AN ASSESSMENT OF DETERMINANTS OF SECTORIAL GROWTH IN NIGERIA

Otalu J.A & Ojo A.S

*Department of Business Administration and Management, Federal Polytechnic Ado-Ekiti, Nigeria and
Department of Economics, Ekiti State University, Ado-Ekiti, Nigeria.*

Abstract: The study examined the determinants of sectorial growth in Nigerian economy between 1980 and 2012. Sectorial growth is expressed as a function of determinants of sector's output growth variables and other relevant variables by literature. The explanatory variables used are labour, capital, interest rate, exchange rate, gross domestic product, trade openness, lending rate and private sector credit. The study applied panel data analysis to assess the existence of specific factor determinants of sectorial growth, cross interdependence of sectors and consistency of the panel estimation using fixed effect, random effect and least square dummy variable (LSDV), while Hausman test was used to test the consistency of the use of either fixed and random effect. Finding from the study shows that there exist positive relationship between sectorial growth and explanatory variables except the inflationary rate that shows negative relationship with sectorial growth which is in conformity with the aprori expectation. Only labour and exchange rate are significant while other explanatory variables are not significant. The SYS-GMM shows the robustness of the estimation result in which all the variables appears to be significant. The policy implication is that for holistic policy to be made in all these sectors, effort must be made to control the openness of the economy reasonably so as to increase the output of the sector in Nigeria. In conclusion, while implementing monetary policy that incorporates effective deregulation it should not be tight with overvalued currency.

Keywords: Sectorial Growth, Determinants, Output Growth, Pane Data

1. INTRODUCTION

Over the last two decades economic growth and its determinants have been of great importance in both theoretical and applied economics. This is due to the importance of economic growth itself. The need to understand the dynamic of economic growth was stressed by a notable economist Lucas (1988) when he stated that "once one starts to think about economic growth, it is hard to think about anything else". Moreover, over the years emphasis of development economists have shifted to achieving a sustainable economic development through accelerated growth rate, Jhigan (1993) pointed out that the synergy between growth and development in developing economies is rather two weak thus, this account for the reasons why some developing countries do experience growth without appreciable impact on economic development. It has been noted that development problems of many developing economies have led to evolvement of different economic policies meant to address these myriads of problems Onah (2002).

However, it is quite imperative that all these policies such as Operation Feed the Nation (OPN), Import substitution Industrialization Strategy, Economic Liberalization Policies which replaced the Import Substitution Policy, Recapitalization, Deregulation of Interest Rate, Consolidation of Banking Institution through Merger and Acquisition, Deregulation and Liberalization of Downstream Sector, and 6-5/6-2-3 education system (before independence), tagged Universal Primary Education (UPE), 6-3-3-4 system of education also tagged Universal Basic Education (UBE) and new system which is 9-3-3, have not impacted significantly on the development of these economies going by various development indicators published by international agencies on these countries.

Furthermore, the study also intends to explain how the sectors under review that is, oil, agricultural, manufacturing, educational and banking sectors are interlink. In view of this the sectors are subdivided into two that is real sector and auxiliary sector. Manufacturing and agricultural sectors fall under the real sector because they serve as the major driver of the Nigerian economy while, education, oil and banking sectors fall under the auxiliary sector. The educational sector provides the manpower to the real sectors while, banking sector provides the finances needed by the real sectors mentioned above. In Nigeria, emergence of various policies in the past had rooted in the different assessment of many sectors in the economy. This has led to policies duplication, conflict of objectives as well as policy somersault. Many of the past empirical studies have been

directed to one particular sector at a time and each has come out with diverse policy recommendation to specific sector each researcher is assessing at a point in time. For instance, Ekpenyong and Ikechukwu (2011), Olajide, Akinlabi and Tijani (2011), Awoyemi (2011), Dauda (2010) and Odulari(2008) assessed, Banking sector ,Agricultural sector, Manufacturing sector, Educational sector and Oil sector respectively. Few of the past empirical studies havenot taken holistic view of all these important sectors altogether with a view to assessing factors that actually determine their growth.

As earlier stated, a holistic view of these sectors may provide a major policy alternatives to these various proliferation policies that are sectorial based. It is opined that a major policy derived from whole interaction of the sectors will have a more significant on the economic development of Nigeria Feddeke (2010) has emphasized that duplication of policies do not lead to sustainable economic growth and economic development and this might be difficult to achieve steady sustainable economic growth.

Nigeria has over the years, implemented a lot of developmental policies that are somehow apply in different sectors targeted. Therefore, a more robust view of policies which will affect the sectors generally will be looked into in this research work. This is believed would have a far-reaching positive effect on the economy. For effective policies in the sectors, a well defined relationship among the determinants of the sectorial growth must be established so as to reflect the influence of holistic policies on the sectorial output which has not been taken into cognizance by many scholars in the past. This research work is carried out to study how policies can be made to affect the important sectors that are interlinked (generally) and also to look at how the sectors under review that is (agricultural, banking, manufacturing, oil and educational sectors) are cross-sectionally dependent. This finding of this research work transcends beyond mere academic brainstorming, but will be of immense benefit to federal agencies such as Nigerian Export Promotion Commission (NEPC), policy makers, and intellectual researcher. The research work will further serve as a guide and provide insight for future research on this topic and related field for students who are willing to improve on it.

Consequently, this study will endeavor to assess growth determinants of many sectors in Nigeria holistically, namely: Oil, Education, Agriculture, Financial and Manufacturing sectors. It is believed that, findings from this research can provide sets of policy recommendation which can impact positively on all the sectors generally.

2. LITERATURE REVIEW

Olajide, Akinlabi and Tijani (2011) analyzed the relationship between agricultural resources and economic growth in Nigeria for period 1970-2010 using the Ordinary Least Square Regression method. The result revealed a positive cause and effect relationship between gross domestic product (GDP) and agricultural output in Nigeria.

Oji-Okoro (2011) examined the impact of the agricultural sector on the Nigerian economy for period 1986-2007 using panel data analysis. He found out that the there was a positive relationship between gross Domestic Product (GDP) vis a vis domestic saving, government expenditure on agriculture and foreign direct investment.

Adoful and Agama (2012) examined the effect of government budgetary allocation to the agricultural sector on the output of the agricultural sector using OLS regression techniques for period 1995-2009. The result revealed that the relationship between them is strong positive and significant.

Muhammad and Atte (2006) focused on the growth of the agricultural sector of the economy for period 1981-2003 using descriptive statistics and regression analysis. They found out the overall agricultural production average growth rate was 5.4% and that GDP growth rate.

Onoja, Onu and Ajodo analyzed the trends and pattern of institutional credit supply to agriculture during pre- and post – financial reforms along with their determinants for period 1978-2009 using ordinary least square method (Linear, semi-log and double log). The result showed that an exponentially increasing trend of agricultural credit supply in the economy after the reform began.

KehindeAdekunle (2012) examined the provision of credit to agricultural sector along with the performance of the ACGSF while at the same time evaluating the food security status of Nigeria for period 1978-2006 using ordinary least square method. The result revealed that the ACGSF settled claims are negatively significant and the tardiness is observed in the claims process. The food security aspect showed that Nigeria is food insecure as the import of foods is on rise as the tests showed.

AchaIkechukwu (2011) investigated the role of banks play in economic growth for period 1990-2008 using regression analysis. He found out that the bank contribute reasonably to economic growth.

Ekpenyong and Acha (2011) examined the contribution of banks in Nigeria using correlation and regression analysis, trace statistics, Eigenvalue test and Augmented Dickey Fuller test for period 1980-2008. They found out that the poor performance of these variables indicated that other variables such as human resources, social infrastructure, political stability and technology may play more robust role in economic growth in Nigeria than banks.

Samson and Elias (2010) examined the relationship between financial sectors development and economic growth in Nigeria for period 1960-2009 using granger causality test. They found out that the various measures of financial development granger cause output.

Azeez and Oke (2012) examined the effect of banking reforms on the economic growth for period 1986-2010 using Augemented Dickey Fuller, Unit Root test, Johansen Co-integration test and Error Correction mechanism (ECM). They found that the presence of long run relationship among the variables.

Samuel and Fadare (2010) investigated the effect of banking sector reforms on economic growth in Nigeria over the period 1999-2009 using ordinary least square regression techniques. He found out that there is positive relationship between economic growth and the total banking sector capital.

Nwanyanwu and Onyinyechi assessed the impact of banks' credit on economic growth in Nigeria for period 1992-2008 using ordinary least square method. She found out that the marginal productivity coefficient of bank credit to the domestic economy is positive but insignificant.

Owolabi and Adegbite (2012) empirically examined the effect of foreign exchange regimes on industrial growth in Nigeria for the period 1985-2005 using multiple regression analysis. They showed that the effect of using foreign exchange, world price index, per capital income, and net export as an inducement for greater performance for stable economic growth and are capable of giving stability in prices for manufactured goods.

Sangosanya and Awoyemi (2011) analyzed the dynamics of manufacturing firm's growth in Nigeria using a panel data analysis for period 1989-2008. He found out that the manufacturing firms finance mix, utilization of assets to generate more sales, abundance of funds reserve and government intervention as indicated by Tobin's Q, operating efficiency, capital reserve and government policies are significant determinants of manufacturing firm's growth.

Tomola, Adebisi and Olawale investigated the effect of banking lending and economic growth on the manufacturing output in Nigeria using time series for period 1873-2009. Their result revealed that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria.

Simon and Awoyemi (2010) investigated the impact of manufacturing capacity utilization on industrial development in Nigeria over the period 1976-2005 using co- integration and error correction mechanism. They found out that there was long run positive relationship between manufacturing capacity utilization, value added and index of industrial productivity in Nigeria.

IsholaSaheed(2012) explored the average contribution of the manufacturing sector to the national earning of Nigeria using time series over the period 1981-2010. He found that there was a significant relationship exists between government expenditure in the manufacturing sector and the economic growth of Nigeria.

Christopher and Tomilade (2012) examined the impact of exchange rate management on the growth of the manufacturing sector in Nigeria using ordinary least square (OLS) multiple regression analysis for period 1986-2010. Their result revealed that depreciation which formed part of the structural adjustment policy (SAP) 1986, and which dominated the period under review has no significant relationship with manufacturing sector's productivity.

Wakeel and Alani examined the contribution of different measures of human capital development to economic growth in Nigeria for period 1980-2010 using Augmented Dickey-Fuller. Their result revealed that though little commitment had been accorded health compare to education.

Omojimite Ben (2010) examined the notion that formal education accelerates economic growth in Nigeria for period 1980-2005 using time series (co-integration and Granger Causality test). The result showed that there was co-integration between public expenditure on education, primary school enrolment and economic growth.

RisikatOladoyin (2010) carried out an empirical investigation on the relationship between investment in education and economic growth in Nigeria, using annual time series (Johansen co- integration technique and error correction method) over the period 1997-2007. She found out that there was, indeed a long-run relationship between investment in education and economic growth.

Dauda (2009) carried out an empirical investigation on the relationship between investment in education and economic growth in Nigeria, using annual time series data from 1977 to 2007. The paper employed Johansen co-integration technique and error correction methodology. Empirical results indicated that there is, indeed a long-run relationship between investment in education and economic growth.

Lawal and Wahab (2011) considered the relation that is established between education and economic growth in Nigeria, using time series data over the period 1980-2008. The paper employed ordinary least square method. They discovered that education investment have direct and significant impact on economic growth in Nigeria.

Ajetomobi and Ayanwale examined education expenditure trend, higher education student enrolment and linkage with employment and economic growth in Nigeria, using several issues of Central Bank of Nigeria for period 1970-2004. The result showed that government funding is unstable and unpredictable.

Adelakun (2011) showed the relevance of human capital development to the growth of Nigerian economy. The paper employed ordinary least square method (OLS), the result revealed that there is strong positive relationship between human capital development and economic growth.

Ogbonna and Appah investigated the effect of petroleum income on the Nigerian economy for period 2000-2009 using simple regression model. The result revealed that petroleum income has a positive and significant impacted the Nigerian economy.

Omojimite (2011) examined whether a link exists between oil shocks and the Nigerian real effective exchange rate and other determinants of exchange rate, for period 1960-1985 and 1986-2011 using Johansen co integration test. He found out that the price of oil and openness of the economy significantly explains the level of exchange rate in Nigeria.

3. METHODLOGY

MODEL SPECIFICATION

This study is guided by to the Leontiff input and output model particularly the DilipDutta(2006) industrial production function model INDUSVA= f (RCAPITAL, LABOURP, REXPORT, TARIFF, EDU). Where industrial value added was expressed as a function of capital, labour, real export, education and average import tariff. However our model is modified in a way that trade liberalization is proxied by trade openness which has been described as a better proxy for trade liberalization in Nigeria by Adebiyi(2002) and Dauda(2006) this replaces real export and average import tariff used in the Dutta's model. Again, other variables such as capacity utilization, exchange rate, inflationary rate and energy generation has been described by Dauda(2006) and Anyawu(1997) as very germane to the determination of industrial output growth in Nigeria. These were also included in our model consequently; our model for sectorial output growth is tailored to follow the industrial production function explained above. The function is however modified to accommodate the variables highlighted above and is specified thus:

$SEC = f(K, L, PSC, EXR, INFR, TOP, GDP, LNR)$…………………………………………(1)

Specifying the production function in log-linear form (with an error term, *ut*), the following equation may be written:

$LnSECTOR_{it} = a_0 + a_1 lnK_{it} + a_2 lnL_{it} + a_3 lnPSC_{it} + a_4 lnEXR_{it} + a_5 lnINFR_{it} + a_6 lnTOP_{it} + a_7 lnGDP_{it} + a_8 lnLNR_{it} + U_{it}$

SECG= Sectorial Growth

K = Capital (proxied by Gross Capital Formation)

L = Labour (Proxied by number of people employed in the sectors)

EXR= Exchange rate

INFR= Inflationary rate

PSC = Private Sector Credit

TOP = Trade Openness

GDP= Gross Domestic Product

LNR= Lending Rate

U_{it}= Error term (stochastic term)

a_i are regression parameters. i =1,2,3……

Apriori expectation: K>0, L>0, PSC>0, EXR>0,INF<0, TOP>0, GDP>0, LNR< 0

Estimating Technique

The panel data analysis was used to achieve our objective here and it will explore the fixed effects setting. According to Gujarati (2007), if T which is the number of time series data is large and the number of cross sectional unit is small, the fixed effect is more appropriate this situation is referred to have long panel. Therefore since our data is from 1980 to 2012 i.e. 32 years and the number of sectors under consideration is 5, hence the choice of fixed effect was justifed. Again Gujarati (2007) further stated that in case individual error components correlate with one or more repressors the estimator of random effect will be biased while that of fixed effect will be unbiased. Despite these assertions, the random effect setting will also be explored and Hausman test will be used to either justify or otherwise the usage of fixed effect for our analysis.

The fixed effect equation in its original form is presented as follows:

$$y_{it} = \beta_1 + \beta_2 x_{2it} + \beta_3 x_{3it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(2)$$

Where i standsfor the cross-sectional unit that is sectors, and$t$for the time period that is year. That is i=1,2,3,4,5 and t=1,2………,32 the pooled regression analysis can be done by estimating equation 3.1. That is the situation where all coefficients constant across time and individuals; this is a very high restricted assumption Gujarati (2007). This will definitely distort the relationship that should exist between y and x's. One way of getting over this is to explore the specific effect of the cross sectional unit's i.e. the sectors. This takes us to fixed effects least-square dummy variable (LSDV). LSDV has been described as a way of accounting for the specific effect of the sectors on y, this is by allowing the intercept to vary across the cross-sectional units and leading to equation 3.2:

$$y_{it} = \beta_{1i} + \beta_2 x_{2it} + \beta_3 x_{3it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(3)$$

The subscript i added to β suggests that the intercepts of the individual sector may be different which may be attributed to the country's system of administration, leadership style and administrative philosophy. The fixed effect or the LSDV uses the different intercept dummies to measure the specific effect of the cross-sectional units hence equation 3.2 can be rewritten as:

$$y_{it} = \propto_1 + \propto_2 D_{2i} + \propto_3 D_{3i} + \propto_4 D_{4i} + \propto_5 D_{5i} + \propto_6 D_{6i} + \beta_2 x_{2it} + \beta_3 x_{3it} + \mu_{it} \ldots \quad (4)$$

The model in equation 3.3 is also known as the least-square dummy variable model. As earlier stated, the random effect will also explored just as a way of checking if the use of the fixed effect is justifiable, this will be done along with the Haussman test. The difference between the fixed and the random effect lies in the nature of the error term and the intercept. Rather than allowing each cross-sectional unit to have its own intercept value as in fixed effect, the random effect has a common intercept that comprises of the mean value of all cross-sectional unit intercept and error component ε_i which is the random deviation of each intercept from their mean value. The random effect model is sated thus:

$$y_{it} = \beta_1 + \beta_2 x_{2it} + \beta_3 x_{3it} + \varepsilon_i + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(5)$$

Equation 3.4 emerged due to the fact that β_{1i} is no longer treated as fixed but we assume now that it is a random variable of $\beta_1$and it is expressed as:

$$\beta_{1i} = \beta_1 + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(6)$$

If we substitute equation 5 into 6the result will be equation 3.4. The basic idea here is that we are assuming that the five sectors to be used in our study are drawn from larger sectors in Nigerian economy that their intercept β_1 have a common mean value and the individual sector differences are shown through the error termε_i generalized least square. GLS is used for the estimation of the random effect model so as to avoid the possible autocorrelation. After the estimation of the random effect, the Hausman test will be carried out. According to Hausman (1978), this test uses the asymptotic value of the chi square. The null and the alternative hypothesis are tested based on the significant test of the chi square value. The random effect model is not appropriate when the null hypothesis is rejected and vice versa.

However, due to the possible multicolinearity in the fixed effect LSDV model, because of the addition of many dummy variables especially in small sample. Again the assumption of strict exogeneity is always there for the LSDV yet, the fixed effect model may possibly have endogeniety problem where the random variable possibly correlated with the regressorsx_{it} thereby leading to inconsistent and biased estimators.

Consequently, we hope to carry out a robust check by using the dynamic panel data approach. This was popularized by Arellano and Bond, (1991). According to them a static specification of the fixed effect model is joined with autoregressive coefficients which is the lagged value of the dependent variable, this allow feedback mechanism flowing from the past or current shocks to the current value of the dependent variable. Franz (2009), this method of specification of model is known as generalized method of moments GMM. The dynamic

specifications take away the temporal autocorrelation in the residuals and prevent running a spurious regression which may lead to inconsistent estimators. The GMM model is specified thus:

$$= \beta_1 + \rho y_{it-1} + \beta_2 x_{2it} + \beta_3 x_{3it} + \mu_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (7)$$

Equation 6 is the modified form of the fixed effect equation in equation 3 with the addition of the lagged value of the dependent variable.

Taking the first difference of equation 7 we obtained equation 8 as follows:

$$\Delta y_{it} = \beta_1 + \rho \Delta y_{it-1} + \beta_2 \Delta x_{2it} + \beta_3 \Delta x_{3it} + \Delta \psi_{it} \dots\dots\dots\dots\dots\dots (8)$$

Avoiding possible correlation between y_{it-1} and ψ_{it} necessitate the use of an instrumental variable that will not be correlated with the both and through matrix transposition instrumental variable Z' is obtained, hence equation 8 is multiplied in vector form by Z' leading to

$$Z'\Delta y = Z'(\Delta y_{-1})\rho + Z'(x)\beta + Z'\Delta \psi \dots\dots\dots\dots\dots\dots\dots\dots (9)$$

Estimating equation.8 using generalized least square GLS the result yields one step consistent GMM estimators. However, additional input to Arellano and Bond (1991) evolved over the years and was developed by Blundell and Bond (1998) this is called system-GMM. There is no much difference between it and GMM only that it exercises more precaution in the usage of the instrumental variables. It was developed to tackle the problem of possible weak instrumental variable which may occur in GMM. This is expected to be explore also in our robustness check of our model, so that at the end the estimates will be consistent and as well as efficient.

Sources of Data:

Data for this research work were gathered from various sources such as Annual digest of Bureau of Statistics, CBN Statistical Bulletin, and World Bank Data base.

4. RESULTS AND DISCUSSION

Panel Estimation Results

The use of panel data analysis is justified in that it takes care of the unobserved heterogeneity. Therefore, to be able to explain in details the causal-effect relationship between the dependent and the independent variables and to study the within variations, we use the error-components model analysis. This includes fixed effect and random effect, this will enable us to see if there is consistency in the result. We start with the fixed effect first. This is explored in the form of within variation.

Table 3 shows the fixed effect results. From the table, it is clear that there is a direct relationship among the major inputs such as capital, labour, dependent variable which is the sectors output. Notwithstanding, only labour is statistically significant at 10%. The implication of the result is that capital exhibit a positive relationship with output but the contribution to output is not significant. In all the five sectors the results further shows that credit to the private sector is positive but not significant while lending rate has inverse relationship and also not significant. There appears to be linkage among the three results that is capital, credit to private sector and lending rate as well as their relationship with the sectors output.

The reason for the non-significant impact of capital might not be unconnected with the fact that credit to the private sector is inadequate. This relationship is corroborated by the non-significance of the lending rate. The exchange rate shows a positive relationship and the coefficient is significant. The implication is that an increase in the exchange rate may be an incentive to boost the sectors outputs. The implication is that the results appear to be in support of currency devaluation as an incentive to promote the growth of the sectors in Nigeria. Again, trade openness has a positive relationship but the coefficient is not statistically significant. This simply implies that trade openness has not brought the expected significant impact to the growth of the sectors output. Expectedly, the GDP and the sectors output also show positive and significant relationship.

Table 3: Fixed Effects (within variation regression) Estimation Results for sectors output in Nigeria

Variables	Coefficient	Standard error
Constant	-24.65808	22.19101
Log of labour	0.7244825*	1.647264
Log of Capital	0.0042853	.0520249
Log of private sector credit	0.0382721	.2021013
Exchange rate	0.003253**	.0019896
inflation rate	-0.0156581	.0216513
Log of trade openness	0.1394756	.2301128

Log of GDP	0.7646286***	.1822042
Lending rate	-0.0006547	.0081235

Note: Standard errors in parentheses
$R^2 = 0.957$(within) $R^2 =0.508$(overall) $F(8,152)=364.57***$
* statistical significance at 10%** statistical significance at 5%.** *statistical significance at 1%
Source: Authors Computation

Again, trade openness has a positive relationship but the coefficient is not statistically significant. Implication of this is that trade openness has not brought the expected significant impact to the growth of the sectors output. Expectedly, the GDP and the sectors output also show positive and significant relationship.
Again, the overall R-square is relatively moderate at 0.508. The independent variables explained about 50% variation sectors output. The within variation is nonetheless higher, explaining about 95% variation. The entire model is statistically significant at 5% level (with the F value is 364.57 and the probability value is 0.000. To be able to confirm the consistency in our result, the study also explores the random effects estimates. The result is presented in the next table.

From the results in table 4, it is very clear that there is consistency in the results obtained from the two estimations that is fixed effect and random effects. All the signs of the variables remain unchanged and the level of significance is also the same. The implication is that both estimates can be used to explain the relationship between the sectors output and their identified determinants. However, according to panel data literature effort can be made to examine the suitability of either random or fixed effect for a particular analysis. This is done through the Hausman test. The Hausman test compiles the estimates of both the fixed and the random effects and examine if there is a significant difference between them. The result of the Hausman test is presented in the next table.

Table 4: Random Effects Estimation Results for sectors output in Nigeria

Variables	Coefficient	Standard error
Constant	-24.66175	26.26227
Log of labour	.7242156*	1.64198
Log of Capital	.0039046	.0512656
Log of private sector credit	.0381201	.2014298
Exchange rate	.0032526**	.0019832
inflation rate	-.0156654	.0215814
Log of trade openness	.1393616	.2293639
Log of GDP	.7651705***	.1812794
Lending rate	-.000656	.0080975

Note: Standard errors in parentheses
$R^2 =0.9505$ (within) $R^2 =0.5082$ (overall) Wald chi2(8) = 2935.37***
* Statistical significance at 10%** statistical significance at 5%.***statistical significance at 1%
Source: Authors Computation.

Table 5 shows the Hausman test results. The implication of this result is that there is no significant difference in the two estimates therefore, any of the two can be relied upon for the purpose of explaining the relationship between sectors output and their determinants. To be able to test for cross-sectional dependence in the analysis, the Fixed Effects Least Square Dummy Variable LSDV estimates is also explored. The result is presented in table 6

Table 5 Hausman Test.

Variables	Fixed effects	Random effects	Difference	Standard error
Constant	-24.65808	-24.66175	0	0
Log of labour	0.7244825*	.7242156*	0	0
Log of Capital	0.0042853	.0039046	0	0
Log of private sector credit	0.0382721	.0381201	0	0
Exchange rate	0.003253**	.0032526**	0	0

inflation rate	-0.0156581	-.0156654	0	0
Log of trade openness	0.1394756	.1393616	0	0
Log of GDP	0.7646286***	.7651705***	0	0
Lending rate	-0.0006547	-.000656	0	0

Table 6: Fixed Effects (LSDV) Estimation Results for sectors output in Nigeria

Variables	Coefficient	Standard error
Constant	-21.48299	26.31984
Dum 2	-5.996742***	.274169
Dum 3	-2.140076	.268889
Dum 4	-2.89931*	.1418992
Dum 5	-4.839304***	.2730236
Log of labour	0.7244825*	1.647264
Log of Capital	0.0042853	.0520249
Log of private sector credit	0.0382721	.2021013
Exchange rate	0.003253**	.0019896
inflation rate	-0.0156581	.0216513
Log of trade openness	0.1394756	.2301128
Log of GDP	0.7646286***	.1822042
Lending rate	-0.0006547	.0081235

Note: Standard errors in parentheses
$R^2 = 0.957(within)$ $R^2 = 0.508(overall)$ $F(8,152)=364.57***$
* statistical significance at 10%** statistical significance at 5%.** *statistical significance at 1%
Source: Authors Computation

The fixed effects LSDV results presented in Table 6 show some important revelations when compared to the previous results in Table 3. As earlier indicated, the use of the fixed effects LSDV is justified by the need to examine the specific effects of the sectors on our results by allowing the intercept to vary across the sectors. Again, the bias of inconsistent estimator varnishes when T is large and N is small in the LSDV model. In our model T=32 and N=5. The dummies represent the individual intercept of the five sectors. Their values are shown in the table together with their standard error values. The results show that three of the intercepts (constant inclusive) are individually statistically significant. That is, the intercept values of three out of five sectors are statistically different from zero. This shows that there is a relative sector-specific effect in our model, which may be attributed to the individual sectors structural, operational and administrative set-up (see Olomola, 2007, Gujarati, 2007).

The LSDV fixed effects results also show that the parameter estimate of all the variables is the same as what we have under the fixed effect within results estimates. Also the LSDV model result is statistically significant at 1%. This is shown through the F statistics values.

Finally, the fixed effects LSDV results are capable of yielding a consistent estimator when the T is large and N is small. According to Arellano and Bond (1991), to obtain an efficient estimator in panel models, the dynamic panel model is preferred. Consequently, we proceeded to conduct a robustness check for our model using system generalized method of moments (SYS-GMM) estimation by Blundell and Bond (1998), respectively. The usage is justified by the need to study the consistency of our results in dynamic panel models, having found out that the results were consistent in the two previous static panel models.

GMM and SYS-GMM estimation for sectors output in Nigeria

Arellano and Bond (1991) argued that fixed effects LSDV might be inefficient hence the need to exploit the orthogonality conditions that exist between the lagged values of the dependent variable and the disturbance term through the use of an additional instrument in the model. This approach is called the generalized method of moments (GMM). This was modified by Blundell and Bond (1998) due to the fact that the assumption of strict exogeniety is more relaxed and is capable of yielding a more efficient estimator (see Roodman, 2006).This approach is a form of dynamic panel modelling that limits the tendency of having a

spurious regression, which may lead to wrong inferences that is common in static models. The results of the dynamic panel models are presented in Table 7.

The results of the SYS-GMM are shown in Table 7. This is another confirmation of our inferences from the previous estimated models. It is clearly shown that there is consistency in our results regarding the different models estimated, i.e. from the fixed effects within group estimation to the fixed effects LSDV to the random effects and dynamic model, which is SYS-GMM. All the coefficients signs are almost the same with the static panel models. The only slight difference is that lending rate and inflation rate become significant in the dynamic model which is an indication that the sectors are likely to be sensitive to volatility in the inflation rate and lending rate in the economy.

Table 7: The SYS-GMM Estimation Results for sectors output

Dynamic Panel Data Analysis	Variables	Coefficient	Standard Error
SYS-GMM	Log of sectors output L1	.9377433	.0212629
	Log of labour	.4378456*	.7647738
	Log of Capital	.0134863	.0169159
	Log of private sector credit	-.1440133	.0803484
	Exchange rate	.0000726**	.0008164
	inflation rate	-.0155512*	.0083785
	Log of trade openness	.1460199	.0942963
	Log of GDP	.1483075**	.0766809
	Lending rate	.0098604**	.0032791
	Constant	-9.36387	12.24275

Wald chi2(9)   =   20076.58, Prob> chi2   =   0.0000
** statistical significance at 5%.** *statistical significance at 1%
Source: Authors Computation

Also the sign of credit to the private sector changed to negative. The implication is that, even if the total credit to the economy increases the credit availability to the individual sectors might not increase. The dynamic panel model is statistically significant at 5% level with Wald Chi2 value of *20076.58*.

Inferences and comparison with previous empirical results

This research effort appears to be few of the panel analysis for sectors in Nigeria. What has been common to previous empirical studies is individual sector analysis. Consequently, major comparison is made with the individual sectors results by the previous authors. Firstly, all the variables used in the model as determinants appear to important determinants of sectorial growth in Nigeria. This is as a result of the R square values in all the panel models and the test of the overall significance of all the models from the static panel models to the dynamic panel models. It will be recalled that Sangosanya and Awoyemi (2011) made use of almost the same factors for manufacturing sector only in Nigeria and the author found that they are all significant in determining the growth of manufacturing sector in Nigeria.

The results confirm the importance of labour as an important input in the sectors. Capital did not show significant impact on the sectors output and the reason for this might not be unconnected with the inadequate funding of the sectors. This is shown through the non-significance of the credit to the private sector which is an indicator of level of fund availability to the sectors. Kayode 2000 has observed in his study that the dearth of fund in major sectors in Nigeria has been inhibiting the growth of the real sectors in Nigeria.

Another important inference from the result is the relationship between the outputs and the exchange rate. The results show that exchange rate exhibit a direct significant relationship with the sectors output. This is in support of currency devaluation as an impetus to promote the growth of the output. Notwithstanding, several authors like Somoye 2009, Olomola 2010 among others have emphasized the need to avoid what is called over-valuation of naira so as not to squeeze out the productive sectors in Nigeria.

Inflation has been shown from the findings of the study as significantly precarious to the growth of productive sectors in Nigeria especially when it becomes more volatile. The dynamic panel results show that inflation rate have significant negative impact on the output. The implication is that for inflation to be a

concomitant factor in promoting economic growth, volatility in it should be guided against as it can have significant adverse effect in sectors output. Consequently, dynamics in inflation rate has been shown from the study as very precarious to the growth of sectors in Nigeria.

Again, as a support to the earlier position of inadequate fund to the sectors, the credit to the private sector does not have significant impact on the output also capital. The inadequacy of capital might be as a result of low credit availability to the sector.

Notwithstanding, lending rate increase has been shown to be dis-incentive to sectorial growth in Nigeria. This result is similar to Dauda (2004), Ogun (2007) among others findings. Apart from the fact that the result conform to economic theory, it also tallies with the findings of many empirical studies both on Nigeria and outside Nigeria.

Finally, trade openness has been shown not to have significant positive impact on the output of the sectors. The MRW model Mankiw ,Romer and Weil (1992) has also shown that for most developing economies trade protectionist theory might be more suitable. Our result has supported this position by showing that the more open the Nigeria economy the less the growth of the sectors.

5. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION

Following the findings from the study, it can be concluded that there exist a direct relationship between Exchange Rate and sectorial output growth. It implies that the output of the sector appears to be positive responsive to rise in exchange rate. In order words, the higher the exchange rate, the higher the sectorial growth. This conclusion is in support of devaluation policy as a catalyst to boost output. Also, from our result labour had shown to have positive relationship with sectorial output growth and also significant which confirms the importance of this variable to sectorial output in Nigerian economy.

Capital also has a direct relationship with sectorial growth but not showing any significance and this can be attributed to the fact that there is inadequate funding to these sectors under review. Also credit to private sector has positive relationship with sectorial growth but not significant, lending rate showed a direct relationship with sectorial output growth but not showing any significant impact on growth of the sectors and this might be the reason for the non-significance of the credit to the private sector which also culminated in the inadequate capital. Moreover, there appears to be linkage among the three results obtained on the relationship between capital, credit to private sector, lending rate and sectors output.

Inflation has indirect relationship with sectorial output growth which follows the aprori expectation from the study. This is an indication that inflation might have precarious implications on growth of output in productive sectors in Nigeria. Finally, trade openness has a positive relationship with sectorial growth but not significant. The implication is that Nigerian sectors appear not to have benefited significantly from their international trade relationship therefore a relative level of trade protection might be necessary in the economy.

POLICY RECOMMENDATIONS

Firstly, an overvalued currency has the tendency of squeezing out the real sector of an economy and this is harmful to sectorial growth in Nigerian economy. The monetary authorities in Nigeria must try to avoid a situation where naira loss its competitiveness in the foreign exchange market as a result of overvaluation. Because failure to do this might spelt doom on productive sectors in the country.

Secondly, **i**mplications from the findings of the study show that contractionary monetary policy which borders on high lending rate may be inimical to sectors output growth in Nigeria. Consequently, a relatively low but competitive interest rate (lending rate) is advised. This might likely aid sectorial growth in Nigeria

Thirdly, **f**unding of the sectors in Nigeria has been shown from the result of the study to be grossly inadequate. The credit to the private sector and capital fail to have significant impact on sectorial growth. The implication is that fund should be made available to real sectors of the economy. In order to increase sectorial output growth, soft loan should be provided by government to sectors in Nigeria and such loan should be supervised and monitored.Following finding from this study, trade openness had not shown a very significance on the sectorial growth. The implication is that the more the economy is opened the less the growth of the sector. In view of this, the openness of the economy should be reasonably controlled so as to increase the output growth of the sectors in Nigeria.

Conclusively,finding from the study was shown that inflation has a negative relationship with growth of the sectors. The implication is that for inflation to be a concomitant factor in promoting economic growth, volatility in it should be guided against as it can have significant adverse effect in sectors output.

REFERENCES

[1]. Ajakaiye, (1989) in Central Bank of Nigeria Bullion Vol.13 No2 April/June.
[2]. Ajakaiye, 1995.Short Run Macroeconomic Effects of Bank Lending Rates in Nigeria 1987–1991. AERC Research Paper, 34. Nairobi, Kenya.
[3]. Akinbosede, (1990). Thirty years of Agricultural Development problems and prospect in the Nigerian interpreter
[4]. Akinboyo, O.L. (2008). "Five decades of agricultural policies: What role has statistics played? CBN Bullion, 32: 134 – 165
[5]. Eboh, E. C. Oji, O. K. Amakom, U. S. Ujah, O. C. (2004). Towards the ECOWAS common agricultural policy framework: Nigeria case study and regional analysis;" Report submitted to Associates for International Resources and Development (AIRD), Cambridge, USA, for USAID/WEST AFRICA. pp. 3 – 7.
[6]. Eboh, E. C. Larsen, B. Oji, K. O. Achike, A. I. Ujah, O. C. Oduh, Amakom, Nzeh (2006).Renewable Natural Resources, Sustainable Economic Growth and Poverty Reduction in Nigeria."AIAE Research Paper 1. African Institute for Applied Economics (AIAE), Enugu. pp. 4 – 6
[7]. Gollin, D. Parente,S. L. and Rogerson, R. (2002). "The role of agriculture in development" American Economic Review 92(2): 160-164
[8]. Greenwood, J and Jovanovic. (1990).Financial Development, Growth and the Distribution of Income.Journal of Political Economy, 98,October.
[9]. Gurley, J. G. and Shaw, E. S. (1955) .Financial Aspects of Economic Development.The American Economic Review, 45(4):515-538.
[10]. "Foreign Aid and Revenue Response: Does the Composition of Aid Matter?" International Monetary Fund, IMF Working Papers: 03/176, 2003).
[11]. Gupta, S. B. J. Clements, Pivovarsky and Tiongson, E. R.Hale, Nigeria's economy dominated by Oil.BBC news 2002 Jan 16.
[12]. Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. Journal of Economic Literature.
[13]. Lewis, W. A. (1954)."Economic development with unlimited supplies of labour".Manchester School Economics and Social Study 22, 139-192
[14]. Obadan, M. I. (1994)."Nigeria's Exchange Rate Policy and Management" National Centre for Economic Management and Administration (NCEMA) Monographs Series.No.5, NCEMA Publication, Ibadan.
[15]. Odularu, G. O. (2008) Crude Oil and Nigeria Economy, Nigeria, http://www.ogbus.ru/eng/
[16]. Ogen, (2007). The Agriculture sector and Nigeria's Development: Comparative Perspective from the Brazilian Agro-Industrial Economy 1960-1995.
[17]. Oluwasanmi, H. A. (1966). Agriculture and Nigeria's Economic Development Ibadan: Ibadan University Press
[18]. Todaro, and Smith, (2003).Economic development. 8th ed, Singapore: Pearson Education
[19]. Tombofa, S. S. (2004). Development economics.an introduction. Port Harcourt: Pearl Publishers
[20]. Tsakok, I. Gardner, B. (2007). "Agriculture in economic development: Primary engine of growth or chicken and egg?" American Journal of Agricultural Economics,89(5): 1145-51.
[21]. Ukoha, O. O. (2000): "Determinants of Manufacturing Capacity Utilization in Nigeria, 1970 1998". The Nigeria Journal of Economics and Social Studies, Vol. 42 (2): 121-130
[22]. Yao, S. (2000). "How important is agriculture in China's economic growth?" OxfordDevelopment Studies 28 (1): 33-49.
[23]. Yesufu, T. M. (2000): The Human factor in National Development in Nigeria, Ibadan : Spectrum books