADF). All of the variables were stationary at first difference, however, INF, RLR, and AVGRAIN were also stationary at level.

Table 1: ADF-Unit Root Test

Variables	At Level	At First Difference	Order of Integration
EDSEXP	-1.911379	-7.302613*	I(1)
VRER	0.086610	-5.151977*	I(1)
GDPPC	0.830510	-6.272502*	I(1)
INF	-3.322044**	-6.144419*	I(1) and I(0)
NOEXP	-2.329631	-9.144419*	I(1)
POLI	-2.319061	-5.806912*	I(1)
RAGRIC	-2.015296	-5.214698*	I(1)
RLR	-3.590782**	-6.184574*	I(1) and I(0)
AVGRAIN	-3.158022**	-7.883402*	I(1) and I(0)
TBMAS	0.974503	-6.806526*	I(1)

critical values			
1%	-3.615588	-3.621023	
5%	-2.941145	-2.943427	
10%	-2.609066	-2.610263	

Note: \*, \*\*, and \*\*\* indicates significant at 1%, 5% and 10% critical levels respectively.

Source: Computed by the author

Given the result of the unit root test, where some variables were not stationary at level, there is the need for a co-integration test. The result from the Johansen cointegration (table 2), suggests the existence of a cointegration relationship among the variables as the Trace and Max-Eigen test values agree to five cointegrating equations.

Table 2: Johansen Cointegration Test.

Sample (adjusted): 1972-2008				
Included observations: 37 after adjustments				
Trend assumption: Linear deterministic trend				
Series: AVGRAIN EDSEXP GDPPC INF NOEXP POLI RAGRIC RLR VRER TBMAS				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.971295	436.0769	239.2354	0.0000
At most 1 *	0.884354	304.7015	197.3709	0.0000
At most 2 *	0.816641	224.8843	159.5297	0.0000
At most 3 *	0.746458	162.1208	125.6154	0.0001
At most 4 *	0.716656	111.3484	95.75366	0.0028
At most 5	0.528351	64.68789	69.81889	0.1199
At most 6	0.455749	36.88164	47.85613	0.3531
At most 7	0.205796	14.37286	29.79707	0.8190
At most 8	0.127698	5.847496	15.49471	0.7135
At most 9	0.021193	0.792578	3.841466	0.3733
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.971295	131.3753	64.50472	0.0000
At most 1 *	0.884354	79.81722	58.43354	0.0001
At most 2 *	0.816641	62.76353	52.36261	0.0031
At most 3 *	0.746458	50.77240	46.23142	0.0153
At most 4 *	0.716656	46.66049	40.07757	0.0079
At most 5	0.528351	27.80624	33.87687	0.2226
At most 6	0.455749	22.50878	27.58434	0.1954
At most 7	0.205796	8.525362	21.13162	0.8687
At most 8	0.127698	5.054918	14.26460	0.7349
At most 9	0.021193	0.792578	3.841466	0.3733
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Authors Analysis

Having confirmed the existence of a long run cointegrating relationship, a uniform I(1) order of integration in the data, and the large number of regressors, we employ an Error Correction Method (ECM); the intuition behind the error correction model is the need to recover the long-run information lost by differencing the variables. The error correction model

rectifies this problem by introducing an error correction term. The error correction term is derived from the long-run equation based on economic theory.

#### 4.2 The Regression Results

Table 3 shows that in the long run, 63 percent variation of net FDI inflow into agricultural were on account of long run variations in the included variables. In line with Gujarati, D (1999), the regression is far from spurious as the DW value greatly exceeds the  $R^2$  value.

Table 3: Long run Model: OLS, using observations 1970-2008 (T = 39) Dependent variable: RAGRIC

	Coefficient	Std. Error	t-ratio	p-value	
Const	0.432605	0.128976	3.3541	0.00223	***
AVGRAIN	-0.00042643	0.000320273	-1.3315	0.19341	
EDSEXP	0.0149485	0.0244382	0.6117	0.54551	
GDPPC	-8.6515e-05	2.69797e-05	-3.2067	0.00326	***
INF	0.00499328	0.00419947	1.1890	0.24407	
NOEXP	-0.179363	0.27752	-0.6463	0.52316	
POLI	-0.012427	0.0126925	-0.9791	0.33564	
RLR	0.00422342	0.00435725	0.9693	0.34042	
TBMAS	0.0458131	0.0157646	2.9061	0.00694	***
VRER	-0.00250775	0.00124666	-2.0116	0.05364	*
R-squared	0.636019		Adjusted R-squared	0.523059	
Durbin-Watson	1.516682		P-value(F)	0.000166	

Note:\*\*\*, \*\*, and \* indicates significant at 1%, 5% and 10% critical levels respectively.

Source: Computed by the author

Only three variables had significant long run effects on FDI inflow into agricultural. The growth in GDP per capita (GDPPC) and volatility in exchange rate (VRER) both had a significant negative effect on FDI inflow into agricultural. While the negative sign in exchange rate volatility conforms to theory and for example the work of Wheeler and Mody (1992), the negative sign on per capita income (GDPPC) is not in tandem with theory. This might be due to the fact that Nigeria has to reach the threshold of per capita income level that can meaningfully impact FDI inflow positively. Further, the significant positive effect of government commitment to foreign investment proxy by bilateral and multilateral investment agreement (TBMAS) on FDI inflow into agriculture is in tandem with theory and the result is consistent that obtained by Gliberman and Shapiro (1999). Political freedom (POLI) was negative and insignificant so was the non-oil exports, and the rainfall effect. This implies that if foreign investors are to increase investment inflow into agriculture, aside the exchange rate behaviour and country-to-country trade/investment agreement, the commitment of domestic income (GDPPC) towards their domestic agricultural sector will be a major watch-out for them (like; "if you want my help in building your house, dig your foundation first").

Table 4 presents the results of the Over-Parameterized model from which the result of the parsimonious ECM shown in table 5 emanates. In table 5, the adjusted R-Square is 77.0% which shows that the model is able to explain approximately 77 percent of factors affecting inflow of FDI into Agricultural sector.

Table 4: Over-Paramatised Error Correction Model. OLS, using observations 1973-2008 (T = 36). Dependent variable:  $\Delta$ RAGRIC

	Coefficient	Std. Error	t-ratio	p-value	
Const	0.0110199	0.0375627	0.2934	0.78102	
$\Delta$ AVGRAIN	0.00017075	0.000614943	0.2777	0.79238	
$\Delta$ AVGRAIN <sub>t-1</sub>	-8.08753e-05	0.000845841	-0.0956	0.92754	
$\Delta$ AVGRAIN <sub>t-2</sub>	0.000163892	0.000821866	0.1994	0.84979	
$\Delta$ EDSEXP	0.0272649	0.0634229	0.4299	0.68517	
$\Delta$ EDSEXP <sub>t-1</sub>	-0.0209234	0.0393734	-0.5314	0.61789	
$\Delta$ EDSEXP <sub>t-2</sub>	0.0056703	0.056612	0.1002	0.92411	
$\Delta$ GDPPC	-0.000100972	0.000105003	-0.9616	0.38041	

$\Delta$ GDPPC <sub>t-1</sub>	6.1734e-05	7.56688e-05	0.8158	0.45169	
$\Delta$ GDPPC <sub>t-2</sub>	2.13628e-05	0.000111332	0.1919	0.85538	
$\Delta$ INF	0.00240338	0.0176861	0.1359	0.89721	
$\Delta$ INF <sub>t-1</sub>	0.0016766	0.00647572	0.2589	0.80603	
$\Delta$ INF <sub>t-2</sub>	-0.00506907	0.00998544	-0.5076	0.63330	
$\Delta$ NOEXP	-0.305345	0.616924	-0.4949	0.64162	
$\Delta$ NOEXP <sub>t-1</sub>	0.144047	0.455775	0.3160	0.76473	
$\Delta$ NOEXP <sub>t-2</sub>	-0.0648393	0.588506	-0.1102	0.91656	
$\Delta$ POLI	0.0189244	0.0508888	0.3719	0.72522	
$\Delta$ POLI <sub>t-1</sub>	0.00543604	0.017274	0.3147	0.76570	
$\Delta$ POLI <sub>t-2</sub>	-0.000668363	0.020623	-0.0324	0.97540	
$\Delta$ RLR	0.00294749	0.0179708	0.1640	0.87614	
$\Delta$ RLR <sub>t-1</sub>	0.00210403	0.0069581	0.3024	0.77453	
$\Delta$ RLR <sub>t-2</sub>	-0.00472362	0.00813128	-0.5809	0.58649	
$\Delta$ TBMAS	-0.000980544	0.105369	-0.0093	0.99294	
$\Delta$ TBMAS <sub>t-1</sub>	-0.0233582	0.088038	-0.2653	0.80136	
$\Delta$ TBMAS <sub>t-2</sub>	-0.0200303	0.0555885	-0.3603	0.73332	
$\Delta$ VRER	0.000245496	0.00192816	0.1273	0.90365	
$\Delta$ VRER <sub>t-1</sub>	0.00191275	0.00628921	0.3041	0.77328	
$\Delta$ VRER <sub>t-2</sub>	0.00102442	0.00533093	0.1922	0.85517	
$\Delta$ RAGRIC <sub>t-1</sub>	0.732546	0.401499	1.8245	0.12766	
$\Delta$ RAGRIC <sub>t-2</sub>	0.384429	0.764596	0.5028	0.63647	
ECM <sub>t-1</sub>	-0.6441	0.572825	-1.1244	0.31190	
Mean dependent var	0.000414		S.D. dependent var	0.087244	
Sum squared resid	0.030469		S.E. of regression	0.078063	
R-squared	0.885629		Adjusted R-squared	0.199401	
F(30, 5)	1.290576		P-value(F)	0.424490	
Log-likelihood	76.26037		Akaike criterion	-90.52075	
Schwarz criterion	-41.43166		Hannan-Quinn	-73.38734	
Rho	-0.000225		Durbin-Watson	1.998903	

The ECM is also negative and significant; its value 0.62, implies a fairly high speed of adjustment to equilibrium after a shock. Approximately 62% of disequilibria from the previous period shocks are adjusted into long run equilibrium in the current period.

Table 5: Parsimonious Results of the Error Correction Model for RAGRIC. OLS, using observations 1973-2008 ( $T = 36$ ). Dependent variable:  $\Delta$ RAGRIC<sub>t</sub>

	Coefficient	Std. Error	t-ratio	p-value	
Const	0.00704951	0.00921435	0.7651	0.45317	
$\Delta$ AVGRAIN <sub>t</sub>	0.000213666	0.000129027	1.6560	0.11333	
$\Delta$ AVGRAIN <sub>t-2</sub>	0.00033358	0.000127749	2.6112	0.01672	**
$\Delta$ EDSEXP <sub>t</sub>	0.0271033	0.0108746	2.4923	0.02158	**
$\Delta$ GDPPC <sub>t</sub>	-9.26827e-05	2.01262e-05	-4.6051	0.00017	***
$\Delta$ GDPPC <sub>t-1</sub>	6.48925e-05	2.60408e-05	2.4920	0.02160	**
$\Delta$ INF <sub>t-2</sub>	-0.00687361	0.00179642	-3.8263	0.00106	***
$\Delta$ NOEXP <sub>t</sub>	-0.253383	0.111928	-2.2638	0.03486	**
$\Delta$ NOEXP <sub>t-1</sub>	0.0863138	0.101726	0.8485	0.40621	
$\Delta$ POLI <sub>t</sub>	0.0212846	0.0083122	2.5606	0.01864	**
$\Delta$ RLR <sub>t-2</sub>	-0.00693932	0.00169012	-4.1058	0.00055	***
$\Delta$ TBMAS <sub>t-2</sub>	-0.00632266	0.0104562	-0.6047	0.55219	
$\Delta$ VRER <sub>t-1</sub>	0.00110628	0.000643739	1.7185	0.10114	
$\Delta$ RAGRIC <sub>t-1</sub>	0.729919	0.144582	5.0485	0.00006	***
$\Delta$ RAGRIC <sub>t-2</sub>	0.338501	0.111646	3.0319	0.00658	***
ECM <sub>t-1</sub>	-0.618669	0.114359	-5.4099	0.00003	***



R-squared	0.868742		Adjusted R-squared	0.770299
F(15, 20)	8.824807		P-value(F)	8.40e <sup>-06</sup>

Note: \*\*\*, \*\*, and \* indicates significant at 1%, 5% and 10% critical levels respectively.

Source: Computed by the author

The lagged value of ratio of net FDI into agriculture ( $\Delta RAGRIC_{t-1}$  and  $t-2$ ) shows a significant positive impact on current net FDI into agriculture ( $\Delta RAGRIC_t$ ), as its lagged value is re-enforcing the attraction of investment in this sector. The bilateral and multinational investment treaties (TBMAS) had no significant short run effect, whereas gains in rainfall, current changes in external debt servicing, previous per capita GDP, and political freedom all had a significant positive effect on the dependent variable in the short run, and will induce FDI inflow into the agricultural sector. This result is consistent with the findings of Lemi and Asafa (2001). However, in as much as the exchange rate volatility in the short run is an insignificant factor, previous experiences of high lending rate ( $\Delta RLR_{t-2}$ ), rate of inflation ( $\Delta INF_{t-2}$ ) and the current changes in the GDP per capital ( $\Delta GDPPC_t$ ) would deter FDI inflow into the sector as the three variables had a significant short run negative effect. That is, high lending rate in the short run discourages investment and credit demand into the agricultural sector as high lending rate to the sector scares away farmers and also serves as a useful tool by the financial institutions to mitigate the flow of credit to this sector (and similar real sectors) probably given the fact that it entails a long term investment that is open to risk compared to alternative short term investments; especially in conditions of high inflation rate (where creditors lose and debtors gain). The ratio of real external debt also shows positive relationship which confirms our assertion that external debt does not deter FDI inflow in Nigeria because the tax structure in Nigeria does not adequately cater for this. Nigeria government does not source their income majorly from tax, but rather from oil revenue.

Further, the results show that in attracting FDI into agricultural sector in Nigeria in the long run, two factors are prominent, namely: commitment to Multi-National Investment Guaranty Agency (MIGA) and a refocusing of domestic income towards revamping the agricultural sector. And in the short run, ensuring exchange rate stability and friendly lending rate charges by financial institutions and lowering inflationary pressure.

## 5. Conclusion and Policy Recommendations

This study has examined the role of uncertainty (both economic and political) in affecting the inflow of FDI into the Agricultural sub sector of the Nigerian economy. We found that in the short run, only the economic uncertainty variable of inflation has a significant but negative effect on FDI inflow to the agricultural sector in-as-much as volatility in exchange rate was insignificant. Interestingly, political freedom has a significant positive effect on the FDI inflow into the agricultural sector in the short-run.

However, the effects when extended into the long run, suggests that, neither the economic uncertainty of price changes (inflation) nor political freedom had any significant effect on FDI into the agric-sector, as the confidence of foreign investors seem already cemented by the significant positive trade relationship established overtime (TBMAS). Note though, that volatility in exchange rate had a significant negative effect on FDI into the agricultural sector in the long run.

To attract FDI inflow into the Agricultural sector of the Nigerian economy, government need to be more committed to Multi-National Investment Guaranty Agency (TBMAS), which will not only boost the confidence of foreign investors through increase government commitment but will alleviate possible fear of expropriation. More importantly, is a need for refocusing and changing the patterns of income/investment to the agricultural sector; the disturbing negative relationship suggested by the result, confirms the general reality of agricultural neglect and poor injection (domestic investment) into the sector. There is need to reconsider the pattern of investment into agriculture. Investable income should be channelled not only to increase raw agricultural produce but to extend the value-chain of agricultural produce, via investment in agricultural machinery, storage, and processing plants/mills. By so doing, we would not only checkmate agricultural wastage, but reduce unemployment, provide import substitutes, earn foreign exchange from export and a favourable balance of payment, thus increasing income and reducing poverty in Nigeria.

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