

THE IMPACT OF EXTERNAL CAPITAL INFLOWS ON CROP PRODUCTION IN NIGERIA

J.A.L. Effiong

Department of Agricultural Technology,
Federal Polytechnic Nekede, Owerri,
Nigeria.

Corresponding author: effiongjale@gmail.com

EKE, I.C

Department of Agricultural Technology,
Rivers State College of Arts and Science,
Port Harcourt, Nigeria.

Abstract

This study investigated the effect of foreign capital inflows (foreign private investment, foreign aids and grants and net export earnings) on index of crops output in Nigeria. Time series data were obtained from National Bureau of Statistics and Central Bank of Nigeria Statistical Bulletin from 1980-2013. The ordinary least squares (OLS) regression analysis and cointegration/error correction mechanism were employed as the main statistical tools. The E-views 7.1 statistical package was used in analyzing data. Results from the study show that the value of the Error Correction Model (ECM) for crop output appeared with the right signs (-5.703872) and statistically significant at the 5 per cent level. Meaning that the ECM corrected the short run deviation to long run equilibrium. The Durbin Watson value of 2.198 for crops outputs suggests a lesser level of autocorrelation. The coefficient of determination (R^2) showed that 53.09% of variation in crop output was explained by changes in the explanatory variables. The F-ratio of 2.749763 for crops output confirmed the overall significance of the model. The beta coefficient (β) of current and lag one forms of Foreign Private Investments (FPI), Foreign Aids and Grants (FAG), Net Export Earnings (NEE) and Exchange Rate (EXR) for crops output model was positively signed but not statistically significant. This result revealed that foreign capital inflows (FPI,FAG,NEE, and EXR) has a positive impact but does not significantly affect crop output in Nigeria. The study recommends that government should put in place a strategy for attracting more foreign investors as well as pursuing an aggressive export promotion drive with a view to increasing the volume of value-added agricultural exports. Attempt should also be made to attract a higher volume of foreign aids and grants by interfacing with international agencies, organizations and financial institutions. Investment of External capital should be channeled to sub-sectors that generate higher growth and contribute significantly to general welfare.

Keywords: Capital, inflows, investments, crops, foreign.

INTRODUCTION

The need for foreign capital to complement domestic resources in the economic growth process has been welcomed as a catalyst of development, since it is considered as the central element of the process of economic growth. Its origin does not matter. In the face of resource deficiency in financing long term development, the capital-deficient economies have heavily resorted to foreign capital as the primary means to achieve rapid growth in all sectors of the economy especially the agricultural sector. Both private and public sectors of the Nigerian economy have utilized the foreign capital to boost their sector capabilities in line with

government development plans. Over time, government's plan to stimulate inflow of resources was with expectation to speed up growth and transform the economy especially the agricultural sector in line with classical economist's prescription. In particular, rapid increase in Gross Domestic Product (GDP) and GDP per capita were expected. Other expectations included improved balance of payment, creation of employment opportunities and stimulation of the overall development of the economy (Effiong, 2015).

The need for capital inflow into an import dependent economy like Nigeria is crucial. A cursory look at the data indicates that Nigeria has posted trade imbalances in most fiscal years, suggesting that total payments had exceeded total receipts vis-à-vis total imports to total exports relations (Amadi, 2002). Overall balance of payments deteriorated in 1999, 2002 and 2008 mainly due to increased outflow from capital accounts (CBN, 2009). Much of the capital outflow must be attributed to increased importation, declining exports particularly non-oil subsector, and majorly due to external debt servicing required in filling resource gaps.

Akinlo (2006) have identified debt servicing and reserve creation as fluctuating variables that create dependence on foreign capital in Nigeria. The long run development of an emerging economy like Nigeria's would require persistent and massive investment expenditures that can match the dire need for capital. Also, Akinlo (2006) opined that economists have come to realize that a massive savings-investment gap exists in developing countries. This has led to the arguments that external financing is critical if not inevitable for the sustained growth of countries like Nigeria. The main arguments in this direction is that if these countries gain access to world financial markets and other donor financing, the savings gap could be overcome by financing domestic (excess) investment out of the savings from high income countries i.e. by capital imports. These capital imports can take the form of concessional lending abroad, foreign direct investment (FDI) inflows and portfolio investment by foreigners.

Anyanwu (2004) disaggregated foreign capital into; foreign loans, direct foreign investments and export earnings. Using Chenery and Stout's two-gap model, he observed that FDI has a negative effect on economic development in Nigeria. According to a World Bank report released in 2011, Foreign capital inflow, which comprises Foreign Direct Investment, FDI, (investment in real assets) and Foreign Portfolio Investment (investment in financial assets) in Nigeria for 2010 stands at N7.7 billion (Anderson and Babula, 2008). Conversely, the experience of a small number of fast growing East-Asian newly industrialized nations has strengthened the belief that foreign capital is the central element of the process of economic development especially in the agricultural sector since it could bridge the resource gap of these economies and avoid further buildup of debt while tackling the causes of poverty directly (Albuquerque, 2003). Therefore, foreign capital inflow and investment is the transfer of entrepreneurship, management skill, physical capital and human capital. It involves transfer of sophisticated skills in production technology, technical knowledge, general know-how, and managerial capacities.

STATEMENT OF THE PROBLEM

It is sad to note that Nigeria which during the 60s and 70s was a global powerhouse in a sector like agriculture is today a major importer of agricultural products. The country has experienced a humiliating decline in productivity in virtually all sectors of the economy. The oil and gas sector which the country hangs on to as its lifeline is also highly susceptible to external shocks that emanate from the roller-coaster ride of world crude oil prices as is the case today. Currently, the oil sector is performing very woefully especially with the

plummeting of crude oil prices recently. With the recent development in the oil sector, it is evident the sector alone cannot address the numerous economic challenges that as the core resource base have not been converted into improved living standards as over 54.7 percent of the population continue to live below the national poverty line (World Bank, 2012).

The contribution of agriculture to economic growth of Nigeria in present times is still very low as against what was obtainable during the 1960s. Even with the recent reforms in Nigeria, the country's agricultural sector to a large extent still possesses the characteristics of a peasant economy that was prominent in the pre-independence era (Adewunmi and Omotesho, 2002). In spite of the presence of abundant primary resources required to enhance growth in the sector, it is bedeviled by a host of problems and challenges thereby making breakthroughs and successes almost unachievable in the sector. The capital investment, productivity and income recorded in today's agricultural sector of Nigeria are very low. Production is still dominated by small-scale farms characterized by small, uneconomic and often fragmented holdings, use of simple implements (hoes and cutlasses) and unimproved planting and storage materials.

Asiedu (2003) explained that agricultural production landscape in Nigeria which is dominated by small-scale farmers who produce about 85 per cent of the total production still employ rudimentary techniques. The quantity and quality of capital investment in the agricultural sector leaves much to cheer. Also, despite the broad objectives of foreign aid as well as the tremendous increases in the flow of foreign aid to developing countries like Nigeria from time to time, there is controversies about aid effectiveness in the various sector especially the agricultural sector. Also, Nigeria as a country, given her natural resource base and large market size (a population of about 170 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. For example, the flow of FDI to agriculture in Nigeria for 1980, 1990, 2000 and 2010 was ₦120.8 million, ₦334.7 million, ₦1209 million and ₦1280 million respectively. In spite of these flows, agricultural output remained very low and its contribution to the GDP for the same period stood at 31%, 39%, 38% and 39% respectively. This shows, the level of FDI attracted especially to agriculture is small compared to the resource base and potential need. There is also a continuing debate on the relationship between foreign aid and economic growth in countries, empirical results by scholars are mixed. It is very difficult to quantify or measure the impact of foreign aid in a country. In Nigeria, sceptics of foreign aid insist that despite the well-intended ideal of impacting economic growth and wellbeing of people in the country, little has actually come from the enormous amount and variety of aid. Most aid projects in Nigeria are subject to failure from its inception. The reasons are partly because most of these financial assistances ended in the private accounts of those who are supposed to administer those projects, also that sometimes donors are not interested in what the money is being used for but what they expected to get in return.

This study examines the effect of foreign capital inflows (foreign private investment, foreign aids and grants, net export earnings and exchange rate) on crops output in Nigeria. The result of this study will be useful for improving policy design, institutional set up, implementation, monitoring and evaluation in the area of foreign investments and aid allocation to public spending in general and sector wise especially the agricultural sector in particular for the sake of economic growth.

LITERATURE REVIEW

Foreign Capital Inflow and Agricultural Output in Nigeria

Binuyo (2014) examined the impact of FDI on the agricultural sector development of the Nigerian economy. This work employs secondary time series data which spanned 1981 to 2012, Following ADF test for stationarity and a granger causality test, the study found a relationship among the variables as affirmed by the error parameter. The study reveals 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. Further, political instability adversely affected agricultural investments in the long run.

(Andersen and Babula, 2008) employed trend analysis and simple linear regression to examine the level of capital flow in the agricultural sector and the consequential effect on GDP; the result of the study showed that foreign capital flow does not follow a regular pattern and the contribution of agricultural sector to GDP is in direct consonance with funding to the sector. The conclusion of (Andersen and Babula, 2008) is interesting as it explains that the government cannot expect high productivity from the agricultural sector when investments in the sector are of low quantity and poor quality. Ayanwale (2007) analyzed the empirical relationship between non-extractive FDI and economic growth in Nigeria. Using OLS estimates, he observed that FDI has a positive link with economic growth but cautioned that the overall effect of FDI on economic growth may not be significant. Okodua (2009) examined the sustainability of the FDI-growth relationship in Nigeria. Using the Johansen cointegration framework and a multivariate VAR within a vector error correction model. He observed a long-run equilibrium relationship between economic growth and FDI inflows. The study also revealed a unidirectional causality from FDI to economic growth. Apart from Nigeria, the relationships have been examined for other country groups.

Imougheli (2014) analyzed the effect of foreign direct investment and economic reforms in India. The study centered on industry specific FDI and its growth, by using Granger Causality and cointegration. Their results showed that the growth effect of FDI vary widely across different sectors.

Hameed (2008) in their analysis examined the impact of external finances on productivity and business growth in Pakistan for the period 1970-2003. They applied cointegration and error correction model on the annual data. Their results showed that debt servicing has a negative relation with labor and capital, hence affects economic growth adversely. It was also observed that a negative relationship exists between debt servicing and GDP, which reduces the debt servicing ability of the country in the long run. In the same vein, Ajayi and Atanda (2012) examined the impact of FDI on productivity in Nigeria in a seemingly unrelated regression and found out that FDI is pro consumption and pro-import and negatively related to gross domestic investment; labour and capital also play a significant role in economic growth. For capital-scarce developing countries like Nigeria, such offshore capital inflows are desirable as they help to stimulate investment, employment and growth. A high inflow of foreign private investment would lead to rise in gross domestic investment, which will in turn lead to growth (Ayanwale, 2007).

Uwubanmwun and Ajao (2012) adopting a Vector Error Correction Model (VECM), examined the determinants and impacts of FDI in Nigeria. His findings suggest that public investment (measured by government size in the economy) has a positive but insignificant

influence on FDI. Moreover, in a similar study, Eli, Udo and Isitua (2006) investigated the determinants of FDI and economic growth in the West Africa Monetary Zone. Using a simultaneous regression methodology to obtain estimates on public investment, political instability, inflation, real interest rate, etc., found, among others, that public investment has a positive and significant relationship with foreign direct investment.

Investment is the most strategic factor in the process of economic development and as such the need for capital inflow into an import dependent country like Nigeria is crucial. Most people are more concerned with the issue of foreign direct investment (FDI) in Nigeria and the role assigned to globalization in foreign direct investment cannot be over emphasized since FDI is the largest single source of external financing for the less developed countries like Nigeria. Since no nation in the world is economically self-sufficient, the need for the needed amount of foreign resources beyond a country's border becomes inevitable. Akinlo (2004) in his study revealed that foreign capital has a small and not statistically significant effect on economic growth in Nigeria.

Foreign direct investment (FDI) is the distinctive feature of multinational enterprise. It is not simply an international transfer of capital but rather the extension of enterprise from its home country (Asiedu, 2003). This extension of enterprise involves flows of capital technology and entrepreneurial skills to the host economy where they are combined with local factors in the production of goods for the local and export market. According to Iyoha (2002), foreign direct investment inflows are by and large investment by transnational corporations in foreign (host) countries for the purpose of controlling assets and managing production activities in those countries (Okafor, 2004). There are several variants of FDI in the literature, wholly-owned enterprise, joint ventures and special contracts arrangement such as licenses, franchises, management contracts, consultancy, Turkey contracts, sub-contracting, quality control and standard services among others.

Obayori (2014) in the test conducted using OLS, found market exchange rate in the official market as being significant at 10% for FDI to agricultural sector, the same is however not significant for manufacturing. He therefore concluded "proper management of the exchange rate to flows of FDI to Nigeria and sub-Sahara African countries.

Asiedo (2003) in his work using panel data for 22 countries in sub-Saharan African over the period of 1984-2000 examined the impact of political risks, institutional framework and government policy on the FDI flows. The dependent variable was the rate of the net FDI flows to GDP while the independent variable used include natural resource intensity, attractiveness of the host country's market, infrastructural development, macroeconomic instability, openness to FDI, host country institution and political instability. His result showed that macroeconomic stability, efficient institution, political stability and goods regulatory framework have positives impacts on FDI an importation implication of the result that FDI to Africa is not solely driven by natural resources endowment and that government can play an important role in promoting FDI to LDC regions. Similarly, (Udoh, 2012) employed bounds test and Autoregressive distributed lag (ARDL) modeling approach to analyze both short- and long-run impacts of public expenditure and foreign direct investment on agricultural output growth in Nigeria. Their results indicate that an increase in public expenditure has a positive influence on the growth of the agricultural output and that government spending has a relatively higher elasticity than foreign direct investment.

Net Export and Agricultural Growth in Nigeria

Interestingly, the new world economic order of Globalization has brought about an increased openness, trade and foreign capital inflow across borders. Globalization is a process of integrating economic decision-making such as consumption, investment, and savings across the world. It is a process of creating a global market place in which, increasingly, all nations are required to participate (Todaro, 2006). Key elements in this process are interconnection of sovereign nations through trade and capital flows, harmonization of the economic rules that govern relationship among these sovereign nations, creation of structures to support and facilitate dependence and interconnection and the development of a global market. All economies are increasingly open in today's economic environment of globalization. Trade plays a vital role in shaping economic and social performance and prospects of countries around the world, especially those of developing countries. No country has grown without trade. However, the contribution of trade to development depends a great deal on the context in which it works and the objectives it serves. In recent decades, a number of developing countries, most notably the East Asian newly industrializing countries, have been able to purposefully use the elemental force of trade to boost growth and development within a relatively short time span. At the same time many other developing countries, especially the least developed country (LDCs), have embarked on unilateral trade liberalization in recent years, with very limited results at best in terms of increase growth and development.

Ajayi and Atanda (2012) investigated the trade and capital flow channels of globalization on macroeconomic stability as proxied by real output growth rate in Nigeria between 1970 and 2009. They employed autoregressive model which indicated that the first lag of real output growth rate has significant positive effect on real current growth rate, while the second autoregressive term is found to exert insignificant negative effect on current real output growth rate. Also, trade and capital flow dimensions were found to deteriorate the macroeconomic stability level in Nigeria. However, the existence of cointegration was later established among the series, while the short run analysis using the error correction mechanism model indicated that for any disequilibrium in the stability level in the short-run, the error correction term adjust 97.5% of this divergence to its long-run equilibrium.

Enu and Havi (2014) examined the effect of globalization on economic growth in Nigeria between 1970 and 2010 amidst cyclical fluctuations in foreign investments. They employed autoregressive model that regress trade openness, cyclical foreign investment to gross domestic products, external reserves, debt stock and exchange rate on real gross domestic product revealed that globalization has positive and significant effect on economic growth in Nigeria, while the positive side of business cycle on real output growth was insignificant. Some studies show that there is little or no evidence suggesting that trade liberalization induces accelerated agricultural production growth, whereas some analyses provide empirical evidence confirming the link between trade openness and agricultural production growth when trade liberalization is introduced (Andersen and Babula, 2008). Moreover, research points out that trade liberalization and agricultural productivity may both feed on each other. Agricultural productivity can be gained from trade openness, along with liberalized trade policies, as agricultural products need to be more competitive to get expected agricultural production levels (Mahadevan, 2003). The positive link between agricultural production growth and trade openness may suggest that trade liberalization goes along with economic development. Removal of trade barriers has become a powerful economic policy in both developed and developing nations today, while import and export tariffs, quotas, and export subsidies were common during the previous decades (Herath, 2008). More recently,

developing nations, such as Sri Lanka, have also been implementing trade liberalization policies. Further, most countries' experience on trade policy reforms suggest that agricultural production growth and domestic welfare gains rise along with trade policy reform implementation.

Foreign Aid and Agricultural Output

In recent years, there has been much discussion about the causes of the slowdown in growth of agricultural production, especially in the context of the world food crisis, which severely hit developing countries in 2007 and 2008. The decline in agricultural investment, including a decline in the share of the agricultural sector in the aggregate investment, was considered to be a major contributing factor to this crisis. Two components of investment in agriculture have drawn particular attention as being of vital importance in this context. One is the trend in foreign aid to agriculture, and the other is the trend in domestic public expenditure on agriculture." (Islam, 2011).

On the other hand international donor organizations play one of the important role in fostering agricultural sector's development and prosperity worldwide and especially in Africa where this sector has vital importance as it is the major means for poverty reduction. Besides donors give some banks impetus to direct their loans to the agricultural sector. "Eventually, donors aim to transform producers' organizations into private co-operatives which may possess higher credibility in business negotiations, in particular those with private banks. Access to credit is another important area where donors provide support. Dopfer (2006) mentions "Donor agencies have traditionally equated rural finance with agricultural credit, seeing it as an "input" to achieve agricultural production targets or other project objectives." In some cases this target was achieved but in some cases with moderate effects. In the work of Simon-oke and Awoyemi (2010) some evidences are shown about the positive impact of foreign aid on economic growth in Melanesian countries. Differing from other work regarding the impact of foreign aid that mostly focus on economic growth the study investigated how foreign aid affects rural sector. Based on the findings, the study suggests that higher proportion of foreign aid should be directed to the rural sector. Similar issue was studied by Ray (2012) where they analyzed how foreign aid affects various sectors of Nigerian economy. In particular they paid attention on the impact of foreign aid on agricultural sector. He concludes that the proper aid coordination and management is needed to have welfare impacts on the Nigerians. Taham (2008) found empirically that the relationship between growth in the agricultural output and agricultural aid for rural development is positive and statistically significant. He conclude that developmental aims of foreign assistance can be obtained if aid is targeted for the agricultural sector of the developing countries.

Gounder (2001) obtained robust results in the foreign aid and growth relations, accepting the fact that aid increase growth through investments despite policy defects. With a sign-restriction VAR approach, Odior (2013) detected that macroeconomic policy influences investment expansion negatively. Burnside and Dollar (2004); Roodman (2004) gave evidences that the quality of domestic policies is essential for aid to drive growth. But Burhop (2005) estimated a Wald tests on VAR coefficient of foreign aid, income per capita and investment of fourth five countries and discovered that there are no causal relationships between aid and economic performance. Blanchard, Marina and Maaruska (2009) advised that the identification of macroeconomic shocks is robust, provided that the effect of fiscal policy on long-term output is negligible relative to other shocks.

More wide analysis was done by Syed, Hasfa, Lee and Sackey (2008). They examined the effect of aid on growth in Africa. They found that aid has positive and statistically significant impact on growth in African states. Aid-growth linkage was analyzed also in the work of Islam(2011). Their results illustrate positive long run relationship between growth rate of per capita real GDP and aid as a percentage of GDP for four out of five observed countries. As a conclusion they mention that this analysis tends to contribute the aid effectiveness hypothesis for South Asian states. Inanga and Mandah (2008) in their work observed that in spite of difficulties to distinguish the impacts of foreign aid finance from those of other growth-stimulating factors, if foreign aid finance availed efficiently and effectively it can induce growth in a stable macroeconomic environment. Similar study by Gounder (2001) found that total aid flows and its various forms has a significant impact on economic growth in Fiji. Previous author's arguments were strengthened by the work of Tiwari, Stazicich and Lee (2008) who estimated the effectiveness of foreign aid, foreign direct investment, and economic freedom for observed 28 Asian countries. Also he found that aid had a negative impact on economic growth in these countries if the aid flows were high.

Tiwari (2011) investigated how specific donors' partner banks in Kyrgyzstan adopted new product - micro agricultural loans. In this case the donors' assistance was carried out in two directions: provision of credit lines and giving technical assistance in the process of developing specific credit technologies. This is not an empirical paper but there is evidence that overall development of agricultural credit was a success and each participating bank improved its own rates.

METHODOLOGY

The following time series data were employed in the study:

- Agricultural output - Index of agricultural production output in Nigeria from 1980-2013, (staple food , crops and fisheries)
- Foreign private capital inflow to agriculture data in Nigeria from 1980 – 2013,
- Foreign aid and grants to agriculture data in Nigeria from 1980 – 2013,
- Net export earnings data in Nigeria from 1980 – 2013, and
- Exchange rate data in Nigeria from 1980 – 2013.

The necessary information (data) for the variables above was obtained from secondary sources. This includes data from Central Bank of Nigeria Statistical Bulletin, National Bureau of Statistics, Journals, and textbooks among others. Therefore, the study adopted the Ordinary Least Square method (OLS), the Error Correction Method of Co-integration based on Engle-Granger (1987) co-integration theorem and the Granger Causality test. The reasons for these econometric approaches have become necessary due to the fact that time series data are sometimes subject to variation that may lead to false regression result.

Ordinary Least Square Test

This study employed this test to investigate the relationship that exists between the dependent and explanatory variables. The study chose the OLS method because of the requisites advantages associated with it such as the Best Linear Unbiasedness Estimate (BLUE) and efficiency.

The Co-integration and Error Correction Model (ECM) Test

The co-integration estimation technique in analyzing data was adopted in this study. Co-integration is an econometric technique used for testing the correlation between non-stationary time series data. Usually time series data are non-stationary due to fluctuations that

do characterize such information. Two variables are said to be co-integrated if they have a long run or equilibrium relationship between them or share a common stochastic drift (Gujarati, 2007). Hence, co-integration technique has been developed to address the problem of spurious correlation (false correlation) often associated with some time series data. Meanwhile, an extension of this, in the co-integration technique is the error correction mechanism (ECM) (Engle and Granger, 1987). These authors have established that co-integration is a sufficient condition for an error correction model formulation.

Unit Root Test

The unit root test is the first stage of co-integration and error correction techniques. This test helps to stabilize the spurious nature of the time series. A test of stationarity could be Dickey Fuller, Philip Peron and Augmented Dickey Fuller (Gujarati, 2007). But for this study, the Augmented Dickey Fuller (ADF) test is adopted. This is because it takes care of the problem of autocorrelation associated with the Dickey Fuller Test. A unit root model is presented below:

Unit Root Model

$$\Delta Y_t = \alpha Y_{t-1} + \sum_{i=1}^m \Delta Y_{t-i} + \delta + \varepsilon_t \text{ (for levels)}$$

$$\Delta \Delta Y_t = \alpha \Delta Y_{t-1} + \sum_{i=1}^m \Delta \Delta Y_{t-i} + \delta + \varepsilon_t \text{ (for first difference)}$$

ΔY is the first difference of the series, m is the number of lags and t is the time.

Suppose two variables A (net export earning) and B(exchange rate), used in our analysis are integrated of order 1 and we are interested in finding out the equilibrium relationship between the two variables, then this method suggests a straight forward test whether two variables are co-integrated of order I(1) or not.

Johansen's Test for Co-Integration: The basic argument of Johansen's procedure is that the rank of matrix of variables can be used to determine whether or not the two variables are co-integrated.

Error Correction Model (ECM): According to Iyoha and Ekanem (2011), error correction model (ECM) involves using lagged residual to correct for deviations of actual values from the long-run equilibrium values.

The error correction model for two variables X and Y is stated generally as:

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 U_{t-1} + \varepsilon_t$$

Where; α_2 is the degree of adjustment.

The decision in favour of this empirical approach is on the ground that time series data usually fluctuate, resulting in spurious short-run regression result due to cyclical behaviour of business activities. Therefore, the chosen methods of analysis will correct inconsistencies in time series data and provide for long-run relationship amongst the variables in this investigation.

Also to be tested in this research work are the following:

- Test for the co-efficient of determination (R^2) as test to knowing the explanatory power of the variables in the models (goodness of fit of the variables).
- Test of significance (T-test) of each of the parameter estimates.
- Overall significance (F-test) of the explanatory variables in the model.

- Durbin Watson test for autocorrelation.

Growth in agricultural production is crucial for achieving sustainable economic growth and poverty reduction in developing nations.

Model Specification

The specified model in this work was to show the expected functional and econometric forms of relationship between the dependent and independent variables included in the model. The model as shown below is technically specified in line with (Odior, 2013) but with rational adjustments in number of explanatory variables and time frame. The model is tried with both linear and log linear specifications. The model that provides the best fit is selected on the basis of magnitude of R^2 , magnitude and statistical significance of the regression coefficients and conformity to expected signs. The model is specified thus;

Model 1: Crop Production Output Model

$$CUP = f(FPI, FAG, NEE, EXR) \dots\dots\dots 1$$

Linear Specification

$$CUP_t = a_0 + a_1 FPI_t + a_2 FAG_t + a_3 NEE + a_4 EXR + U_t \dots\dots\dots 2$$

Log Linear Specification

$$\text{Log} CUP_t = \text{Log} a_0 + \text{Log} a_1 FPI_t + \text{Log} a_2 FAG_t + \text{Log} a_3 NEE + \text{Log} a_4 EXR + U_t \dots\dots 3$$

Where:

f = functional sign

a_0 = Autonomous component of crops output

a_1 - a_4 = slopes of macroeconomic fundamentals

CUP = Output of crop Production

FPI = Foreign private investment

FAG = Foreign aids and grant to agriculture

NEE = Net export earnings

EXR = Exchange rate

t = time.

A priori expectations

On the *a priori*; $a_1 > 0$, $a_2 > 0$ $a_3 > 0$ and $a_4 > 0$

RESULTS AND DISCUSSION

Table 1: Crop, Staples and Fish Outputs, Foreign Private Investment, Foreign Aid and Grants, Net Export Earnings and Exchange Rate (1980-2013)

YEAR	CUP	SUP	FUP	FPI	FAG	NEE	EXR
1980	51.11	45.35	198.19	120.8	794800000	5091.100	0.540000
1981	52.00	46.15	171.45	120.5	101520000	-1816.300	0.610000
1982	53.17	48.26	176.74	120.5	922900000	-2564.100	0.670000
1983	50.28	46.15	189.79	127.8	123750000	-1401.200	0.720000
1984	55.56	52.80	129.20	128.5	90100000	1909.700	0.760000
1985	57.50	54.54	80.49	126.0	868200000	4658.200	0.890000
1986	61.78	58.08	89.79	128.2	12300000	2937.000	2.020000
1987	49.60	44.51	80.63	117.3	119360000	12498.90	4.020000
1988	52.35	46.82	88.57	128.9	184910000	9747.100	4.540000
1989	94.35	94.29	115.24	134.8	546250000	27111.00	7.390000
1990	100.00	100.00	100.00	334.7	383270000	64168.20	8.010000
1991	118.04	120.76	108.89	382.8	378760000	32047.20	9.910000
1992	129.59	134.23	108.89	386.4	358120000	62460.50	17.30000
1993	133.89	140.61	81.27	1214.9	427680000	53140.70	22.05000
1994	138.51	146.17	86.67	1208.5	270420000	43270.40	21.89000
1995	141.93	150.61	100.32	1209	261450000	195533.7	21.89000
1996	149.97	157.39	115.56	1209	246750000	746916.8	21.89000
1997	154.82	162.25	128.57	1209	277230000	395946.1	21.89000
1998	159.96	166.89	136.51	1209	287100000	-85562.00	21.89000
1999	165.45	172.71	140.63	1209	209800000	326454.1	102.1100
2000	171.01	178.51	146.03	1209	245770000	960700.9	102.1100
2001	143.40	157.50	157.00	1209	263430000	509773.5	112.9400
2002	149.30	164.10	158.10	1209	419250000	231482.3	126.8800
2003	196.18	175.90	160.50	12091	384570000	1007651	137.2200
2004	169.90	186.90	172.10	1209	654310000	2615736	133.5000
2005	181.50	199.50	182.10	1209	6954730000	4445679	132.1500
2006	206.20	215.10	73.24	1209	1238334000	4216161	128.6500
2007	195.16	210.53	149.60	1329.9	1951130000	4397806	125.8300
2008	194.3	208.4	134.98	1249.9	1271670000	4971688	126.4800
2009	198.5	211.3	119.27	1262.7	1671210000	3253851	149.9000
2010	196.0	210.1	134.62	1280.8	2061960000	3917582	150.4800
2011	196.3	209.9	129.62	1264.5	1776670000	3993678	158.2100
2012	196.9	210.4	127.84	1269.3	2061960000	4272836	159.3900
2013	196.4	210.1	130.69	1271.5	1966860000	4061365	161.5000

Source: CBN Statistical Bulletin (Various Issues)

Trend Analysis of the Variables in the Models

CUP

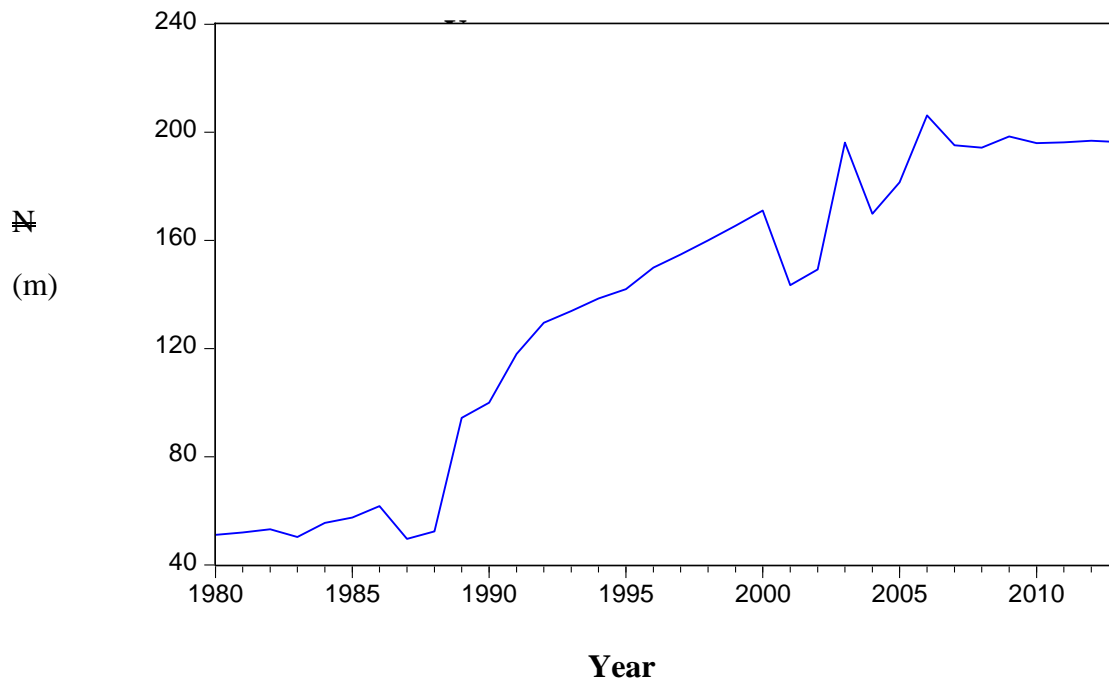


Figure 1: Trend Analysis of Crop Output Production

FAG

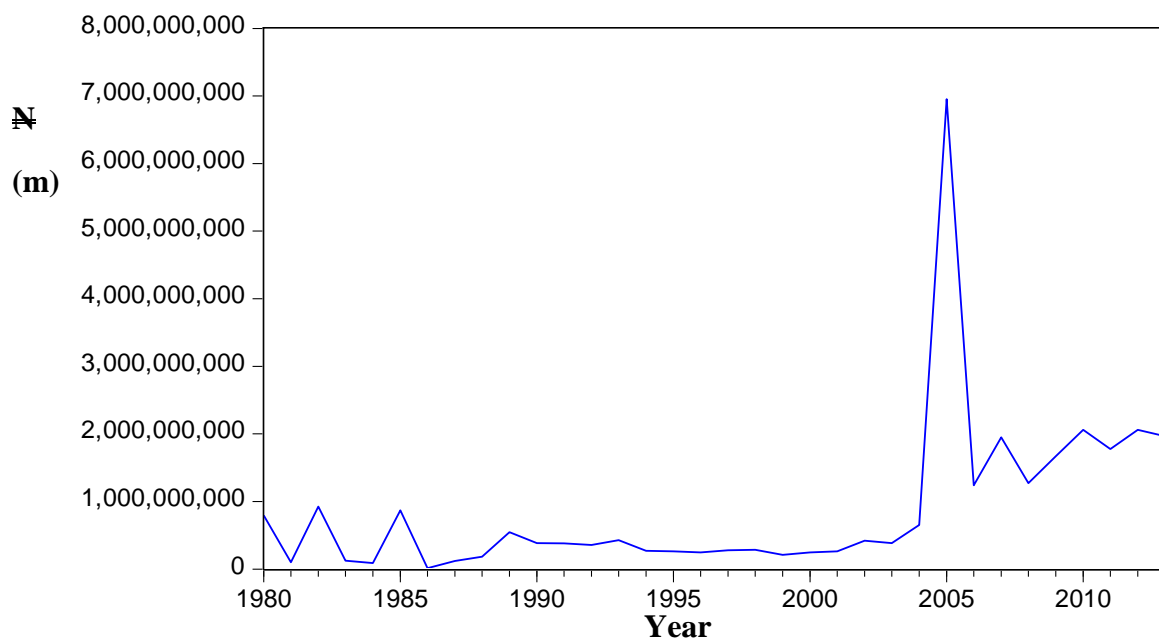


Figure 2: Trend Analysis of Foreign Aids and Grants to Agriculture

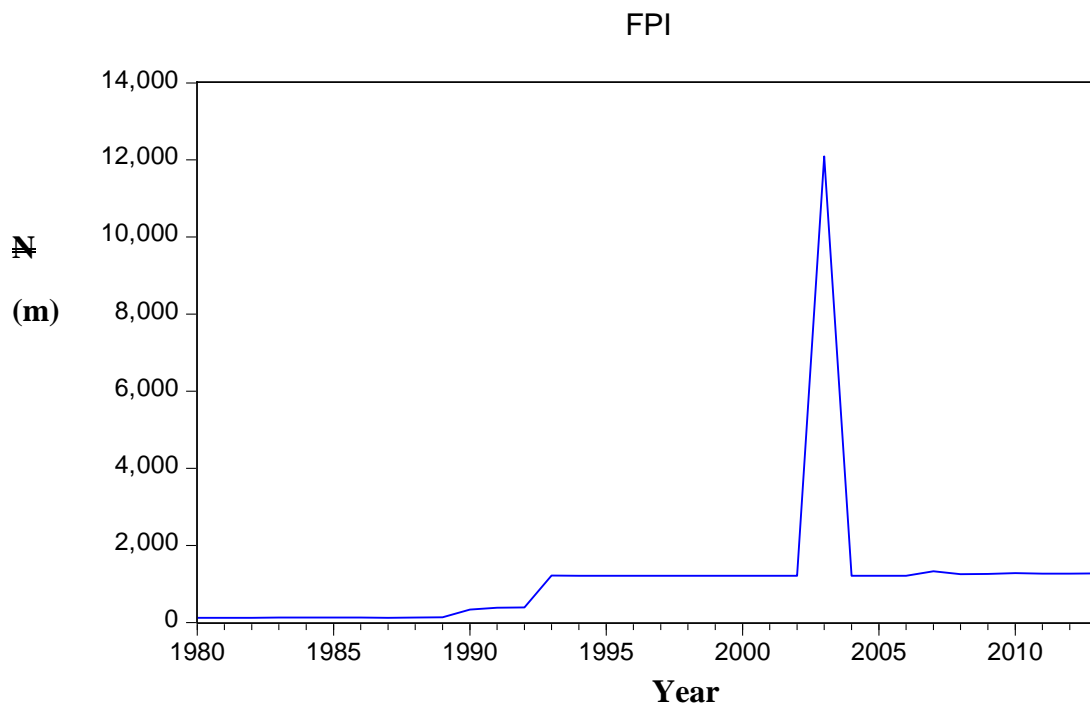


Figure 3: Trend Analysis of Foreign Private Investment

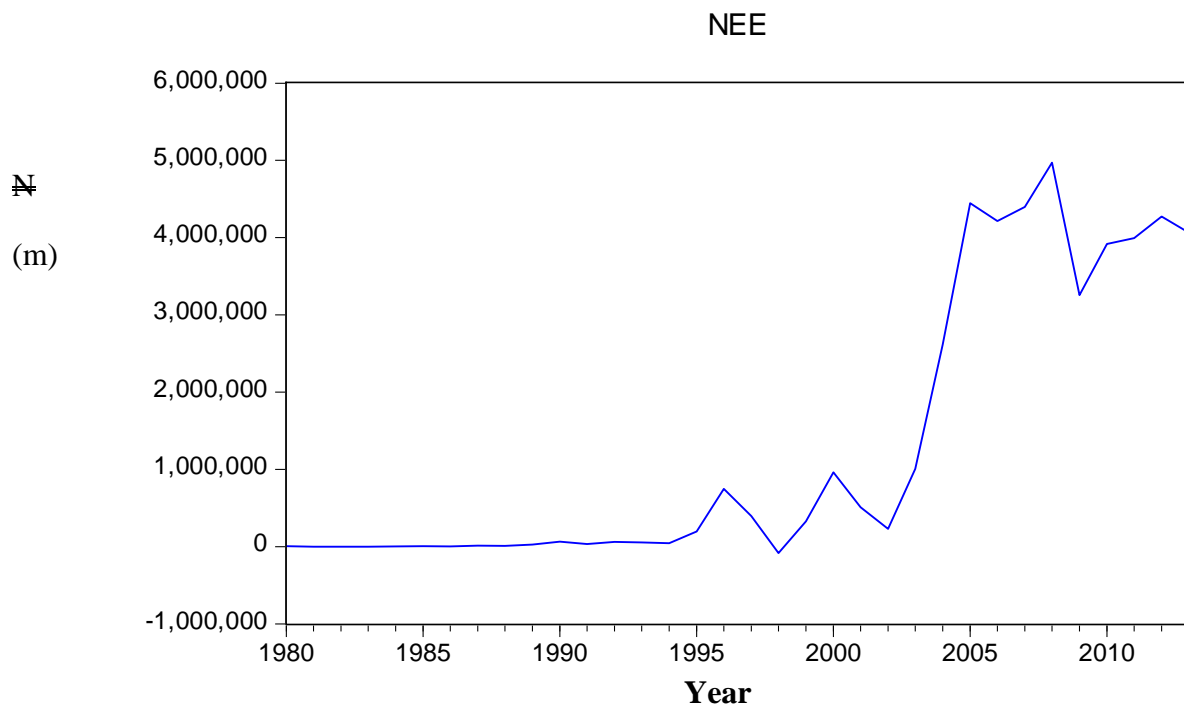


Figure 4: Trend Analysis of Net Export Earning

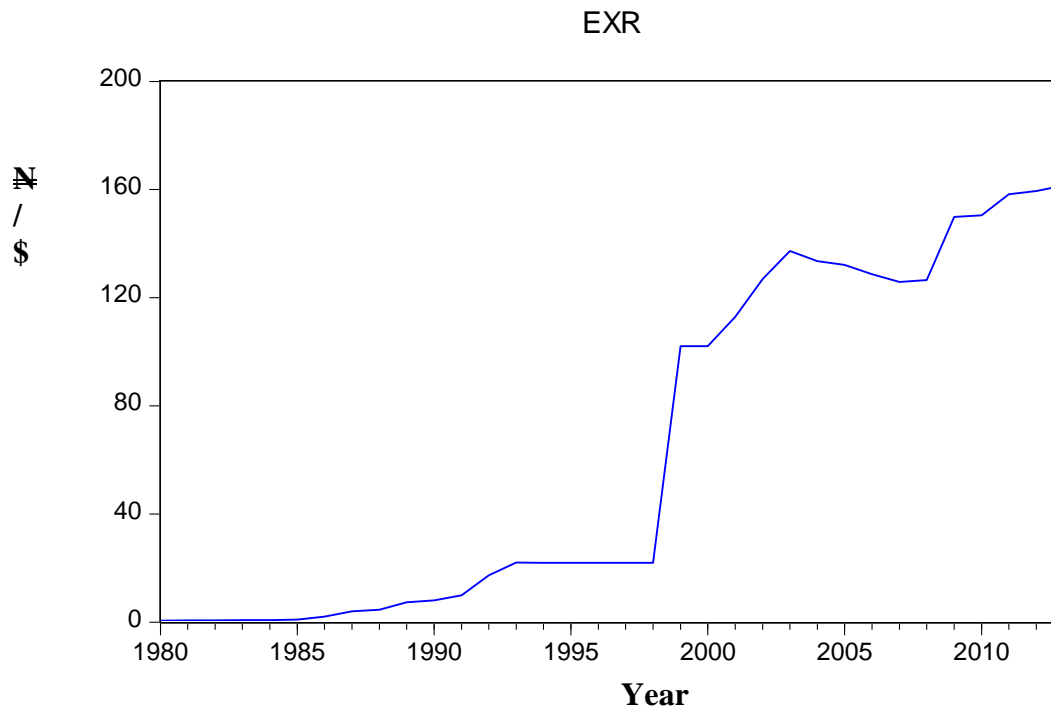


Figure 5: Trend Analysis of Exchange Rate

Regression Analysis at levels

The argument in model specification in chapter three was tried with both linear and log-linear specifications. The model that provided the best fit was selected on the basis of magnitude of the coefficients of R^2 , magnitude and statistical significance of the regression coefficients and expected signs. The log linear specification was selected for both crop and staple food models while the linear specification was selected for fish model. The results are shown in the tables below.

Table 1: Regression Analysis Result for Crop Production Output Model

Dependent Variable: LOG(CUP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.527457	0.605783	4.172212	0.0003
LOG(FPI)	0.174730	0.045519	3.838599	0.0006
LOG(FAG)	0.035060	0.030128	1.163704	0.2540
LOG(NEE)	9.02E-09	2.41E-08	0.373519	0.7115
LOG(EXR)	0.141571	0.031242	4.531488	0.0001
R-squared	0.939410	Mean dependent var	4.783840	
Adjusted R-squared	0.931053	S.D. dependent var	0.524357	
S.E. of regression	0.137684	Akaike info criterion	-0.992653	
Sum squared resid	0.549752	Schwarz criterion	-0.768189	
Log likelihood	21.87511	Hannan-Quinn criter.	-0.916104	
F-statistic	112.4074	Durbin-Watson stat	1.214641	
Prob(F-statistic)	0.000000			

Source: Author's Computation from (E-View 7.1)

The Durbin Watson value of 1.21 depicted the presence of serial autocorrelation. The presence of serial autocorrelation may be attributed to non-stationarity of time series data that are used for the study. Having identified the presence of autocorrelation in the DW test and multicollinearity from the R^2 test, there is the need to conduct stationarity test and the long run analysis to stabilize the time series.

Table 2: Result of Unit Root of Variables in the Models

Variables	ADF Test	Critical Value			Order of integration
		1% critical value	5% Critical value	10% critical value	
CUP	-6.797855	-3.653730	-2.957110	-2.617434	I(1)= 1 st Diff.
FPI	-5.070341	-3.646342	-2.954021	-2.615817	I(0) = At Level.
FAG	-4.247843	-3.646342	-2.954021	-2.615817	I(0) = At Level
NEE	-5.029539	-3.653730	-2.957110	-2.617434	I(1)= 1 st Diff.
EXR	-5.835808	-3.653730	-2.957110	-2.617434	I(1)= 1 st Diff.

Source: Author computation from (E-view 7.1)

The result of the unit root test presented in Table 2 shows that the time series were stationary at various levels of significance of 1%, 5% and 10%. While FPI (foreign private investment to agriculture) and FAG (foreign aids and grants to agriculture) were stationary at

levels. However, all the remaining non stationarity variables become stationary at first difference. That is, NEE (net export earnings), EXR (exchange rate), CUP (output of crop production) were integrated of order one (first difference).

4.3.2 Johansen Test for Co-integration

The cointegration used in this study is the Johansen cointegration test. According to Iyoha and Ekanem, (2011) cointegration deals with the methodology of modeling non-stationary time series variables. The results of the Johansen co-integration test is presented in Table 3.

Table 3: Johansen Cointegration Test Result for CUP Model

Eigen value	Max-Eigen Statistic	5% critical value	Prob. **	Hypothesized N0 of CE(s)
0.947757	94.45932	33.87687	0.0000	None *
0.634284	32.18874	27.58434	0.00119	At most 1 *
0.406039	16.67013	21.13162	0.1881	At most 2
0.177397	6.249019	14.26460	0.5815	At most 3
0.035095	1.143214	3.841466	0.2850	At most 4

Source: Author's Computation from (E-View 7.1)

Note: * denote rejection of the hypothesis at the 0.05 level. **Mackinnon-Haug-Michelis (1999) p-values. Max-eigenvalue test indicate 2 co-integrating eqn(s) at 0.05 level. Due to the existence of two co-integrating equations, the requirement for an error correction model is fulfilled.

Error Correction Model (ECM)

Granger causality has been used to see whether one time series such as variable X is useful to forecasting another variable Y. This research determines the causality relationship between FPI and crops output. Secondly, it determines the causality relationship between FAG with crops output, thirdly the study determines the causality relationship between NEE with crops output, and fourthly research will want to see the causality relationship between EXR and crops output. Granger causality is tested in order to understand whether the lag value of one variable cause another variable or not.

Error correction model (ECM) is the means of adjusting the short-run behaviour of an economic variable to long-run behaviour. The table below shows the results of error correction test conducted:

Table 4: Over Parameterized Error Correction Mechanism for CUP Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.603403	2.705246	1.332005	0.2027
D(CUP(-1))	0.396872	0.235664	1.684056	0.1129
D(CUP(-2))	0.328323	0.211357	1.553405	0.1412
D(FPI)	0.004372	0.001091	4.005849	0.0011
D(FPI(-1))	-0.000714	0.001867	-0.382315	0.7076
D(FPI(-2))	-0.003768	0.003621	-1.040584	0.3146
D(FAG)	7.67E-09	5.92E-09	1.294250	0.2152
D(FAG(-1))	4.55E-09	2.45E-09	1.854869	0.0834
D(FAG(-2))	1.15E-09	1.88E-09	0.609505	0.5513
D(NEE)	-3.76E-06	4.03E-06	-0.931171	0.3665
D(NEE(-1))	-1.80E-07	3.96E-06	-0.045364	0.9644
D(NEE(-2))	-4.41E-06	4.22E-06	-1.044033	0.3130
D(EXR)	0.120373	0.131410	0.916013	0.3742
D(EXR(-1))	-0.034401	0.125087	-0.275015	0.7871
D(EXR(-2))	-0.436155	0.121131	-3.600692	0.0026
ECM(-1)	-56.48473	22.09784	-2.556120	0.0219
R-squared	0.808751	Mean dependent var	4.620323	
Adjusted R-squared	0.617502	S.D. dependent var	14.84559	
S.E. of regression	9.181466	Akaike info criterion	7.578572	
Sum squared resid	1264.490	Schwarz criterion	8.318694	
Log likelihood	-101.4679	Hannan-Quinn criter.	7.819833	
F-statistic	4.228789	Durbin-Watson stat	2.281032	
Prob(F-statistic)	0.004131			

Source: Author's *Computation from (E-View 7.1)*

The reason for the over parameterized specification is to show the main dynamic processes in the model and as well sets the lag length such that the dynamic processes would not be constrained by too long a lag length. The over parameterized is the transform in order to achieve the parsimonious Error Correction Mechanism to make it more interpretable for policy implementation.

Table 5: Parsimonious Error Correction Mechanism for CUP Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.466038	3.177936	0.461317	0.6498
D(CUP(-1))	0.435609	0.268395	1.623011	0.1211
D(CUP(-2))	0.185933	0.249192	0.746142	0.4647
D(FPI)	0.003666	0.001221	3.001938	0.0073
D(FPI(-1))	-0.001690	0.001782	-0.948448	0.3548
D(FAG)	3.20E-11	2.75E-09	0.011632	0.9908
D(FAG(-1))	3.26E-09	2.17E-09	1.504358	0.1489
D(NEE)	2.51E-06	5.01E-06	-0.500355	0.6226
D(NEE(-1))	2.71E-06	4.60E-06	-0.589554	0.5624
D(EXR)	0.124160	0.159320	0.779312	0.4454
D(EXR(-1))	0.024808	0.151554	0.163694	0.8717
ECM(-1)	-5.703872	26.81528	-2.127098	0.0467
R-squared	0.614193	Mean dependent var	4.620323	
Adjusted R-squared	0.390831	S.D. dependent var	14.84559	
S.E. of regression	11.58688	Akaike info criterion	8.022270	
Sum squared resid	2550.861	Schwarz criterion	8.577361	
Log likelihood	-112.3452	Hannan-Quinn criter.	8.203216	
F-statistic	2.749763	Durbin-Watson stat	2.198453	
Prob(F-statistic)	0.025596			

Source: Author's *Computation from (E-View 7.1)*

Trend Analysis of the Variables in the Models

In 1980, Crop Output Production (CUP) which was 51.11, in 1980 it drastically increased to 55.56 million in 1984 million and increased to 94.35 million in 1989. Between 1990 to 1994, crop output production increased from 100.00 million to 138.51 million. It then increased from 141.93 million in 1995 to 165.45 million in 1999 and then rose or increased steadily from 171.01 million in 2000 to 169.90 million in 2004. Between 2005 to 2009, it increased from 181.50 million in 2005 to 206.20 million in 2006 and fell to 194.3 million in 2008 then increased to 198.5 million in 2009. It later fell from 196.0 million in 2010 to 196.4 million in 2013.

Furthermore foreign private investment (FPI), which stood at 120.8 in 1980 increased to 128.5 in 1984. It then fell slightly to 126.0 in 1985 and then increased to 134.8 in 1989. Between 1990 to 1994, it increased drastically from 334.7 to 1208.5. It then fell steadily from 1995 to 1999 (1209). It fell in 2000, 2001, 2002 to 1209 respectively. Then increased drastically to 12091 in 2003 and then fell sharply to 1209 again in 2004. In addition, foreign private investment which stood at 1209 in 2005 increased to 1262.7 in 2009 and then rose or increased steadily throughout the years of study.

The above table also shows that foreign aids and grants to agriculture (FAG) which was 794800000 in 1980 fell to 90100000 in 1984. It fell from 868200000 in 1985 to 546250000 in 1989. Between 1990 to 1994, it fell again from 383270000 to 270420000. From 1995 to 1999 it fell from 261450000 to 209800000. From 2000 to 2004 it increased drastically from

245770000 to 654310000. It fell sharply in 2005 from 6954730000 to 1671210000 in 2009. However it increased in 2010 to 2061960000 and fell to 1966860000 in 2013.

The above table shows that in 1980 net export earnings (NEE) which stood at 5091.100 decreased to 1909.700 in 1984. It increased from 4658.200 in 1985 to 27111.00 in 1989. Between 1990 to 1994, it fell from 64168.20 to 43270.40. It increased from 195533.7 in 1995 to 326454.1 in 1999. From 2000 to 2004 it increased from 960700.9 to 2615736. By 2005 to 2009 it fell from 4445679 to 3253851. It then increased steadily throughout the years of study.

The exchange rate moved from its level of N0.54: US \$ 1.00 in 1980 to N0.89: US \$ N1.00 in 1985. Between 1986 and 1993 when structural adjustment program (SAP) was introduced, it rose from N2.02: US \$1.00 to N22.05: US \$1.00 from 1994 to 1998, there was a stable exchange rate of N21.89: US \$1.00 this is as a result of exchange rate policy that was completely revised in 1994 with the re-introduction of fixed exchange rate regime. Furthermore between 1992 and 2013 the exchange rate rose again from N102.11: US \$1.00 to N161.50: US \$1.00

Short Run Log-Linear Result for Output of Crop Production Model

The analysis of short run result of Crop Production Output model as depicted in Table 1 shows that the coefficient of R^2 is 0.939, indicating that the variation in output of crop production explained by foreign private investment to agriculture, foreign aids and grants to agriculture, net export earnings and exchange rate is 94 percent. Thus, the explanatory power of the model estimated is 94 percent. The coefficient of FPI (foreign private investment to agriculture) variable appeared with positive sign and statistically significant. The regression coefficient of FAG (foreign aids and grants to agriculture) appeared with positive sign but statistically not significant at 5 percent level. The regression coefficient of NEE (net export earnings) appeared with the positive sign but statistically not significant at 5 percent level.

Also, the estimated result for EXR (exchange rate) is positively related with output of crop production and statistically significant. The overall model is significant at 5 percent level given the F-value of 112 which is greater than the F-table value of 3.47. The Durbin Watson value of 1.21 depicted the presence of serial autocorrelation. The presence of serial autocorrelation may be attributed to non-stationarity of time series data that are used for the study. Having identified the presence of autocorrelation in the DW test and multicollinearity from the R^2 test, there is the need to conduct stationarity test and the long run analysis to stabilize the time series.

Unit Root Test for Stationarity

The result of the unit root test presented in Table 2 shows that the time series were stationary at various levels of significance of 1%, 5% and 10%. While FPI (foreign private investment to agriculture) and FAG (foreign aids and grants to agriculture) were stationary at levels. However, all the remaining non stationarity variables become stationary at first difference. That is, NEE (net export earnings), EXR (exchange rate), CUP (output of crop production) were integrated of order one (first difference). Having established stationarity of the variables, the Johansen cointegration test will be conducted to establish the long –run relationship among the variables.

Johansen Test of Cointegration

Table 3 shows that there are two co-integrating equations at 5% level of significance. Meaning that two variables are co-integrated at 5% significance level. In summary, there exists a long-run equilibrium among the variables. This is because, the Max-Eigen Statistics values of only two variables are greater than the critical values at 5% significant level. Due to the existence of two co-integrating equations, the requirement for an error correction model is fulfilled.

Parsimonious Error Correction Results for Output of Crop Production Model

The analysis of result in Table 5 shows that the value of the ECM appeared with the right sign and statistically significant at the 5% level. Meaning that the ECM will correct the short run deviation to long-run equilibrium. The Durbin Watson value of 2.198 which is approximately 2.0 suggests a lesser level of autocorrelation. The overall model is satisfactory given the value of $R^2(0.614)$. This simply means that 61 percent of the systematic variation in output of crop production is explained by the ECM. The F-statistic of 2.749763 is significant at the 5% level. This showed that the overall model is significant.

Moreover, the current form of the independent variable FPI is positively signed and statistically significant. Therefore, we accept the alternative hypothesis that Foreign Private Investment is statistically significant in explaining the level of output of crop production in the current period. But its lag one form is negatively signed and statistically not significant. Therefore, we accept the null hypothesis that Foreign Private Investment is not statistically significant in explaining the level of output of crop production in lag one period.

The current and lag one forms of the independent variables FAG, NEE and EXR were positively signed but statistically not significant. Based on these results, we accept the null hypothesis of the research which states that, there is no significant relationship between foreign capital inflow and crops output.

What we could infer from the above test of significance is that foreign capital inflow (proxied by foreign private investment to agriculture, foreign aids and grants to agriculture, net export earnings and exchange rate) will to a large extent contribute positively to crop output in Nigeria but foreign capital inflow alone will not impact very significantly on crops output in Nigeria during the period under review.

Conclusion and Recommendations

The importance of agriculture in Nigeria's economy cannot be overemphasized, agriculture has over the years made tremendous impact on the country's economy and still of great relevance even with immense rivalry encountered from the oil sector after the oil boom. If Nigeria's agricultural sector is to return to its place of pride in Nigeria's economy, then issue of provision of funds and increased availability of capital need to be addressed. The need for foreign capital to complement domestic resources in the economic growth process has been welcomed as a catalyst of development, since it is considered as the central element of the process of economic growth. From the model, it was discovered that the current and lag one forms of the independent variables FAG, NEE and EXR were positively signed but statistically not significant. Based on these results, we accept the null hypothesis of the research which states that there is no statistically significant relationship between foreign capital inflow and crop output.

From the above results, foreign capital inflow (proxied by foreign private investment to agriculture, foreign aids and grants to agriculture, net export earnings and exchange rate) will to a large extent contribute positively to crops output in Nigeria but does not have significant impact.

Government should put in place a strategy for attracting more foreign investors capable of generating a higher volume of foreign private investment that can have a significant impact on crops output. To this end, government should create an enabling environment and put in place appropriate policies for the influx of foreign investors.

An aggressive export promotion drive should be vigorously pursued with a view to increasing the volume of value-added agricultural exports. This will increase the volume of net export earnings accruable to the agricultural sector and which can produce significant impact on crops output.

Attempt should be made to attract a higher volume of foreign aids and grants by interfacing with international agencies, organizations and financial institutions. This is in view of the strategic role of agriculture in food security and poverty alleviation. A higher volume of foreign aids and grants to the agricultural sector is expected to have a significant impact on crops output.

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