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Effectiveness of Economic Diversification on Economic Growth in Africa: The Nigerian Experience.

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Abstract
The study investigates empirically the effectiveness of economic diversification on economic growth in Africa with a particular reference to Nigeria using annual time series data spanning from 1970 to 2017. The main objectives of the study are to examine the effect of agricultural revenue, trade revenue and tourism revenue on the Nigerian economy over the periods under review. The study adopts Augmented Dickey Fuller (ADF) and Philips Perron unit root tests to examine the stationary status of all the variables employed and the results of the both tests show that all the variables (GDP, AGRICR, TRADER and TOURR) were stationary after differencing them once. The Johanson co integration results and the Error Correction Mechanism (ECM) results show that the variables exhibit a long run relationship and that there is a reasonable speed of adjustment in case of disequilibrium in the short run. This implies that economic diversification in the key sectors like agriculture, trade and tourism have improved the revenue base of Nigeria and consequently stimulated growth within the periods under review. Based on the above findings, the study submits ; inter-alia, that agriculture, trade and tourism should be more funded and equipped by the government to ensure good outputs and maximum contributions to the growth of Nigerian economy.

Key Words: *Economic Diversification, Economic growth and Nigeria.*

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I. Introduction

The issue of economic diversification has attracted the attention of policy makers and financial analysts especially now that there is economic recession and a fall in the price of oil in international market generally in Africa and particularly in Nigeria. Many studies have documented that economic diversification has brought about economic development in recent years (e.g. Subera, Ajala, Akande & Olure-Bank, 2015; Godwin & Ubong, 2015 and Khodayi, Darabi & Khodayi, 2014). A recent study by the International Monetary Fund (2016) showed that the significant and prolonged drop in oil prices since mid-2014 has changed the fortunes of Nigeria and many other African nations engaged in oil export. Thus, findings from the report on budgets in oil exporting nations have generally turned out from surpluses to large deficits, growth has slowed down, and financial stability risks have increased. The report stressed that in such a challenging environment, a policy of "business as usual" will not suffice—policymakers will need to adopt a significant measure such as economic diversification in certain sectors, to put public budgets on a sounder footing, address risks to liquidity and the quality of assets in the financial sector in order to improve growth prospects.

A review of the Federal Government revenue profile in the last half-decade showed that oil earnings accounted for over 80.0 per cent of the foreign exchange earnings, while the non-oil sector, despite its improved performance, contributed 20.0 per cent (CBN, 2013), thus revealing the extent of the vulnerability of the economy to swings in the price of oil in the international market. The renewed emphasis on the production of Shale oil in the United States and other alternatives to fossil-fuel energy, such as solar, wind and bioenergy in the advanced economies, has reduces oil demand and price, and further weaken Nigerian earnings. Thus, in the absence of concerted efforts to shore-up and widen the revenue base, there will be reduction in crude oil revenue and excess crude oil receipts savings in the coming years with grave macroeconomic implications. The performance of the non-oil export sector such as agricultural sector, trade and tourism sector in the past three decades leaves little or nothing to be desired, in spite of the efforts to promote non-oil exports in Nigeria

(Abogan, Akinola & Baruwa, 2014). This is the more reasons why African countries particularly Nigeria requires economic diversification in such key sectors to safeguard the economy.

Thus, the depressed economic situation of Africa and indeed Nigeria occasioned by the recent fall in the price of oil in international market has called for urgent need for economic diversification. The policy concern over the years has therefore been to expand non-oil export in a bid to diversify the nation's export base (Adedipe, 2004). Again, following the drop in crude prices from a peak of $114 per barrel in July 2014 to as low as $33/barrel in January 2016, the country's total reserves have suffered great pressure from speculative attacks, round tripping and front loading activities by actors in the forex market (CBN Quarterly Reports, 2016). This fall in oil prices also implied that the Central Bank of Nigeria's (CBN) monthly forex earnings has fallen from as high as $3.2 billion to current levels of as low as $1billion (CBN Quarterly Reports, 2016). Yet, the demand for foreign exchange by mostly domestic importers has remained unabated. The net effect of these combined forces unfortunately is the depletion of the country's forex reserves and pressure on the naira. The major task of this paper is to determine whether agricultral revenue, trade revenue and tourism revenue have any significant effect on the diversification of the Nigerian economy. The rest of the paper is organized as follows ; section II presents the theoretical and empirical evidence, section III contains the methodological issues, section IV discusses the empirical results while section V concludes.

II. Theoretical And Empirical Evidence

This paper adopts the theory of growth rate maximization as was developed by Robin Marris (1964) with the aim of introducing balanced growth maximizing model of a firm. This theory is based on the assumption that product diversification gives way for price structure, production costs and firms' growth. He opined that firms pursue diversification mainly because of financial motives and growth of the economy. Firms with enough managerial and financial capacity could easily diversify into other industries since diversification is perceived as investment behaviour which will in turn increase the level of economic growth in the country. The theory says that a country should export products in which it is more productive than other countries: that is, goods for which it can produce more output per unit of input than others can while importing those goods where it is less productive than other countries. This theory is relevant to the present day study because the issue of economic diversification is a resource based concept. The availability of natural endowment is a function of where a country diversify.

However, empirical works relating to the issue of economic diversification and economic development have been scanty. This could be attributed to the fact that the issue of economic diversification is a new concept in economic literature. A few of such empirical works include a recent study by Maria (2015) who investigated on the economic diversification in Nigeria in the face of dwindling oil revenue using time series data spanning from 1970 to 2013. The study adopted a descriptive statistical method and simple econometric methodology and found that there exist a positive relationship between economic growth in Nigeria and diversification of other sectors. Michael and Anthony (2015) studied on economic diversification for sustainable development in Nigeria between 1960 to 2009. The study employed a descriptive and analytical approach and found that the generated revenue is not effectively invested on diversification of the economy to develop a robust and a stable economy. They therefore concluded that Nigeria should pragmatically address the challenges of poor industrialization to diversify her economy.

In a related study, Subera, Ajala, Akande and Olure-Bank (2015) investigated on the diversification of the Nigerian economy towards a sustainable growth and economic development using a descriptive method of analysis. The study found that considering Nigeria's peculiar circumstances and the successes recorded before the advent of oil, for Nigeria to break loose from the problems inherent in a mono-economy, especially one largely dominated by oil, which is subject to depletion, international price shocks and unfavorable quota arrangement, there is need for diversification. The study suggested that agriculture sector is the possible options for diversifying the Nigerian economy. Muttaka (2015) examined the effect of Nigeria's oil dependency on economic growth. He observed that Nigeria has wasted much of its opportunities to break away from underdevelopment despite its massive natural and human resources endowment due to heavy reliance on her huge crude oil resources, regrettably mismanaged, as the major source of revenue. He identified and discussed on some key drivers of economic diversification such as investment, governance and regional dimensions of economic diversification as well as human and natural resources. He maintained that of all the other drivers, good governance remains a prerequisite in building an enabling environment for such diversification.

Khodayi, Darabi and Khodayi (2014) studied on export diversification and economic growth in some selected developing countries using time series data spanning from 2000 to 2009. Adopting a Generalized Method of Moment (GMM), the study showed that reducing export specialization and consequently increasing export diversification have significantly positive effect on the rate of economic growth of these countries. Again, Nwanne (2014) assessed the relationship between diversification of non oil export product and economic growth in Nigeria from 1981 to 2014. The study adopted OLS involving unit root test, co integration

and error correction mechanism. The result reveals that all the variables included in the model were co integrated, which confirms the long run relationship between the variables. The study further documented that there is a significant relationship between diversification of non oil sector and economic growth in Nigeria. Ayeni (2013) studied on predicting the effect of economic diversification on sustainable tourism development in Nigeria. The study was carried out using the quantitative method of data collection within the tourism sector and the study showed te empirical effect of tourism on the Nigerian economy and concludes that tourism would be of immense benefit to the Nigerian economy. Godwin and Ubong (2015) investigated on economic diversification and economic growth: evidence from Nigeria using a time series data spanning from 1981 to 2011. Adopting the error correction mechanism (ECM), the result points to the fact that, Nigeria could tap from her largely untapped trade potentials for sustained gains, both in the short run and long run. Their findings indicate the fact that this can greatly be achieved through conscious efforts at diversifying the economy, encouraging large-scale industrialization of the non-oil (real) sector of the economy, emphasizing deepening technology in every trade and investment discourse, sustaining the recent improvements in the agricultural sub-sector, amongst other factors.

Adesoji and Sotubo (2013) studied non oil exports in the economic growth of Nigeria focusing on agricultural sector and mineral resources using ordinary least square and co-integration analyses. The study revealed that non-oil exports have performed below expectations given reason to doubt the effectiveness of the expert promotion strategies that have been adopted in the Nigeria economy. Onodugo, Ikpe and Anowor (2013) used the augmented production function (APT) and endogenous growth model (EGM) in evaluating the effect of non-oil expert on economic growth in Nigeria. The study indicates that there is a very weak and infinite small impact of non -oil expert in influencing rate of change in the level of economic growth in Nigeria .Nwachukwu (2014) examined the impact of non-oil export strategies on economic growth in Nigeria from 1970 to 2013 using regression analysis. it was observed that Infrastructure bears a negative relationship with the GDP and credit from commercial bank and tariffs have positively affected economic growth in Nigeria. Olabanji and Henry (2013) used co-integration test and granger causality test in investigating the causal link between non-oil exports and economic growth in Nigeria. it was discovered that government must diversify the product base of the economy, promote non-oil exports, and build up an efficient service infrastructure to derive private domestic and foreign investment. Kolawole and Henry (2012) investigate the relationship between FDI, non –oil exports and economic growth in Nigeria using causality analysis of the relevant variables. The study revealed that a unidirectional causality runs from FDI to non -oil exports. Abogan, Akinola and Baruwa (2014) used ordinary least square involving error correction model to investigate the effect of non-oil export on economic growth in Nigeria. The study reveals that the effect of non-oil export impacted positively by 26% on the productive capacity of goods and services in Nigeria during the period under review.

III. Methodological Issues

Model Specification

Following the modeling approach of Romer (1989):, we can specify our model in its implicit functional form as:

$GDP_t = (AGRICR, TRADER, TOURR)$ (1)

Where;

GDP is the gross domestic product as a proxy to economic growth;

AGRICR captures the revenue arising from the agricultural sector;

TRADER is the revenue from the foreign transaction of other countries; and

TOURR is the revenue from tourism

In order to transform the model into an explicit form, we specify as follows;

$GDP_t = a_0 + a_1GDP_{t-1} + a_2AGRICR + a_3TRADER + a_4TOUR + U_t$ (2)

Taking logarithms of both sides of the equation; we have,

$LogGDP_t = a_0 + a_1logGDPt_{-1} + a_2logAGRICR + a_3logTRADER + a_4logTOURR + U_t$ (3)

Where;

a_0 = constant and a_1 to a_4 = coefficients,

$logGDP_t$ = log of real Gross Domestic Product (GDP) growth in time t,

$logGDP_{t-1}$ = log of lagged GDP in one year,

logAGRICR = log of Revenue from Agricultural sector

logTRADER = log of Revenue from Foreign Trade,

logTOURR = log of Revenue arising from Tourism sector.

Ut = Disturbance element.

Apriori, it is expected that $a_1>0$, $a_2>0$, $a_3>0$, $a_4<0$,

However, the study first began with examining the non-stationarity and the order of integration for both the AGRICR, TRADER and the TOURR by employing the Augmented Dickey-Fuller (ADF) and the Philips-Perron (PP) unit root tests, which use a null hypothesis of stationarity. For all the unit root tests, if non-

stationarity is not rejected, the variable will have to be differenced once or more until stationarity is achieved. Economic literature suggests that the number of differencing taken before the series become stationary is then the order of integration, that is; I(d). Therefore, the study employs the Augmented Dickey-Fuller (ADF) test based on the following regression:

$\boldsymbol{\Delta}y_t = + \boldsymbol{\beta}t + \alpha y_{t-1} + \sum_{i=1}^{k} di\ \boldsymbol{\Delta}y_{t-1} + \mu_t$ (4)

Where μ_t is a white noise error term and $\boldsymbol{\Delta}y_{t-1} = y_{t-1} - y_{t-2}$; $\boldsymbol{\Delta}y_{t-2} = y_{t-2} - y_{t-3}$ and so on. Equation 4 tests the null hypothesis of a unit root against a trend stationary alternative. The Phillips-Perron (PP) test was equally conducted with models similar to that of ADF approach on the variables but with Newey-West non-parametric correction for poss ible autocorrelation rather than the lagged variables method employed in the ADF test. The equation (5) below reports the Philips-Perron (PP) specification:

$y_1 = \delta_1 + \Upsilon y_{t-1} + \Upsilon_t \boldsymbol{\Delta}y_{t-1} + - - - + \Upsilon_p \boldsymbol{\Delta}y_{t-p} + \mu_t$ (5)

where $\delta 1$ may be zero, φ or $\varphi + \boldsymbol{\beta}$. The Philips-Perron equation is however regarded as a modified version of the Dickey-Fuller test (Philip and Perron, 1988).

However, if two time series are found to be integrated of the same order, the implication is that such study can proceed to conduct a co integration test. Consequently, the study also employed a co integration test after ascertaining that the variables are stationary at a particular order. Thus, the Johansen cointegration specification for the existence of cointegration vectors is therefore stated as follows:

$\boldsymbol{\Delta}v_t = \phi v_{t-1} + \sum_{i=1}^{k} \lambda 1 \boldsymbol{\Delta}_{t-1} + \mu_t$ (6)

However, if the study finds the existence of one integrating relation between the variables, we proceed to derive the Error Correction Mechanism (ECM) of the form as specified below;

$\boldsymbol{\Delta}LGDP_t = \mu_1 + \sum_{j=1}^{k-1} \Gamma 11(j) + \boldsymbol{\Delta}LGDP_{t-j} + \sum_{j=1}^{k-i} \Gamma 12(j) LAGRICR_{t-j} + \Pi_{11} LTRADER_{t-k} + \Pi_{12} LTOURR_{t-j}$ (7)

Where the matrix Γ represents the short run dynamics of the relationship between the variables and the matrix Π captures the long run information in the data. All data were sourced from CBN quarterly and annual reports and statistical bulletin 2015

IV. Results And Discussion

Unit Root Tests

Table 1 below shows the result of the unit root tests of ADF and PP for the variables, which included the GDP, AGRICR, TRADER and TOURR. With evidence of unit roots, the series are said to be integrated of order one I(1), meaning that they must be modeled in first difference ($\Delta yt = yt - yt\ -1$) to make them stationary. A time series is stationary if it does not change overtime, which implies that its values have constant variability. This enables us to avoid the problems of spurious regressions that are associated with non-stationary time series models. After testing for unit roots, we proceed to test for co-integration (long run relationship between variables). This study uses Johansen and Juselius's (1991) definition of co-integration. Johansen's co-integration procedure was used to test for the possibility of at least one co-integrating vector between variables in the models developed for the Nigerian economy.

Table 1: Summary of ADF and PP Unit Root tests

Variables	Level		First Difference	
	ADF*	ADF**	PP*	PP**
LGDP	0.7897	0.2258	-5.6129	-5.7961
LAGRICR	3.8248	2.1805	-4.4525	-4.9078
LTRADER	3.0001	3.2082	-5.4856	-5.6124
LTOURR	5.4546	4.5551	-4.9611	-3.9294

ADF* and PP* indicate unit root test with intercept
ADF** and PP** indicate unit root test with trend and intercept
McKinnon (1991) Critical Values with intercept -3.5550 (1%), -2.9155 (5%) and -2.5956 (10%)
McKinnon (1991) Critical Values with trend and intercept -4.1338 (1%), -34937 (5%) and -3.1757 (10%).
Source: E-view 9.0

All the variables were non stationary but integrated of order one, that is I(1) in both ADF and PP tests.

The results of the co-integration test allows the paper to examine the long run relationship among the variables. The result shows that there was at least one co-integration relationship among the variables in the model. The evidence of multivariate co-integration test results suggest that economic diversification in Africa and indeed in Nigeria through agriculture, trade and tourism and economic development is co-integrated. That is, these variables move together in the long run. However, the short-run estimates show that about 85 percent of the variation in the dependent variable which is economic growth is explained by the independent variables,

which are revenue arising from agriculture, trade and tourism. Most of the variables are not statistically significant indicating that the model cannot the completely be relied on to explain the incidence of economic diversification in Nigeria within the periods under study. For instance, diversification through tourism was found to be statistically insignificant though positive. This implies that tourism sector has not been well diversified to spur the needed economic growth and development. Quite interestingly, the result of the agriculture, which has been the main economic base of the country before oil was statistically significant, implying that diversification through agriculture is gradually gaining ground in the economy. The Durbin Watson result, which is 0.7 indicates that there is presence of autocorrelation in the model.

V. **Discussion**

As earlier noted, the overall regression estimates has shown that economic diversification in certain sectors such as agriculture, trade and tourism will go a long way in stimulating economic growth in Nigeria. This is so because the estimates showed that the co-efficient of determination R^2 is 85 percent, indicating that the variation in the dependent variable (GDP) is explained by changes in exogenous variables including agriculture, trade and tourism. From the short run regression estimates, revenue arising from agricultural diversification is found to be statistically significant. For instance, the coefficient of agriculture was found to be 1.371857, indicating that a one percent rise in the diversification of agricultural sector may have increased economic growth in Nigeria by 1.4 percent point. The implication of this findings suggests that diversification through agriculture in Nigeria has brought about a rise in economic development in Nigeria within the period under study. This empirical evidence seems to coincide with the recent study of those of Subera, Ajala, Akande and Olure-Bank (2015) who investigated on the diversification of the Nigerian economy towards a sustainable growth and economic development using a descriptive method of analysis. Their study found that agricultural sector is the possible options for diversifying the Nigerian economy.

Subsequently, our evidence also showed that the coefficient of trade was 8.381757, which is positive and highly statistically significant. This indicates that a one percent rise in revenue arising from trade diversification will increase economic growth by 8.4 percent point. This evidence is also in line with the study of Godwin and Ubong (2015) who investigated on economic diversification and economic growth: evidence from Nigeria using a time series data spanning from 1981 to 2011. Adopting the error correction mechanism (ECM), the result points to the fact that, Nigeria could tap from her largely untapped trade potentials for sustained gains, both in the short run and long run. Their findings indicate the fact that this can greatly be achieved through conscious efforts at diversifying the economy, encouraging large-scale industrialization of the non-oil (real) sector of the economy, emphasizing deepening technology in every trade and investment discourse, sustaining the recent improvements in the agricultural sub-sector, amongst other factors.

The result of parsimonious model as reported above indicates model parsimony. Thus, this result clearly showed a well defined error correction term, and indicates a feedback of 98 percent of the previous year's disequilibrium from the long run economic diversification and the elasticity of real economic growth in Nigeria. The implication of this result is that both economic diversification and revenue arising from agriculture, trade and tourism maintained equilibrium with the GDP through time. The effects of these disequilibria error corrections is not only large, but also have negative signs as expected. The strong significance of the coefficient of ECM_{t-1} supports our earlier assertion that GDP indeed cointegrates with economic diversification in Nigeria.

However, we previously showed that all variables under consideration are cointegrated at 5 percent and 10 percent critical level, i.e. there is a long-run relationship among them. In the short-run, there may be disequilibrium in which the estimated model, that is;

$$Ut = GDP - (27.36 + 1.37AGRICR + 8.38TRADER + 8.02TOURR \quad (8)$$

is the "equilibrium error". Therefore, the error term is used to show the short-run behaviour of the GDP to its long-run values. We can now specify the ECM equation for this study as:

$$\Delta GDP_t = a_0 + a_1\Delta AGRICR_t + a_2\Delta TRADER_t + a_3\Delta TOURR_t + a_4ECM_{t-1} + \varepsilon_t \quad (9)$$

Where;

Δ denotes the difference operator; ε_t is the disturbance element, and

$ECM_{t-1} = (GDP - a0 - a_1AGRICR_{t-1} - a_2TRADER_{t-1} - a_3TOURR_{t-1})$, that is, the one-period lagged value of the error from the cointegrating regression. The ECM_{t-1} equation above states that ΔGDP depends on change in the explanatory variables and also on equilibrium error term that determines the short-run behavior of the model. The ECM_{t-1} equation is estimated through the use of E-view 9.0 and the result extracted from the E-view output as reported in table 4 above. Since, ECM_{t-1} is positive (i.e. GDP is above its equilibrium value), a_6ECM_{t-1} will need to be negative which will cause ΔGDP_t to be negative. This led GDP_t to fall in period t. Thus, the absolute value of $a_4(1.000)$ decides how quickly the equilibrium is restored, that is; U_{t-1} is the mechanism that adjust to the long-run equilibrium by a unit of any distortion that may occur in the short-run. The estimated ECM_{t-1} equation above showed that the short-run changes in all the exogenous variables have positive and significant

impact on the short-run changes in the endogenous variable GDP. Therefore, the estimated parameters, that is; a_1 to a_3 are the short-run marginal effect of economic diversification on economic development in Nigeria.

VI. Conclusions

From the analysis so far, it can be inferred that economic diversification is the only option left for depressed economies in Africa. In Nigeria, economic diversification is necessary especially now that the prices of oil at international market are fallen drastically. Consequently, the only option that will save Nigeria from her economic depression now or in future is to diversify key sectors. Equally, government must have the political will to develop a heterogeneous economy in order to achieve this objective. This is the only option to drive Nigerian economy forward and make it more productive and viable. Finally, it is only when Nigeria diversify certain key sectors such agriculture, trade and tourism that economic growth would be achieved.

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