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Foreign Direct Investment in Real Sector and Economic Growth in Nigeria, 1986 – 2011: A Parsimonious Error Correction Model

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Abstract
The paper represents part of larger research agenda aimed at investigating the impact of FDI on economic growth. The study which is a sectoral analysis examined the impact of agriculture, manufacturing, mining and telecommunication sectors on economic growth for the period 1980-2011. The econometric method includes co-integration test, over-parameterized and error correction model. Results reveal that in the long run agriculture and manufacturing have negative impact on growth while mining and telecom sectors exhibit positive influence on economic growth. In the short run, results show that FDI in agricultural sector has either negative or no impact on economic growth while impact of manufacturing on growth is completely negative. On the other hand, the impact of mining and telecom sectors on growth is positive in the short run. The study recommended among other things that effort should be intensified by all levels of government, public and private sectors to revise the ugly trend where foreign investors are not keen in investing in the agricultural sector and that enabling laws guiding priority area for foreign investors where agriculture is considered topmost should be put in place.
Keywords: Foreign Direct Investment, Economic Growth, Co-integration, Parsimonious Error Correction Model.

I Introduction

The motivation for the study of foreign direct investment (FDI) is usually based on the crucial role of enhancing development in a country like Nigeria as most of the developing economies appear unable to generate sufficient capital stock and investment internally to stimulate economic growth and development. However, the achievements of the United Nation Millennium Development Goals have been premised on the ability to attract substantial foreign investments. The United Nation Conference on Trade and Development (UNCTAD) data showed that there have been significant changes in the direction of flow of investment to the disadvantage of the developing economies of Africa. One plausible explanation for this may be the increase in competition for investment coming from the new transitional economies especially those of the former soviet blocs. This invariably means that developing countries in Africa and Asia need to find better attractions for foreign investors. To this end, Nigerian authorities have been trying to attract FDI via various reforms. The reforms included the deregulation of the economy, the new industrial policy of 1989, the establishment of the Nigeria Investment Promotion Commission (NIPC) in early 1990s, and the signing of Bilateral Investment Treaties (BITs) in the late 1990s. Others were the establishment of the Economic and Financial Crime Commission (EFCC) and the Independent Corrupt Practices and other related offences Commission (ICPC). However, FDI inflows to Nigeria, though high, have remained low compared to other developing countries. This recent surge in FDI inflows to Nigeria is attributable to the reduction in the nation's debt profile (through debt arrangements with London and Paris clubs) and the renewed confidence of foreign investors in the Nigerian economy (CBN, 2006).

But these notwithstanding, Africa and indeed Nigeria is undoubtedly facing an economic crisis situation featured by inadequate resources for long-term development, high poverty level, low capacity utilization, high level of unemployment and other Millennium Development Goals (MDGs) increasingly becoming difficult to achieve by 2020. In fact, one of the pillars on which the New Partnership for Africa's Development (NEPAD) was launched was to increase available capital to US$64 billion through a combination of reforms, resource mobilization and a conducive environment for FDI (Egwaikhide and Ohwofasa, 2011).

With her large population, Nigeria has all it takes to be one of the economies with great demand for goods and services and as such has attracted some FDI over the years. But the co-existence of vast wealth in natural resources and extreme personal poverty referred to as the "resource curse" or 'Dutch disease' (Auty, 1993) appears to bedevil the country. In 2011, the country ranked 170 out of 213 countries with respect to the Gross National Income Per Capita estimated at US$1,200 (The World Bank, 2011). This has prompted many analysts and experts to suggest the use of FDI as a veritable injection to kick-start the Nigerian economy. This is because

FDI is not only the transfer of ownership from domestic to foreign companies but also a device for improved corporate governance and attendant transparency in business practice.

Despite the contributions to corporate tax revenues in the host country from profits generated by FDI, the highly capital intensive technology engendered can exacerbate the unemployment situations in labour surplus host country like Nigeria. Also, the creation of monopolies in areas where the entry barriers have been raised in some cases my crowd out domestic operators (Onakoya, 2012). As a result, the importance of FDI in the growth dynamics of countries therefore has created much interest amongst scholars and lots of researchers have been focused on the impact of FDI on the economy.

Most of the works on the role of FDI on economic growth in Nigeria have examined various aspects. However, the nature and impact of FDI especially at sub-national and sector levels have been largely ignored. Therefore, capturing the disaggregated impact of FDI in the real sector on the economy performance would give better insight into the variations inherent therein. Theoretically, ignoring these multiplier effects, when in fact they exist, may lead to biased and inefficient results. The present study is an attempt to remove such biases and examine the impact of the disaggregated FDI in the real sectors of the economy by employing a parsimonious error correction model.

The rest of the paper is structured as followed. Section two presents a brief review of related literature. The method of study is presented in section three and while section discusses the result of findings, section five ends the study with concluding remarks.

II. Conceptual Literation

Foreign direct investment, a major component of international capital flows, refers to investment by multinational companies with headquarters in developed countries. This investment ranges from transfer of funds to whole package of physical capital, techniques of production, managerial and marketing expertise, products, advertising and business practices for the maximization of global profits. The Organization for Economic Cooperation and Development (OECD) conceptualized FDI as net financing by an entity in a developed country with the objective of retaining a lasting interest in an entity resident in a developing country (Oyeranti, 2003). The implications of this definition are: one, FDI flows from developed country to developing countries; and two, the investor has a significant influence on the management of the enterprise. There are three main determinants of FDI, namely firm-specific advantages, internalization advantages, and locational advantages.

In the view of Shiro (2007), FDI consists of external resources, including technology, managerial and marketing expertise and capital which generate a considerable impact on host nation's production capabilities. He argues that at the current level of gross domestic product, the success of government's policies of stimulating the productive base of the economy depends largely on her ability to control adequate amount of foreign direct investments comprising of managerial,capital and technological resources to boost the existing production capabilities. The Nigerian government had in the past endeavored to provide foreign investors with a healthy climate as well as generous tax incentives, but the result had not been sufficiently encouraging. Nigeria still requires foreign assistance in the form of managerial, entrepreneurial and technical skills that often accompany foreign direct investments.

Generally, there are two broad categories of foreign investments namely official (public) and private foreign investments. Official foreign investments are undertaken at the bilateral and multilateral levels. The former refers to investment arrangements between two countries by means of direct government to government transfers, while the later relates to investments originating from such international organizations such as the IMF and the World Bank (Okafor, 2012). Official capital flows are largely driven by strategic and political motivations (Iyoha, 2001). However, the private capital flows are basically of three strands; the foreign direct investment, the portfolio investment and the short-term capital flows: bank credit and bond lending commercial loans (Okafor, 2012). 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. 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.

Theoretical Literature

The direction of both foreign direct investment and private capital inflows is explained by two categories of theory namely; push and pull factors theories (Oyejide, 2005). The push factor theorize that the surge of foreign direct investment is contingent on the increasing tax burden of multinational corporations in their home countries and due in part to domestic developments such as sound policies and strong economic performance for private portfolio investments. On the other hand, the pull factor theory traces the cause of capital flows to domestic factors such as autonomous increase in the domestic money demand, increasing integration of domestic capital markets with the global capital markets, improvement in external credit relations, adoption of sound fiscal and

monetary policies, and neighbor externalities.

Carkovic and Levine (2002) noted that the economic rationale for offering special incentives to attract FDI frequently derives from the belief that foreign investment produces externalities in the form of technology transfers and spillovers. According to Althukorala (2003), FDI provides much needed resources to developing countries such as capital, technology, managerial skills, entrepreneurial ability, brand and access to markets which are essential for developing countries to industrialize, develop and create jobs attacking the poverty situation in their countries. As a result, most developing countries recognize the potential value of FDI and have liberalized their investment regimes and engaged in investment promotion activities to attract various countries.
Dauda (2007) argued that FDI is generally believed to propel economic growth in developing countries as it makes significant contributions to the host country's development process especially through easing of the constraints of low levels of domestic savings and investment as well as foreign exchange shortages. He further argues that FDI increases the GDP and generates a stream of real incomes in the host country. The increased productivity benefits local income groups through higher wages and expanded employment, lower product prices paid by consumers, rent to local resource owners, and high tax revenue or royalties to the government. Other segments of the economy also benefits through the realization of external economies. In some cases, the expanded production leads to penetration into export markets thereby increasing foreign exchange earnings for host countries.

Empirical Literature

There have been several studies on the relationship between FDI and economic growth with conflicting findings. Türkcan, et al., (2008) tested the endogenous relationship between the two variables using a panel dataset for 23 OECD countries for the period 1975-2004. They treated economic growth and FDI as endogenous variables and estimated a two-equation simultaneous system with the generalized methods of moments (GMM). Their results indicate that there is an endogenous relationship between FDI and economic growth. The examination of the causal relationship between FDI and economic growth by Karimi and Zulkornain (2009) was based on the Toda-Yamamoto test for causality for the period 1970-2005. This test which is sometimes preferred to the standard granger causality tests does not rely so heavily on pre-testing evaluations. The study found no strong evidence of bi-directional causality but a long run relationship suggesting that FDI has indirect effect on Malaysia's economic growth.

Chakraborty and Nunnenkamp (2008) assessed the proposition that the FDI boom recorded in post-reform India is widely believed to promote economic growth. The study subjects industry-specific FDI and output data to granger causality tests within a panel co-integration framework. The result shows that growth effects of FDI vary extensively across sectors. Although there is no causal relationship in the primary sector and only transitory effects of FDI on output in the services sector, FDI stocks and output are found to be mutually reinforcing in the manufacturing sector. In the services sector however, FDI appears to have caused rapid growth in the manufacturing sector through cross-sector spillovers and externalities.

Ullah, et al., (2011) analyzed the role of FDI on sectoral growth of Pakistan economy with special reference to agriculture and industrial sectors for the period 1979 to 2009. The study developed simultaneous models to capture the joint effects of FDI on the said two sectors while 2SLS technique was used to estimate the role of FDI on sectoral growth. The study found a significant negative impact of FDI on growth of agricultural sector. FDI positively affects the industrial sector but the impact is found to be statistically insignificant. The study confirmed significant positive impact of the terms of trade, growth of service sector and growth of real GDP on growth rate of industrial sector in Pakistan.

In a survey of African countries, Elijah (2006) employed an econometric model to regress FDI on exogenous variables that include human capital, real exchange rate, annual inflation and openness of the economy in Kenya. The author found that economic openness and human capital affect FDI inflows positively in the short-run while inflation and real exchange were negatively related to FDI inflows in the short-run and long-run respectively. Adeniyi,et al., (2012) examined the causal linkage between foreign direct investment and economic growth - in Cote' d'Ivoire, Gambia, Ghana, Nigeria and Sierra Leone with financial development accounted for over the period 1970-2005 within a trivariate framework which applies granger causality tests in a vector error correction(VEC) setting. Three alternative measures of financial sector development - total liquid liabilities, total banking sector credit and credit to the private sector - were employed to capture different ramifications of financial intermediation. The results of the study support the view that the extent of financial sophistication matters for the benefits of FDI on economic growth in Ghana, Gambia and Sierra Leone depending on the financial indicator used. Nigeria, on the other hand, displays no evidence of any short- or long-run causal flow from FDI to growth with accompanying financial deepening.

In Nigeria, Wafure and Nurudeen (2010) investigated the determinants of FDI with an error correction technique. The results reveal that the market size of the host country, deregulation, political stability, and exchange rate depreciation are the main determinants of foreign direct investment in Nigeria.Egwaikhide and

Ohwofasa (2011) examined the relationship between FDI and economic growth in Nigeria between 1980-2009 with co-integration and vector error correction model. FDI was disaggregated into oil and non-oil components. The results of the study reveal that the impact of the disaggregated FDI on real growth in Nigeria namely: agriculture, mining, manufacturing and petroleum sectors is very little with the exception of the telecom sector which has a good and promising future, especially in the long run while past level of FDI and level of infrastructures are FDI enhancing.

Onakoya (2012) investigated the impact of FDI on economic growth in Nigeria through a structural macro econometric model of simultaneous equations consisting of four blocks made up of supply, private demand, government and external sectors to capture the disaggregated impact of FDI on the different sectors of the economy and the inter-linkages amongst the sectors. The finding shows that FDI has a significant impact on output of the economy but that the growth effects of FDI differ across sectors.

Bello and Adeniyi (2010) conducted an investigation into the causal relationship among FDI, economic growth and environment using the Autoregressive Distributed Lag (ARDL) approach by applying the annual time series data for the period spanning 1970-2006. The findings show that there was no existence of a long run relationship between FDI and growth on the one hand while long run causal link between environmental quality and FDI inflows exist on the other hand.

The exploration of the possibility of the existence of causality between FDI and economic growth in Nigeria in the pre- and post-deregulation era was conducted by Ogundipe and Aworinde (2011) using granger causality analysis. The result shows one-way causality relationship from economic growth (GDP) to FDI in the pre deregulation era (1970-1985) and the absence of casual relationship during the post-deregulation era (1986-2007). Oyatoye, et al., (2011) reviewed the effect and relationship between FDI and economic growth in Nigeria for 20 years (1987 – 2006) using Ordinary Least Square regression analysis and report a positive relationship between the two variables.

Table 1: Summary of Empirical Studies and Findings

Author(s)	Years covered	Country	Methodology	Main Findings
Developed Country				
Turkcan, et al. (2008)	1975-2004	23 OECD Countries	Generalized Method of Moments (GMM)	There is an endogeneous relationship between FDI and economic growth
Developing Countries				
Karimi&Zulkornian (2009)	1970-2005	Malaysia	Toda-Yamamoto Causality Test	No strong evidence of bi-directional causality between FDI and economic growth in Malaysia
Chakraborty&Nunnen kamp (2008)	-	India	Co-integration & Granger causality Test	Growth effects of FDI vary extensively across sectors.
Ullah, et al. (2011)	1979-2011	Pakistan	Simultaneous equation & 2SLS	Found negative impact of FDI on growth of agriculture, positive impact on industrial and services sectors and terms of trade.
Elijah (2006)	-	Kenya	OLS	In the short run, trade openness and human capital positively affect FDI. In both the short and long run, inflation and real exchange rate were negatively related to FDI inflows in Kenya.
Adeniyi, et al. (2012)	1970-2005	5 African Countries: Cote d'Ivoire, Gambia, Ghana, Nigeria & Sierra-Leone	Granger causality & VEC Model	Financial sophistication necessary for the benefits of FDI on economic growth in Gambia, Ghana and Sierra-Leone. No evidence of any short or long run causal flow from FDI to growth in Nigeria.
Nigeria				
Wafure&Nurudeen (2010)	-	Nigeria	ECM	Market siz of host country, deregulation, political stability, and exchange rate depreciation are the main determinants of FDI in Nigeria
Egwaikhide&Ohwofa sa (2011)	1980-2009	Nigeria	Co-integration and VECM	Impact of FDI in agriculture, mining, manufacturing and petroleum sectors on real growth is very little while telecom sector holds promising future for the Nigerian economy.
Onakoya (2012)	-	Nigeria	Structural macro model, 3SLS and simultaneous equation	FDI has significant impact on output while growth effects of FDI differ across sector.
Bello &Adeniyi (2010)	1970-2007	Nigeria	ARDL	No existence of long run relationship between FDI and growth but long run causal link between environmental quality and FDI inflows exist.
Ogundipe&Aworinde (2011)	1970-2007	Nigeria	Granger causality	One way causality from economic growth to FDI between 1970-1985 and absence of causal relationship from 1986-2007.
Oyatoye, et al. (2011)	1987-2006	Nigeria	OLS	Positive relationship between FDI and economic growth.

III. Model Specification

The model developed and discussed below is adapted from a well-known equation system, tractable and relevant; it benefits greatly from the works of Wafure and Nurudeen (2010), Egwaikhide and Ohwofasa (2011), Ullah, et al (2011) and Onakoya (2012). The general specification of the model using a linear approach is thus presented below:

GDP = f(FAG, FMAN, FMIN, FTEL, FPET)……………………….(1)

In log stochastic term, equation (1) can be written as:

$GDP_t = \delta_0 + \delta_1 InFAG_t + \delta_2 InFMAN_t + \delta_3 InFMIN_t + \delta_4 InFTEL_t + \mu_t$……..(2)

Where

GDP = Real gross domestic product

FAG = Foreign Direct Investment in agriculture

FMAN = Foreign Direct Investment in manufacturing

FMIN = Foreign Direct Investment in mining

FTEL = Foreign Direct Investment telecommunication

t = time trend

δ = white noise error

δ_0 = constant

δ_1-δ_6 = parameters to be estimated

The error correction model is estimated thus

$$\Delta InGDP = a_0 + \sum_{i-1}^{n=1} a_{1t}\Delta InGDP_{t-1} + \sum_{i-1}^{n-1} a_{2t}\Delta InFAG_{t-1} + \sum_{i-1}^{n-1} a_{3t}\Delta InFMAN_{t-1} +$$

$$\sum_{i-1}^{n-1} a_{4t}\Delta InFMIN_{t-1} + \sum_{i-1}^{n-1} a_{5t}\Delta InFTEL_{t-1} + \lambda_8 ECM_{t-1} \ldots\ldots (3)$$

Unit Root Test

The Augmented Dickey Fuller (ADF) and the Phillips-Perron tests were used to test for unit roots as in the equation below.

$$\Delta Yt = Ci + \omega Yt - 1 + C2t + \sum_{t=1}^{p} di\Delta Yt - 1 + \varepsilon t \ldots\ldots\ldots (4)$$

yt = relevant time series

Δ = an operator for first difference

t = a linear trend

εt= error term

The null hypothesis of the existence of a unit root is Ho: ω=0. Failure to reject the null hypothesis leads to conducting the test on further differences of the series. Further differencing is conducted until stationarity is reached and the null hypothesis is rejected. Akaike Information Criteria (AIC) and the Schwarz criterion (SC) were employed to determine the lag length.

Co-integration

Co-integration regressions measure the long-term relationship between the variables whose existence guarantees that the variables demonstrate no inherent tendency to drift apart. The Johansen co-integration tests (Johansen 1988; Johansen and Juselius, 1990), which set up the non-stationary time series as a vector auto regression (VAR) of order p were employed for the test. Consider a VAR of order:

$$Yi = A1Yi - 1 + \ldots\ldots + ApYi - p + BXi + \varepsilon t \ldots\ldots\ldots (5)$$

Where yi is a k-vector of non-stationary I(1) variables, xi is a d-vector of deterministic variables, and εt is a vector of innovations. The trace statistic for the null hypothesis of co-integrating relations is computed as:

$$LRtr\ (K) = -\Gamma \sum_{i=r+1}^{h} \log(1-\mu i) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

Where: LR_{tr} = trace statistics
K =cointegratin relations
μi =itheigen value

In Johasen (1990), two test statistics are employed and they include the trace test and the maximum eigenvalue test which are used to test the hypothesized existence of r co-integrating vectors. The trace test statistic tests the null hypothesis that the number of distinct co-integrating vectors is less than or equal to r against a general alternative while the maximum eigenvalue test statistic tests the null hypothesis that the number of co-integrating vectors is r against the alternative of r+1 co-integrating vectors.

IV. Presentation of Results

This section presents the results of findings beginning with unit root test for the stochastic properties for the series as well as co-integration test which investigated the long run relationship of the variables.

Table 2: Result of Unit Root Test

ADF (Trend & Intercept)				Phillips-Peron (PP) (Trend & Intercept)		
Variable	Level	1st Diff	2nd Diff	Level	1st Diff	2nd Diff
LGDP	-2.2866	-3.7424	-6.9566	-9.3322	-29.1028	-49.8129
LFAG	-2.0475	-3.8158	-6.5742	-2.0648	-5.0703	-10.0814
LFMAN	-2.4151	-2.8723	-4.9291	-2.3319	-4.6287	-10.0631
LFMIN	-2.9203	-3.7750	-5.3262	-2.6185	-4.9923	-10.0631
LFTEL	-2.1422	-3.3831	-6.8276	-2.4062	-5.4604	-11.5921
		Critical Value				
1%	-4.2949	-4.3082	-4.3226	-4.2826	-4.2949	-4.3082
5%	-3.5670	-3.5731	-3.5796	-3.5614	-3.5670	-3.5731
10%	-3.2169	-3.2203	-3.2239	-3.2138	-3.2169	-3.2203

The ADF statistics reveal that the series are non-stationary at level but at first and second differencing, stationary was achieved at 1 percent confidence level. Similarly, the PP test shows that only GDP is stationary at level while the entire variables are stationary at first and second differencing and at 1 percent confidence level.

Table 3: Co-integration Results

Null Hypothesis	Alternative Hypothesis	Statistical Value	5 percent critical value	1 percent critical value	Eigen value
Trace Statistics					
r = 0	r ≥ 0	110.83	87.31	96.58	0.7572
r ≥ 1	r ≥ 1	72.60	62.99	70.05	0.6685
Max-Eigen Statistics					
r = 0	r = 1	38.22	37.52	42.36	0.7572
r ≤1	r = 2	29.81	31.46	36.65	0.6685
Long Run Regression Results Normalized on GDP					
LGDP = 1.00 – 0.10LFAG – 0.25LFMAN + 0.20LFMIN + 0.03LFTEL *(-5.0) (-3.6) (5.0) (0.4)* *Log Likelihood = 69.5*					

The test in table 3 above is conducted with intercept and trend and the trace statistic revealed two co-integrating equations at 1 percent and one equation at 5 percent. The max-eigen statistic on the other hand established at least two co-integrating equations at 5 percent. Since at least a co-integrating equation is established in either the trace or max-eigen value, we can conclude that long run relationship exists between GDP and FDI variables and that the variables have been growing together over time.

The second panel of table three contained the results of the long run static regression normalized on GDP. The results reveal that the impact of FDI in agriculture (FAG) and manufacturing (FMAN) are significantly negative on growth. On the other hand, FDI in mining (FMIN) and telecommunication (FTEL) exert positive impact on economic growth in Nigeria during the review period with only mining statistically significant.

With co-integration confirmed, the over-parameterized error correction model is estimated whose results are presented in table 4. Although the model looks fairly well estimated, it appears cumbersome to be interpreted in its present form. The number of lag in table 4 is an empirical issue. The lag length was set at two bearing in mind the possible problems of low degrees of freedom if higher order lags are used.

Table 4: Over-parameterized Error Correction Model

Method: Least Square

Dependent Variable: DLGDP

Variable	Coefficient	Std Error	t-statistic	Probability
C	0.052813	0.027015	1.954944	0.0823
DLGDP(-1)	0.257466	0.307426	0.837489	0.4240
DLGDP(-2)	-0.078010	0.033630	-2.319660	0.0455
DLFAG	0.011888	0.037943	0.313313	0.7612
DLFAG(-1)	0.058636	0.043667	-1.342809	0.2122
DLFAG(-2)	-0.000868	0.028432	-0.030518	0.9763
DLFMAN	0.044793	0.061438	0.729072	0.4845
DLFMAN(-1)	-0.019511	0.064314	-0.303366	0.7685
DLFMAN(-2)	-0.028348	0.062066	-0.456745	0.6587
DLFMIN	-0.040568	0.037632	-1.078013	0.3091
DLFMIN(-1)	-0.006440	0.053973	-0.119324	0.9076
DLFMIN(-2)	-0.017563	0.033526	-0.523858	0.6130
DLFTEL	0.066828	0.060514	1.104339	0.2981
DLFTEL(-1)	0.026887	0.069320	0.387875	0.7071
DLFTEL(-2)	-0.052373	0.086132	-0.608056	0.5582
ECM(-1)	-0.053479	0.128333	-0.416712	0.6866
R^2 = 0.72; F-Stat = 1.51; DW = 2.1				

Table 5 depicts the parsimonious error-correction model. Clearly, the interpretation of the dynamic process in this model is easy. Thus, we base the discussion on the parameter estimates on this model. Specifically, four diagnostic tests were applied to the model in order to test the validity of its estimates and their suitability for policy discussions. The p-values in parenthesis of table 5 are presented alongside with the F-statistics. If the p-value is greater than the chosen level then we will accept the null hypothesis and conclude that there is no residual problem in the study.

Thus, the Jarque-Bera normality test indicated by the level of significance shows that the model is normally specified. Furthermore, the Breusch-Godfrey serial correlation Lagrange Multiplier (LM) test for higher order serial correlation could also not reject the null hypothesis of absence of serial correlation in the residuals. Finally, both the Autoregressive Conditional Heteroskedasticty (ARCH) and the White Heteroskedasticity Tests were used to test for heteroskedasticity in the error process and the results indicated absence of heteroskedasticity in the model.

Table 5: Parsimonious Error Correction Model

Method: Least Squares

Dependent Variable: DLGDP

Variable	Coefficient	Std Error	t-statistic	Probability
C	0.035466	0.014499	2.446125	0.0256
DLGDP(-2)	-0.065426	0.022117	-2.958125	0.0088
DLFAG	0.026987	0.022113	1.220433	0.2390
DLFAG(-1)	-0.046325	0.018237	-2.540186	0.0211
DLFMAN(-1)	-0.035777	0.037469	-0.954856	0.3530
DLFMAN(-2)	-0.051300	0.035992	-1.425326	0.1722
DLFMIN(-1)	0.030086	0.014788	2.034460	0.0578
DLFTEL	0.112937	0.032769	3.446469	0.0031
DLFTEL(-1)	0.078036	0.034490	2.262560	0.0370
ECM(-1)	-0.079370	0.078547	-1.010480	0.3264
R^2 = 0.69; F-stat = 4.12; DW = 2.1				
Diagnostic Test				
Jarque-Bera (Normality) Test F-stat 4.036419(0.132893				
Breusch-Godfrey Serial Correlation LM Test F-stat0.016786(0.983373)				
ARCH LM F-stat 0.039422(0.844361)				
White Heteroskedasticity Test F-stat 0.733306(0.723353)				

From the battery of diagnostics tests presented and discussed above we conclude that the model is well estimated and that the observed data fits the model specification adequately, thus we expect that the residuals are distributed as white noise and the coefficients valid for policy discussions. There is significant improvement in table 5 over table 4 in that a number of variable became significant even as there is improvement in the F-stat

and the ECM term in table 5 which although insignificant, carries the expected negative sign and therefore provided evidence for equilibrium to be restored after short-run disturbances as indicated by the coefficients of the error correction terms of -0.079370. This means the speed of adjustment between the short and the long run due to disequilibrium in the system is about 7.9 percent within a year. Table 5 further reveal that the DW of 2.1 shows absence of autocorrelation problem while the R^2 shows that the explanatory variables explain about 69 percent of GDP in Nigeria between 1980-2011.

It can be seen that the impact of GDP (lag 2) is negative on current growth and is statistically significant with t-ratio of -2.958128. Similarly, FDI in agriculture (lag 1) and in manufacturing (lag 1 & 2) also negatively affect GDP with only agriculture (lag 1) statistically significant. Conversely, current FDI in agriculture (DLFAG), in mining (DLFMING) lag 1, in telecommunication (DLFTEL) and previous FDI in telecommunication (DLFTEL) lag 1 impacted positively on economic growth in Nigeria in the short run with only the current level of FDI in agriculture statistically insignificant with a t-statistic of 1.220433. It can further be observed from the results that the current level of FDI in telecommunication is highly significant with a t-statistic of 3.446469. This means that a 100 percent increase in FDI in telecom sector increases economic growth by about 11 percent in the short run. Egwaikhide and Ohwofasa (2011), Onakoya (2012) had earlier reached similar findings. Finally, the positive constant shows that in the absence of all the explanatory variables economic growth will be positive to the tune of 0.04 percent which may not be unconnected with variables not included in the model.

Test for model stability.

The result of the test for model stability using the Chow Break Point test for 1999 has an F-statistic of 0.199789 and p-value of 0.988586. Comparing the p-value to the chosen level of the test or 5 percent, the result implies that the null hypothesis of model stability cannot be rejected. Thus, we conclude that the estimated impact of FDI in agriculture, manufacturing, mining and telecom sectors on economic growth has been structurally stable. This means FDI in these sectors before and during the present democratic dispensation is the same. The significance of this test is that the parameters of FDI variables and GDP do not change over time.

V. Concluding Remarks

The objective of the paper was to investigate the impact of FDI in some sectors of the Nigerian economy namely: agriculture, manufacturing, mining and telecommunication on economic growth for the period 1980-2011. The study therefore is a sectoral analysis. The econometric method includes stationarity test, co-integration test, over-parameterized and error correction model.

The empirical results reveal that in the long run agriculture and manufacturing have negative impact on growth while mining and telecom sectors exhibit positive influence on economic growth proxy by the GDP. Similarly, the short run results show that FDI in agricultural sector has either negative or no impact on economic growth while impact of manufacturing on growth is completely negative. On the other hand, it was discovered that the impact of mining and telecom sectors on growth is positive in the short run. Thus, we can conclude that the agricultural and the manufacturing sectors have not help to grow the Nigerian economy that much over the last three decades.

On the basis of the findings, it is recommended that effort should be intensified by all levels of government, public and private sectors to revise the ugly trend where foreign investors are not keen in investing in the agricultural sector. Consequently, enabling laws guiding priority area for foreign investors where agriculture is considered topmost should be put in place. Secondly, in order to boost foreign investment in the manufacturing sector, essential facilities like stable power supply must be guaranteed. In most cases in Nigeria, investors have to provide portable water and power supply for their operations and these couple with bad network of roads represents high cost of investment. Finally, the positive potentials for the mining and telecom sectors for the Nigerian economy must be sustained.

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Appendix 1: Regression Data

Year	GDP	FAG	FMAN	FMIN	FTEL
1980	31546.8	120.5	1503.9	677.4	62.2
1981	205222.1	120.5	1705.7	526	60.8
1982	199685.3	120.5	1922.5	974	68.9
1983	185598.1	127.8	2128.1	511.2	77.3
1984	183563	128.5	2109.3	702.8	80.6
1985	201036.3	126	2278.1	744	85.9
1986	205971.4	128.2	2810.2	2510.4	80.4
1987	204806.5	117.3	3122.3	2260.2	75.6
1988	219875.6	128.9	3637	3403	160.6
1989	236729.6	134.8	5406.4	6367	158.2
1990	267550	334.7	6339	1091.6	240.5
1991	265379.1	382.8	8692.4	-810	373.2
1992	271365.5	386.4	9746.3	6417.2	391.5
1993	274833.3	1214.9	12885.1	27686.9	426.4
1994	275450.6	1208.5	14059.9	26680	429.6
1995	281407.4	1209	27668.8	56747.3	374.8
1996	293745.4	1209	29814.3	56792.3	485.6
1997	302022.5	1209	31297.2	56221.4	672.6
1998	310890.1	1209	34503.9	59970.5	689.2
1999	312183.5	1209	36282.1	58855.4	820.3
2000	329178.7	1209	37333.6	60710.9	820.3
2001	356994.3	1209	37779.6	61611.9	955.3
2002	433203.5	1209	39953.6	61611.9	1736.3
2003	477533	1209	45719.4	61809.1	2890.5
2004	527576	1209	102995.8	62145.7	4281.1
2005	561931.4	1209	133894.5	80789.4	5565.4
2006	595821.6	1209	212729.4	105668.4	8291
2007	634251.1	1329	219512	132085.5	10758.2
2008	672202.6	1999.2	155938.3	91963.6	7996.8
2009	716947.7	12647.6	174302.1	85606.6	13238.1
2010	716947.7	12647.6	174302.1	85606.6	13238.1
2011	717947.7	12647.6	174302.1	85606.6	13238.1

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