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The Impact of Sectorial Contribution of Foreign Direct Investment on Growth in Nigeria.

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Abstract: *This study examines the impact of sectorial contribution of Foreign Direct investment on growth in Nigeria over the period of 1985 to 2017 using the ARDL approach to cointegration analysis. Three macroeconomic variables are employed: Foreign direct investment in agriculture, Foreign direct investment in Petroleum Profit tax, Foreign direct investment in mining & quarryover the study period. The results suggest that in the long run all the variable statistically insignificant on exerting influence on real gdp. In the short run, only contribution of fdi to petroleum tax profit is significant in exerting influence on realgdp. This study has some policy implications. Policies aimed at improving and reducing macroeconomic instability will be beneficial for FDI flows to the continent. Finally, policies aimed at attracting FDI are necessary because higher FDI flows can cause more banking and financial development*

Keywords: *FDI, ARDL, Macroeconomic variables*

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I. Introduction

Over the past decades, the benefit of foreign direct investment as a catalyst for economic growth and development has been identified by the government. However, the poor and immature state of Nigeria capital and money market may have been responsible for the poor inflow of foreign direct investment. Although efforts have been made in making these markets more effective, yet, they are not as sophisticated and vibrant as their counterpart in developed nations, thus cannot compete favorably for foreign direct investment.

Besides, a number of studies have analyzed the relationship between FDI inflows and economic growth, but the issue is far from been settled in view of the mixed findings and conclusion reached by different researchers. De Gregorio, (2003) did a panel data analysis of 12 Latin American countries in the period 1965-2000 and his results suggest a positive and significant impact of FDI on economic growth. In addition, the study shows that the productivity of FDI is higher than the productivity of domestic investment. Fry, (1993) examined the role of FDI in promoting growth by using the framework of a macro-model for a pooled time series cross section data of 16 developing countries for 2002 to 2012 period. The countries included in the sample were Argentina, Brazil, Chile, Egypt, India, Mexico, Nigeria, Pakistan, Sri Lanka, Turkey, Venezuela, and 5 Pacific basin countries, viz., Indonesia, Korea, Malaysia, Philippines and Thailand. For his sample as a whole, he did not find FDI to exert a significantly different effect from domestically financed investment on the rate of economic growth, as the coefficient of FDI after controlling for gross investment rate, was not significantly different from zero in statistical terms. Umoh, Jacob and Chuku, (2012)which investigates the relationship between foreign direct investment and economic growth in Nigeria between 1970 and 2008. The paper makes the proposition that there is endogeniety, i.e. bi-directional relationship between FDI and economic growth in Nigeria.

However, in contrast to all these positive conclusions, Akinlo (2004) investigates the impact of Foreign Direct Investment (FDI) on economic growth in Nigeria using data for the period 1970 to 2001. His error correction model (ECM) results show that both private capital and lagged foreign capital have negative impact on export and economic growth. Reis (2001) formulated a model that investigates the effects of FDI on economic growth when investment returns may be repatriated. She states that after the opening up to FDI, domestic firms will be replaced by foreign firms in the R&D sector. The result show a negative impact on domestic welfare due to the transfer of capital returns to foreign firms. Borenszatein, et al., (2012) examine the effect of foreign direct investment in Nigeria, they included 69 developing countries in their sample. The study found that the effect of FDI on host country growth is dependent on stock of human capital. They infer from it that flow of advanced technology brought along by FDI increase the growth rate only by interacting with a country's absorptive capability. However, the results of the study show a negative impact of FDI on economic growth in Nigeria. The review of extant studies above revealed that the main variables for the study were not

directly incidental to the disaggregated components of foreign direct investment , thus, difficult to align the contribution of foreign direct investment to the specific sectors of the economy.
Following the aforementioned gap created by the earlier researchers in the light of mixed views in findings and conclusion reached, this study is designed to fill the gap in literature by extending the time scope and also by aligning the sectorial contribution of foreign direct investment on gross domestic product in Nigeria.

2. Theoretical and Empirical Literature of FDI and Growth

The theoretical argument on the effects of FDI and economic growth identifies contrasting views from the neoclassical and the endogenous growth models. In the context of the neoclassical model of economic growth, the long-run growth could only result from technological progress and/or labor force growth, which are considered as exogenous. Some empirical studies, such as de Mello (1997) and Solow (1957) model the effects of FDI within this framework since it could stimulate economic growth if it influences technological progress positively and permanently. Under the assumption of diminishing returns to capital inputs, economies are converging to the same steady-state growth rate in neoclassical growth theory. FDI only affects growth in short-run and leaves long-run growth unchanged. This lack of realism in the neoclassical models stimulated the development of the endogenous growth model, which many regard as a more appropriate model emphasizing the role of technological change.

This study is anchored on endogenous growth models. According to Barro and Sala-i-Martin (1995) this model explains that FDI is expected to have a long-run growth effect by generating technological transfer and diffusion. It further explained that FDI is known to have ‘composite bundle of capital stocks, know-how, and technology’ that can play a significant role for economic growth (De Mello, 1999). By so doing, the presence of foreign firms is expected to generate knowledge and technology spillovers that enhance aggregate productivity and growth (De Mello, 1997)

This growth model according to the frontrunners Lucas (1988), Rebelo (1991) and Romer (1986) introduces capital in the form of human capital accumulation and research and development and highlights the externalities that arise from these types of capital. FDI encourages the incorporation of new inputs and technologies in the production systems of host countries. FDI could also stimulate economic growth endogenously if it generates productivity, positive externalities and spillover effects. Since FDI is considered as an important source of know-how, human capital and technological diffusion, these factors can be initiated to promote economic growth through FDI inflows. Both direct and through channels from endogenous growth models can explain the effects of FDI inflows on growth more clearly, compared to the neoclassical growth model. As such, it may be more appropriate to use endogenous growth model to explain the FDI-growth association.

An alternative approach is based on neoclassical trade theory, which has mainly focused on the direct effects of FDI on factor rewards, employment and capital flows, while those following the industrial organization approach have put more emphasis on potential effects or externalities from FDI inflows. In the industrial organization approach2, FDI can be a channel to stimulate host country growth as it can supplement the domestic capital

Growth Effects of Sectoral

FDI One possible reason for the inconclusive findings on the effect of FDI on economic growth is the use of highly aggregated FDI data, as similarly argued by Alfaro (2003), Nunnenkamp and Spatz (2004) and Alfaro and Charlton (2013). Most of the empirical studies on FDI-induced growth effects do not consider the varying impact of FDI across economic sectors, in part due to data limitations, especially in developing countries. The limited comparable crosscountry datasets of sectoral FDI are mentioned in several studies that analyze the growth effect of aggregate FDI (e.g., Blomström et al., 1994, Borensztein et al., 1998).

Hanafy, (2015) investigates the effect of sectoral foreign direct investment (FDI) on economic growth in Egypt, using a novel panel dataset of 26 Egyptian governorates for the period 1992–2007. The scholar argues that one possible reason for the ambiguous effect is the use of aggregate FDI data across different sectors. The results show no significant effect of aggregate FDI stock on economic growth in Egyptian governorates, which can be partly explained by the contradictory growth effects of FDI at the sectoral level. They find a positive effect of manufacturing FDI, a negative effect of agricultural FDI and no significant effect of services FDI on economic growth.

II. Data and Methodology

2.1. Definition of variables and data description

This study uses annual data covering the period of 1985 to 2017. Four macroeconomic variables are employed: real gdp per capita, Foreign direct investment in agriculture, Foreign direct investment in Petroleum Profit tax, Foreign direct investment in mining & quarry. All data are sourced form from central bank of Nigeria.

2.2 Model Specification

The fundamental and linear equation, which forms the model is drawn from the theoretical literature and empirical literature reviewed in the previous chapter. It is observed that there is a causal link between foreign direct investment and economic growth. In this section, we pursue the same objective further by specifying our model. The model is then used to verify the effective view of the foreign direct investment and economic growth in Nigeria. The approach is to modify the model by specifying a multiple regression equation made up of economic growth as a function of foreign direct investment output. As a result the model is specified below.The foreign direct investment function is therefore expressed empirically as:

RGDP = (FDAG, FDPT, FDMQ,)

Where

RGDP = Real gross domestic product

FDAG= Foreign direct investment in agriculture

FDPT= Foreign direct investment in Petroleum Profit tax

FDMQ = Foreign direct investment in mining & quarry

The above equation can be restated in a functional form as;

$RGDP= \beta_0+\beta_1 FDAG+\beta_2\ FDPT+\beta_3\ FDMQ + \mu_t$

Whereβ

β_O= Autonomous or intercept

β_1= Co-efficient of parameters FDAG

β_2= Co-efficient of parameters FDPT

β_3= Co-efficient of parameters FDMQ

$\mu_{t=}$ Uncorrelated error term

The above can be restarted in log form as

$Log\ RGDP= \beta_0 + Log\beta_1 FDAG + Log\beta_2 FDPT + Log_3 FDMQ + \mu_t$

Where Log = logged values of the variables.

A' priori, Expectation

This is based on the principle of economic theory, Here our results can be checked for their reliability with both the size and sign of economic a' priori expectation.

VARIABLES	SIGN
FDAG	+
FDPT	+
FDMQ	+

Method data Anlysis

2.3.1 Unit root Test

In time series analysis, before running the cointegration test the variables must be tested for stationarity. For this purpose, we use the conventional ADF tests. The ARDL bounds test is based on the assumption that the variables are I(0) or I(1). Therefore, before applying this test, we determine the order of integration of all variables using unit root tests by testing for null hypothesis $H_o: \beta = 0$ (i.e β has a unit root), and the alternative hypothesis is $H_1: \beta < 0$. The objective is all variables should not be I(2) so as to avoid spurious results. In the presence of variables integrated of order two we cannot interpret the values of F statistics provided by Pesaran et al. (2001) or it will go boasted.

3.3.2 Cointegration Approach

In order to empirically analyse the long-run relationships and short-run relationship between *RGDP and (FDAG, FDPT, FDMQ,)*this study apply the autoregressive distributed lag (ARDL) cointegration technique as a general vector autoregressive (VAR).The ARDL cointegration approach was developed by Pesaran and Shin (1999) and Pesaran et al. (2001).This approach enjoys several advantages over the traditional cointegration technique documented by (Johansen and Juseline, 1990). Firstly, it requires small sample size. Two set of critical values are provided, low and upper value bounds for all classification of explanatory variables into pure I(1), purely I(0) or mutually cointegrated. Indeed, these critical values are generated for various sample sizes. However, Narayan (2005) argues that existing critical values of large sample sizes cannot be employed for small sample sizes. Secondly, Johensen'sprocedure require that the variables should be integrated of the same order, whereas ARDL approach does not require variable to be of the same order. Thirdly, ARDL approach provides unbiased long-run estimates with valid t'statistics if some of the model explanatory variables are endogenous (Narayan 2005 and Odhiambo,2008).Fourthly, this approach provides a method of assessing the short run and long run effects of one variables on the other and as well separate both once an appropriate choice of the order of the ARDL model is made, (see Bentzen and Engslted, 2001). In this regard, Pesaran and Shin, (1999) explain that AIC and SC perform well in small sample, but SC is relatively superior to AIC. The ARDL model is written as follow;

RGDP = (FDAG, FDPT, FDMQ,)

$$\Delta LRGDP_t = \alpha_0 + \sum_{i=1}^{n} \beta_{1i} \Delta LRGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta LFDAG_{1_{t-i}} + \sum_{i=0}^{n} \beta_{3i} \Delta LFDPT_{2_{t-i}} +$$
$$+ \sum_{i=0}^{n} \beta_{4i} \Delta LFDMQ_{4_{t-i}} + \beta_{6i} lnRGDP_{t-i} + \beta_7 LFDAG_{t-1} + \beta_8 LFDPT_{t-1} + \beta_9 LFDMQ_{t-1} + \varepsilon_t \quad (3)$$

Where $\Delta$is the difference operator while $\varepsilon_t$is white noise or error term.The bounds test is mainly based on the joint F-statistic whose asymptotic distribution is non-standard under the null hypothesis of no cointegration. The first step in the ARDL bounds approach is to estimate the four equations (2) by ordinary least squares (OLS). The estimation of the three equations tests for the existence of a long-run relationship among the variables by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables. The null hypothesis of no co-integration and the alternative hypothesis which are presented in (Table 2) below as thus:

Table 2: Statement of Hypothesis

null hypothesis of no co-integration	alternative hypothesis	Eqt
$H_0: \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{13} = 0$	$H_1: \beta_6 \neq \beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq 0$	2

Source: author's design

According to Narayan (2005), two sets of critical values for a given significance level can be determined. The first level is calculated on the assumption that all variables included in the ARDL model are integrated of order zero, while the second one is calculated on the assumption that the variables are integrated of order one. The null hypothesis of no cointegration is rejected when the value of the test statistic exceeds the upper critical bounds value, while it is not rejected if the F-statistic is lower than the lower bounds value. Otherwise, the cointegration test is inconclusive. Following Odhiambo (2009) and Narayan and Smyth (2008), we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. The equation, where the null hypothesis of no cointegration is rejected, is estimated with an error-correction term (see Narayan and Smyth, 2006; Morley, 2006). The vector error correction model is specified as follows:

$$\Delta LRGDP_t = \alpha_0 + \sum_{i=1}^{n} \beta_{1i} \Delta LRGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta LFDAG_{1_{t-i}} + \sum_{i=0}^{n} \beta_{3i} \Delta LFDPT_{2_{t-i}} +$$
$$+ \sum_{i=0}^{n} \beta_{4i} \Delta LFDMQ_{4_{t-i}} + \lambda_1 ECM_{t-i} + \mu_{1t} \quad (4)$$

$ECM_{t-1}$is the error correction term obtained from the cointegration model. The error coefficients (λ_1) indicate the rate at which the cointegration model corrects its previous period's disequilibrium or speed of adjustment to restore the long run equilibrium relationship. A negative and significant ECM_{t-1} coefficient implies that any short run movement between the dependant and explanatory variables will converge back to the long run relationship.

3.6 Stability and Diagnostic test

To ensure the goodness of fit of the model, diagnostic and stability tests are conducted. Diagnostic tests examine the model for serial correlation, functional form, non-normality and heteroscedasticity. The stability test is conducted by employing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) suggested by Brown et al. (1975). The CUSUM and CUSUMSQ statistics are updated recursively and plotted against the break points. If the plots of the CUSUM and CUSUMSQ statistics stay within the critical bonds of a 5 percent level of significance, the null hypothesis of all coefficients in the given regression is stable and cannot be rejected.

IV. Empirical Results

4.1 Unit root tests

The results of the ADF (Augmented Dickey Fuller) unit root tests in Table 2 show that the order of integration of the variables I(1). However none of the variables is integrated of order two I(2). The integration of the variables at I(1) makes ARDL the preferred approach in this empirical analysis and also the sample size. The results of unit root in all the data series. Interestingly, the stationary properties confirm that none of the variables is stationary at second difference [I(2)].

Table 2.unit root tests

variable	t-Statistic	Prob.	I(1)	remark
d(LRGDP)	-4.517	0.0011	I(1)	stationary
d(LFDPT)	-5.6715	0.0001	I(1)	stationary
d(LFDMQ)	-3.4063	0.0036	I(1)	stationary
d(LFDAG)	-5.5837	0.0001	I(1)	stationary

Note: all variables are in the natural log form
Source: eview10

The results for the unit root test are reported in table 2. All that data are transformed into the natural log form. To determine the order of integration of the variables, the ADF (augmented Dickey-Fuller) test in which the null hypothesis is $H_0 = \beta = 0$ (i.eβ has a unit root) and the alternative hypothesis is $H_1 : \beta < 0$ are implemented. The result for both the level and differenced variables are presented in table 2.

The stationarity tests were performed first in levels and then in first difference to establish the presence of unit roots and the order of integration in all the variables. The results of the ADF stationarity tests for each variable show that both tests fail to reject the presence of unit root for the data series in level, indicating that these variables are non-stationary at levels. The first difference results show that these variables are stationary at 1% significance level (integrated of order one 1(1).

4.2 Results of ARDL Co-integration Test

Since ARDL bounds test is known to be sensitive to lag length, this study examines the VAR Lag Order Selection. Table 4 suggests the specification of a maximum lag length of one (Max lag = 1) in the ARDL bound test using (SIC). Given the sample size of 32 observations (1985-2017) used in this study, the critical values for the evaluation of the null hypothesis are taken from Narayan (2005). The results of the co-integration test based on the ARDL-bounds testing method for one specifications of the log-linear empirical model in Eq. (2) are presented in Table 5. The results indicate that the F-statistic is greater than the upper critical bound from Narayan (2005) at 5% significance level using restricted intercept and no trend. This study therefore rejects the null hypothesis of no cointegration among the variables. This shows that there is a long-run causal relationship among the variables in Nigerian economy.

Table 3.ARDL bounds cointegration test results

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	10.53708	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
			Finite Sample: n=35	
Actual Sample Size	31	10%	2.618	3.532
		5%	3.164	4.194
		1%	4.428	5.816
			Finite Sample: n=30	
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

ARDL Models selected on (SIC)
 * indicate significance at 10% level respectively.
Source: eview10

4.3 Long run and short run estimates

The estimated long-run and short-run coefficients are presented in Table 4 and 5. The long-run coefficients of the variables are statistically insignificant at 10% level. This indicates that none of these variables is developed enough to drive growth in the long run.

However, in the short run, the coefficient of ECM (-1) is negative and significant at 1% level. It means, about 0.03% of the short-run disequilibrium is corrected in the long-run. The short-run coefficient of all the variables in the short run are statisticallyinsignificant at 10% level except contribution of FDI on petroleum profit tax

Table 4.*Long run estimates*

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFDPT)	-0.020165	0.029471	-0.684215	0.5004
D(LFDPT(-1))	0.064157	0.033794	1.898454	0.0697
D(LFDMQ)	0.014733	0.029102	0.506250	0.6173
D(LFDAG)	-0.012356	0.033060	-0.373739	0.7119
CointEq(-1)	-0.037584	0.022715	-2.654625	0.0010

Table 5.*shortrun estimates*

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFDPT	0.255092	0.899584	0.283566	0.7792
LFDMQ	0.392001	0.837095	0.468288	0.6438
LFDAG	-0.328745	1.014978	-0.323894	0.7488
C	1.724613	3.826181	0.450740	0.6562

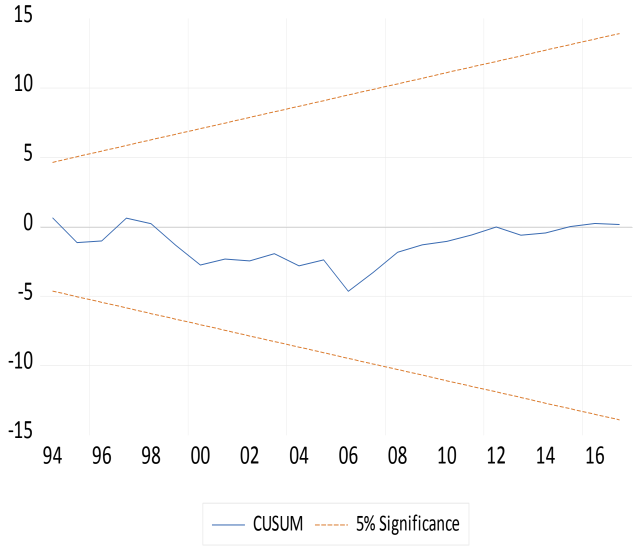
4.4 Diagnostic and stability tests

The diagnostic test results in Table 6 show that there are no evidence of serial correlation, heteroscedasticity and functional form misspecification in the two ARDL models estimated. Figure 1 shows the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares (CUSUMSQ) stability test results. The figures suggest that the coefficients of the estimated ARDL model are stable.

Table 6: Diagnostic test

Diagnostic tests	**Null hypothesis**	**F-statistic**	**Decision**
Breusch Godfrey serial correlation LM test	H0: no serial correlation	1.2014 (0.3197)	Don’t reject H0
Heteroskedasticity test: Breusch-Pagan-Godfrey	H0: homoskedasticity	0.2402 (0.9586)	Don’t reject H0
Normality	H0: residuals are normally distributed	11.612(0.3009	Don’t reject H0
Ramsey reset test	H0: model is correctly specified	2.0431 (0.1663)	Don’t reject H0

P values in parentheses



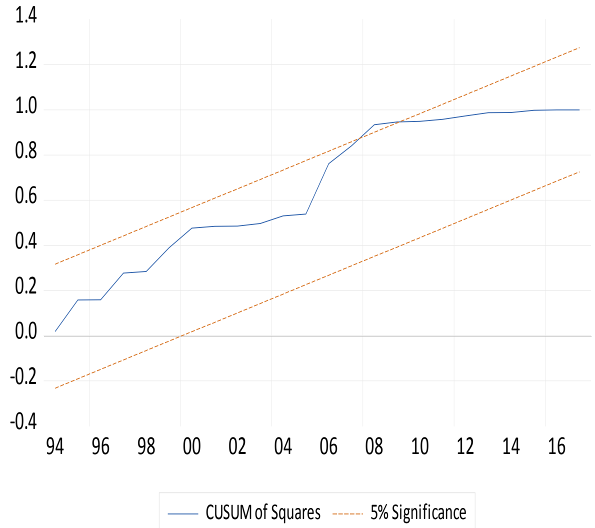


Figure 1: CUSUM and CUSUM of Squares for the model

V. Conclusion and Policy implication

This study examinedimpact of sectorial contribution of Foreign Direct investment on growth in Nigeria over the period of 1985 to 2017 using the ARDL approach to cointegration analysis. Three macroeconomic variables are employed: Foreign direct investment in agriculture, Foreign direct investment in Petroleum Profit tax, Foreign direct investment in mining & quarryrate over the study period. The results suggest that the long and short run effects of the selected macroeconomic variables effect on real gdp. First, in the long run all the variable statisticallyinsignificant on exerting influence on real gdp. In the short run, only contribution of fdi to petroleum tax profit is significant in exerting influence on real gdp.

However, this study has some policy implications. Policies aimed at improving stock improving the level of infrastructure on the continent, opening up and liberalizing trade, strengthening institutions and reducing macroeconomic instability will be beneficial for FDI flows to the continent. Finally, policies aimed at attracting FDI are necessary because higher FDI flows can cause more banking and financial development. Also government should strengthened the political institutions and adopt democratic principles that will ensure stability within the polity. Fourthly, government should allow the exchange rate to depreciate further since it will reduce the dollar price of some ailing indigenous industries, thereby attracting more foreign investment in the form acquisition or mergers.

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