Global Journal of Arts, Humanities and Social Sciences
Vol.8, No. 5, pp.51-66, May 2020
Published by ECRTD-UK
Print ISSN: 2052-6350(Print), Online ISSN: 2052-6369(Online)

DIVERSIFYING THE NIGERIAN ECONOMY: LEVERAGING ON TAX REVENUE SUPERSTRUCTURE AND THE HUMAN CAPITAL INFRASTRUCTURE

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ABSTRACT: *This paper is set to empirically investigate the dynamics of tax revenue and human capital development in accelerating the rate of diversification of the Nigerian economy in view of de-escalating the role of petroleum in the global economy. To achieve this, Error-Correction Modeling approach was adopted for a period of between 1980 and 2018. This study revealed that the coefficients of human capital development, as captured by Human Development Index (HDI), Ease of Doing Business (EDB), and Tax Revenue (TXR), were all statistically germane, suggesting that these variables were critical in improving the growth rate of the Nigerian economy, hence, significant and pivotal to diversifying the Nigerian economy. Also, from the result, the coefficient of the speed of adjustment indicated that it would take about 71 percent for growth rate of the Nigerian economy to respond to changes in any of the explanatory variables. The paper therefore recommended that adequate measures be put in place towards creating the enabling economic environment that will stimulate foreign and domestic investments, which will improve tax base, thereby contributing to economic growth.*

KEY WORDS: ease of doing business, diversification, resource-rich economies, **HDI**

JEL: O15, Q35, Q38

INTRODUCTION

Human **capital** infrastructure is the superstructure upon which modern economies that are driven by diversification and transformation can leverage on to attain predetermined macroeconomic goals. It is no longer fashionable to build an economy around physical and natural resource endowments alone. In the 17th and 18th Centuries, when Mercantilist philosophy held sway, the wealth of a Nation was assumed to be conditioned and determined by the number of physical and natural resources the Nation is endowed with or able to accumulate. This could be in the form of gold or precious metals. In the late 19th and 20th Centuries, precious metals were replaced by crude oil resources. In the 21st Century, the crude oil economy is being dwarfed by scientific innovations and Information Communication Technology (ICT), powered by human capital

infrastructure. But according to Rainis (1991); Bulmer-Thomas (1994); Sach &Warner (1995,1997); Lal & Myint (1996); Auty (2001); & Akanni (2007), most of the Resource-Rich Economies (RREs) are paradoxically among the poorest in terms of all economic indicators. They averred that the availability of natural resources does not necessarily imply a resource rich economy. In their opinion, most RREs lag behind when their economic strength and prosperity are only predicated on physical resource endowments. On the basis of commodity price volatility and incongruent demand and supply of the commodity, their economies become highly unpredictable and susceptible to world economic vagaries that influence resource demand. Gylfason (2001) & Akanni (2007) noted that for the past five decades, almost all members of the Organization of Petroleum Exporting Countries (OPEC) experienced a downward trend in their growth trajectory. This was basically adduced to the volatility of price of crude oil at the international oil market.

At the beginning of the 19th Century, Venezuela was ranked among the ten wealthiest nations, in spite of its enormous oil reserves; it is today downgraded to the level of a developing economy. In the same vein, Alaska is the only U.S. state with a negative growth rate over the past three decades, despite its extensive and abundant oil wealth and fishing industry. With enormous resource endowment in DR Congo, it ranked among the poorest nations on earth (Lay and Mahmoud, 2004). It was also confirmed by Auty and Mikesell (2000) that Nigeria, with its enormous oil wealth, the country's per capita income of 400 US Dollar is far below the 895 US Dollar projected by the United Nations. In 2019, the nation's per capita income was placed at about 87 US Dollar, based on the increase in minimum wage to Thirty Thousand Naira, this is even with an estimated oil rent of over 379 billion US Dollar received in the past Thirty years. This happens to be the lowest among OPEC member countries (Ovenseri-Ogbomo, 2019).

As observed by Akanni (2007), only four out of sixty-five countries classified as RREs could attain both long-term investment in excess of 28 percent of GDP and also able to maintain per capita GNP growth rate of 5 percent annually on the average in the past five decades. These include Botswana, Indonesia, Malaysia and Thailand. The strength of these three Asian countries attaining this height lies on economic diversification and industrialization adopted and not merely the sales of their mineral resources. Juxtapose this with the Ricardian position, which state that open economies are assumed to specialize in producing a specific range of goods, so that specialization is expected to accompany reduction in the impediments to trade (Sala-i-Martin & Subramanian, 2003). Diversification, when fully consummated will deepen the aggregate effect of sector-specific shocks. Gylfason (2001), Ovenseri-Ogbomo and Igbinedion (2019) observed that East Asian economies such as Hong Kong, South Korea, Singapore, and Taiwan are some of the countries that are less endowed with natural resources and yet are able to even surpass the growth trend of Indonesia, Malaysia, and Thailand. Akanni (2007), shows that countries with more oil rents do not have the tendency to experience economic growth. This idea corroborates Collier (2002) who gave three reasons why resource wealth is a problem to countries: price volatility from external shocks, poor governance associated with rent arising from natural resource wealth and lastly, natural resource wealth is crisis ridden as it generates income for different groups including rebel groups. This is the reason the term natural resource curse was coined. Also related here is the Dutch

Disease (DD), the term associated with negative effect of over reliance on a single booming export product on the manufacturing sector.

Traditional and the comparative trade theories of Ricardo posit that the global economies will be well off if countries specialize in the production of those goods they have comparative advantage at their production. The issue of diversification therefore, appears as a contradiction to the age old acclaimed comparative theory of trade. There is no gainsaying that comparative advantage cannot be static or permanent for a country hence, the assumption of perfectly competitive market in the comparative advantage trade theory is far from reality. Therefore the question of trying to innovate, invent, restructure and transform the economy, either through increased sophistication within the product space of the existing but threatened comparative advantage or complete shift in sectoral emphasis as the mainstay of the economy.

This research is therefore aimed at empirically determining how these constituents of the conducive environment of diversification have and can continue to help in enhancing economic growth in Nigeria.

This paper is decomposed into five sections. Following this section is section two which contains literature review and other conceptual issues, section three deals with theoretical stand point and framework of the paper as well as method of analysis. Section four and five emphasized respectively analysis of result, policy implications and concluding remarks.

LITERATURE REVIEW

Conceptual Issues

Klinger and Lederman (2004), saw diversification from two perspectives. On the one hand, they infer could be in the form of inside-the-frontier-innovation, in which a renewed importance is attached to an existing product probably as a result of discovered level of productivity. On the other hand, it could be in the form of on-the-frontier-innovation which involves the invention of entirely new product that confers patent right on the inventor. Cadot, Carrere and Strauss-Khan (2007) classified export diversification into extensive and intensive margins. They posit that diversification is based on the process of incremental product lines and that of incremental number of each product in the existing product lines. Botswana government (2011), in their economic diversification drive, following their medium to long term strategy 2011-2016, sees economic diversification in the following light: economic diversification means diversifying a country's source of growth and income in such a way that the country becomes more or less equally dependent on all sectors of the economy. Conversely, an economy is diversified if no sector is singled out as a major engine of the growth process. According to OECD Report 2010 as in Pauline Lectord (2013), diversification thrives in an environment consisting of infrastructure, human capital development, R & D, and transmission of information.

Dutch Disease Phenomenon

Nigeria is a classic example of a country experiencing the Dutch Disease (DD). With the enormity of financial resources that the nation has received it lag behind among the comity of nations in terms of all human development measuring parameters. According to the Organization of Petroleum Exporting Countries (OPEC) annual statistical bulletin (2019), Nigeria made over 85 trillion Naira (USD 236.2 billion) from crude oil sales from 2014 to 2018. The report also claimed that Nigeria is the 6th oil revenue earner in the World and the highest in Africa. The highest revenue received from oil was in 2014 and 2018 with over 27.1 billion Naira (USD 75.2 million) and 19.6 billion Naira (USD 54 million) respectively. With this revenue received from crude oil sales, the nation is ranked among the poorest in the world. There is high level of unemployment, inflation, low level of output and other myriad macroeconomic problems.

Corden and Neary (1982) developed the classic economic model describing Dutch disease. In the model, there is the non-traded good sector (this includes services and two traded good sectors: the booming sector and the lagging sector, also called the non-booming tradeable sector). The booming sector is in this case the oil sector. The lagging sector generally refers to manufacturing. A resource boom will affect this economy in two ways: ***resource movement effect*** and ***spending effect***. In the resource movement effect, the resource boom will increase the demand for labour, which will cause production to shift toward the booming sector, away from the lagging sector. Such an effect can be negligible, however, since the hydrocarbon and mineral sectors generally employ few people. The spending effect occurs as a result of the extra revenue brought in by the resource boom. It increases the demand for labour in the non-tradeble, shifting labour away from the lagging sector. This shift from the lagging sector to the non-tradeable sector is called indirect deindustrialization. As a result of the increased demand for non-traded goods, the price of these goods will increase. Prices in the traded good sector are set internationally, however, so they cannot change. This is an increase of the real exchange rate.

Akanni (2007) noted that an appreciation of the real exchange rate may shrink manufacturing exports and reduce investment from firms, since firms will not invest if they are not sure what the future economic conditions will be. There are also many other harmful effects often associated with Dutch disease, such as corruption and protectionist policies for affected lagging sector industries. Hence the government may not be able to carry out effective and sound macroeconomic, social and industrial policies (Polterovich and Popov, 2006).

THEORETICAL LITERATURE REVIEW

Diversification is a fundamental feature of developing countries. Kuznets (1971), Grossman and Helpman (1992), see diversification as the process development for the developing countries. To Kuznets, economic growth is synonymous with long term appreciation in ability to supply incrementally diverse economic goods and services to its population. And to Grossman, *et al.* (2007), for an economy to be said to be growing, it should have the ability to successively produce wide range of variety of goods in large quantity, which will be of high quality.

Diversification is a hedge against economic shocks and output volatility. Ramey and Ramey (1995) and Osakwe (2007), observed that output and export diversification protect a county against external shocks, at the same time, makes a country's level of output less volatile. These remedies are more associated with higher levels and stability of economic growth. Diversification is an issue with sectoral change. This is linked with the Graham paradox (1923), the Prebisch-Singer hypothesis (1959) and the endogenous growth theory. Considering the Graham Paradox, a drop of the assumption of the constant unit cost in the comparative cost analysis by comparative trade theory of David Ricardo, shows that unit cost of production falls in manufacturing sector compared to increase in unit cost of production in agriculture as output increases. This means that the manufacturing sector experiences increased productivity while that of agricultural sector reduced productivity.

The Prebisch-Singer Hypothesis (PSH) is basically on the disadvantage of the export of resource-based products. According to this model, export of primary products compared to that of manufacturing products confers falling terms of trade on the primary product exporters. In the case of the endogenous growth model, the sector a country specializes matters, as the agricultural sector is considered to be associated with either constant returns to scale or even decreasing returns to scale. The manufacturing sector is characterized with increasing returns to scale. The impulse of this theories is that diversification means changing from specializing in the sector with constant or decreasing returns to scale (agriculture) to the sector with increasing returns to scale (manufacturing). According to OECD Report (2010), diversification thrives in an environment consisting of infrastructure, human capital development, R & D, and transmission of information.

REVIEW OF EMPIRICAL LITERATURE

Many studies contribute empirical findings to the conclusion that natural resource abundant economies have tended to grow more slowly than economies without substantial resources (Auty, 2001a; Rainis, 1991; Bulmer-Thomas, 1994; Sachs and Warner, 1995, 1997; Lal and Myint, 1996). In a recent paper, Ding and Field (2005) continue the exploration of whether natural resource abundance leads to slower growth Tales. They distinguished between natural resource dependence (RD) and natural resource endowment (RE), estimating two models using World Bank data on national capital stocks. In a one-equation model they showed that RD has a negative effect on growth rates, apparently confirming the main results of the resource "curse" literature. RE, however, has a positive impact on growth. Then a three-equation recursive model was estimated by introducing endogenous human capital and allowing for endogeneity also in resource dependence. Here, the effects of natural resources on growth are not significant.

More importantly, in examining the channels through which natural resources transmit to the rest of the economy, a number of empirical studies have given support to the existence of Dutch disease. These include studies on Bolivia (Auty and Evia (2001), Venezuela (Rodriquez and Sachs, 1999), Mexico, Brazil and Venezuela (Auty, 1994), and Algeria, Ecuador, Indonesia, Nigeria and Venezuela (Fardmanesh, 1991).

A major problem with all of these papers is that they tend to predict a monotonic effect of resources on development that is not always consistent with the cross-country evidence (Acemoglu, Johnson & Robinson, 2002). Although the Dutch disease literature has a lengthy theoretical degree, it appears to be the empirically least important mechanism. For example, Spatafora and Warner (2001) examined 18 oil exporting developing countries, covering a period 1960s until the 1980s. They found that Dutch disease effects are strikingly absent.Another strand of the literature on economic growth, starting with early contributions by Knack and Keefer (1997) and Mauro (1995), has turned to the effects of good institutions on economic growth. It is fair to say that recent works, including Hall and Jones (1999), Acemoglu et al. (2002), Easterly and Levine (1997), Dollar and Kraay (2003), and Rodrik & Trebbi (2002), have concluded that institutions contribute to economic growth.

Vijayaraghavan and Ward (2004) examined the relationship between institutional infrastructure and economic growth rates across 43 nations during the years 1975-1990. Within the framework of the neoclassical growth model, their study integrates a broad set of institutional variables that .together proxy for the overall institutional infrastructure of an economy. Security of property rights, governance, political freedom and size of government are the indicators used in the study, facilitating identification of the most important institutions that account for the observed variations in economic growth rates among nations. Results indicate that security of property rights and size of government are the most significant institutions that explain the variations in economic growth rates.

There is also an extensive literature on the interrelationship between economic growth and democracy (Przeworski, Michael, Alvarez, Cheibub, & Limongi, (2000). Democracy is said to undermine investment (because of populist pressure for increased consumption) and to block good economic policies and reform because the governments in democratic societies are exposed to pressure from particular interests. Autocratic regimes are believed to be better suited than democracies to oppose pressures for the redistribution of income and resources coming from the poor majority of the population (Alesina & Rodrik, 1994).

Robinson et al. (2006) modeled a situation in which politicians in developing countries seem to have quite a large amount of autonomy from interest groups. This follows from the group formation effect postulated by Ross (2001), where increased oil wealth permits government to thwart the formation of social and pressure groups to demand political rights, or even influence the outcomes of elections, and increase resource misallocation in the rest of the economy (Mehlum et al., 2005). For example, in a study of effects of the oil boom in Nigeria, Gavin (1993) found that between 1973 and 1987 employment in all sectors contracted with the only exception being the service sector, which included government employment. This led to a highly bloated public sector. Government paid huge wage bills. More importantly, this effort was seen as a deliberate policy by the then government to stay in power despite an earlier promise to withdraw in 1975 (Gavin, 1993). Ross (2001) found that oil rents do inhibit democratic governance not only in the Middle East, as formally claimed in previous empirical studies, but also in other oil exporting countries like Indonesia, Malaysia, Mexico and Nigeria. Moreover, oil does greater damage to democracy in oil-

poor states than in oil-rich ones. Thus oil inhibits democracy even when exports are relatively small, particularly in poor states.

Majority of studies investigating the economic growth-resource curse nexus use version of the neoclassical growth model (Solow, 1956), augmented to include measures of human capital (from Mankiw, Romer and Weil, 1992) and such transmission mechanisms such as institutions, democracy or Dutch disease. Studies are yet to incorporate all these different transmission mechanisms in a single model for empirical analysis to assess their various implications for oil exporting African countries. This study intends to bridge this gap.

THEORETICAL FRAMEWORK

The model upon which the study is predicated is endogenous growth model. The foundation of the model is the neoclassical growth model. The neoclassical model accentuates the fact that long term economic growth results from physical capital (K) and labour force (L). Swan (1956) and Solow (1957) were among those who first demonstrated this. The neoclassical production function assumes constant returns to scale in labour and capital. The endogenous growth model essentially sees technical change to be influenced by expandable such as human capital accumulation and institutional variables, rather than been considered to be a variable unexplainable or "exogenous". In view of the forgoing, the Cobb-Douglas production function can be presented as follows:

$$Y_{(t)} = K_{(t)}^{\alpha} A_{(t)} L_{(t)}^{1-\alpha} \text{-------- } 0 < \alpha < 1 \quad \text{---------- (3.1)}$$

Where, Y_t = Output at time (t), K_t = Capital at time (t), A_t = The level of technology at time (t).

A and L are assumed to grow exogenously at rates of **n** and **g**. The growth of labour force (L) is defined as **n**, while the efficiency of each unit of labour (A) grows at the rate of **g**, therefore we can define labour force at time, t $L_{(t)}$ and the level of technology at time, t $A_{(t)}$ to be :

$$L_{(t)} = L_{(0)}e^{nt} \quad \text{---------- (3.2)}$$

$$A_{(t)} = A_{(0)}e^{gt} \quad \text{---------- (3.3)}$$

The Solow's model assumes that savings rates, **(s)** population growth **(n)** and technological progress (A) are all exogenously determined and that capital and labour are paid their marginal products. The number of effective units of labour $A_{(t)}$ $L_{(t)}$, grows at rate **n+g.** Many economists have asserted that the Solow model cannot account for the differentials in income among different countries of the world. This shortcoming of the Solow model stimulated an improved model which is referred to as the endogenous growth model, developed by Romer (1987, 1989). The model postulated that saving is positively related to growth and that it has a positive externality from capital accumulation. The second model of Romer (1990), takes a different approach to account

for technological progress. In this model, he saw knowledge as part of the aggregate capital (k). The model assumed that technological knowledge is labour-augmented, thereby acting as a pivot to labour productivity. The production function is expressed as:

$$Y = K^{\alpha}(AL)^{1-\alpha} \quad \text{---------- (3.4)}$$

Where; AL = Knowledge – adjusted workforce

If **sk** is the fraction of income invested in physical capital and **sh** is the proportion invested in human capital, the given economy is determined by

$$\dot{k}_{(t)} = sky_{(t)} - (n+g+\delta)\, k_{(t)} \quad \text{---------- (3.5)}$$

$$\dot{h}_{(t)} = shy_{(t)} - (n+g+\delta)h_{(t)} \quad \text{---------- (3.6)}$$

Where; y - Y/AL (ratio of per capital income to effective unit of labour), k - K/AL (ratio of physical capital to effective unit of labour), h - H/AL (ratio of human capital to effective unit of labour). Equation (3.5) and (3.6) indicate that the economy converges to a steady state defined as:

$$K^{*} = \left[\frac{S_k{}^{1-\beta} S^{\beta} h}{n+g+\delta}\right] 1/1-\alpha-\beta \quad \text{---------- (3.7a)}$$

$$h^{*} = \left[\frac{S_k{}^{\alpha} S_h{}^{1-\alpha}}{n+g+\delta}\right] 1/1-\alpha-\beta \quad \text{---------- (3.7b)}$$

Substituting (3.7a) and (3.7b) into the production function in equation (3.5) and (3.6) and taking logs give

$$\ln\left(\frac{Y_{(t)}}{L_{(t)}}\right) = \ln A(0) + gt - \frac{\alpha+\beta}{1-\alpha-\beta}\ln(n+g+\delta) + \frac{\alpha}{1-\alpha-\beta}\ln(sk) + \frac{\beta}{1-\alpha-\beta}\ln(sh) \text{ --- (3.8)}$$

Equation (3.8) implies that income per capita is a function of population growth and accumulation of physical and human capital. The augmented Solow model is also predicated on α, which is the physical capital's share of income and β, which is the human capital's share of income. The augmented Solow model is therefore summarized as

$$Y = AK^{\alpha}(hL)^{\beta} \quad \text{---------- (3.9)}$$

Where; Y = Output level, K = Stock of physical capital, h = Level of human capital, L = Labour force, A = Efficiency of labour.

Methodology and Estimation Techniques

The paper employs the Ordinary Least Square (OLS) multiple regression technique to gauge the impact of Non-Oil Variables on economic growth. It relied extensively on co-integration and Error Correction Mechanism (ECM) to establish the long and short run relationships between RGDP and the associated explanatory variables in Nigeria from 1980-2018.

Model Specification

Based on the above theoretical underpinning enshrined in the theoretical literature, the functional form of the model is specified as follows:

$$GRR_t = \sum_{i=0}^{n} Non-Oil + \varepsilon_t \quad \text{---------- (3.1)}$$

The specified equation above is the growth rate of the Nigerian economy with emphasis placed on the non-oil sector as economic template for diversification of the Nigerian economy well as the stochastic error term. A further decomposition of equation (3.1) gives the following:

$$GRR_t = f(AGRQ_t, HDI_t, ICT_t, EDB_t, TXR_t, \varepsilon_t) \quad \text{----------(3.2)}$$

Where: economic growth rate (GRR_t), agricultural output ($AGRQt$), human development index (HDI_t), information and communication technology (ICT_t) ease of doing business, (EDB_t), tax revenue (TXR_t), stochastic error term- assumed to be Gaussian-White noise) (ε_t), all at time (t). In a more econometric manner, equation 3.2 can be stated as:

$$GRR_t = \delta_0 + \delta_1 AGRQ_t + \delta_2 HDI_t + \delta_3 ICT_t + \delta_4 EDB_t + \delta_5 TXR_t + \varepsilon_t \quad \text{----------(3.3)}$$

All the explanatory variables are expected to have a positive relationship with the dependent variable, except tax revenue which is only expected to manifest its usefulness when it forms part of government expenditure. The error term is stated as: ε_t thus, the error correction specification takes the following form:

$$\nabla Z_t = \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta_{t-2} + ... + \Gamma_{k-1} \Delta Z_{t-k-1} + \prod Z_{t-1} \quad \text{----------(3.4)}$$

Where; $\Gamma_1 = -(1 - A1 - ... - Ai)(i = 1...K-1)$, a matrix representing short-term adjustments and $\Pi = -(1 - A1 - ... - AK)$, being a coefficient matrix showing the long-run relationship between the vector. Z_t is px1 vector of stochastic variables integrated of order 1, K is the lag length and η_t is px1 Gaussian white noise residual factor. Therefore, from equation (3.4), we have,

$$GRR_t = \partial_0 + AGRQ_t + ... + \partial_k ECM_t \quad \text{----------(3.5)}$$

DATA ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

Descriptive Evidence

Table 4.1 summarizes the descriptive statistics of the employed data in the study. The results indicate that the growth rate of the economy averaged 4.58 while the tax revenue was on the average of N3.42 billion. The agricultural output grew at an average rate of 4.56 percent. The descriptive evidence revealed that human development index had the lowest rate of variability judging from the standard deviation recorded over the period. Considering the level and direction of skewness, only GRR and AGRQ were found to be negatively skewed to the left of the normal distribution curve; while variables were positively skewed. AGRQ, HDI and EDB were found to be normally distributed at 1 percent level of significance as captured by the probability values of the Jarque-Bera statistics. The other variables were normally distributed at 5 percent levels, indicating that all the variables are stable over time and statistically significant.

Table 4.1 Descriptive Statistics

	GRR	AGRQ	HDI	ICT	EDB	TXR
Mean	4.576316	4.515789	0.504711	47.06211	16.34737	3.423684
Median	4.750000	4.250000	0.495000	39.58500	13.45000	3.150000
Maximum	9.900000	16.80000	1.700000	82.21000	112.5000	6.800000
Minimum	-1.600000	-16.50000	0.237000	22.40000	10.40000	0.900000
Std. Dev.	3.001030	5.185193	0.241085	15.12591	16.16248	1.635160
Skewness	-0.220263	-1.576497	3.283521	0.615479	5.756782	0.259698
Kurtosis	2.277565	8.975229	17.06881	2.376003	34.77222	1.877657
Jarque-Bera	1.133629	72.27083	381.6743	3.015665	1808.223	2.421591
Probability	0.567330	0.000000	0.000000	0.221389	0.000000	0.297960
Sum	173.9000	171.6000	19.17900	1788.360	621.2000	130.1000
Sum Sq. Dev.	333.2287	994.7905	2.150522	8465.342	9665.355	98.92868
Observations	38	38	38	38	38	38

Table 4.2 below shows the correlation matrix which provides evidence on the magnitude and direction of the relationship between each pair of variables. The correlation matrix was symmetric about the diagonal with values of 1.000000 indicating the perfect correlation of each variable with itself.

Table 4.2 Correlation Matrix

	GRR	AGRQ	HDI	ICT	EDB	TXR
GRR	1.000000	0.374855	0.166981	-0.036146	-0.268630	0.058389
AGRQ	0.374855	1.000000	0.073232	0.413081	-0.649066	0.355093
HDI	0.166981	0.073232	1.000000	0.242932	0.042851	0.341361
ICT	-0.036146	0.413081	0.242932	1.000000	-0.154932	0.329116
EDB	-0.268630	-0.649066	0.042851	-0.154932	1.000000	-0.224138
TXR	0.058389	0.355093	0.341361	0.329116	-0.224138	1.000000

Table 4.3 Results in Unit root Tests

Variables	**Augmented Dickey-Fuller**		**Phillips-Perron**		**Order of Integration**
	Levels	**1st Diff**	**Levels**	**1st Diff**	
GRR	-3.536601**		-3.536601**		I(0)
AGRQ	-3.552973**		-3.536601**		I(0)
HDI	-3.536601**		-3.536601**		I(0)
ICT	-3.536601**	-3.540328**	-3.536601**	-3.540328**	I(1)
EDB	-3.536601**		-3.536601**		I(0)
TXR	-3.536601**	-3.540328**	-3.536601**	-3.540328**	I(1)

Note: *,**,** and * denotes level of significance at 1, 5, and 10 percent respectively.

Source: Authors' Computation

The unit roots tests are considered to ascertain the data generating mechanism using the Augmented Dickey-Fuller (ADF) and the Phillips-Perron unit root tests. The results revealed that economic growth, agricultural output, human development index, solid mineral sector were stationary at levels, while ICT and tax revenue are stationary after first difference.

Table 4.4 Unit Root Test of the Residual

Null Hypothesis: ECM has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.040730	0.0012
Test critical values:	1% level	-4.226815	
	5% level	-3.536601	
	10% level	-3.200320	

*MacKinnon (1996) one-sided p-values.

The result of the stationary test of the residual from the co integrating variables is shown in table 4.4. The results revealed that the series individually exhibited random walk as it was stationary at levels, I (0) at one percent level of significance. There exists a stable long run relationship among the variables.

Error–Correction Modelling (ECM)

The result in table 4.5 below shows all included variables are in conformity with the *a priori* expectation and *a priori* restrictions except tax revenue. The variables were all statistically significant at 5 percent level except ICT (captured by telecom density) and HDI (human development index) respectively.

Table 4.5 ECM Regression Result

Dependent Variable: D(GRR)
Method: Least Squares
Date: 02/01/20 Time: 14:59
Sample (adjusted): 2 38
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.012360	0.482068	0.025639	0.9797
D(AGRQ)	0.346131	0.075118	4.607838	0.0001
D(HDI)	2.661789	1.514762	1.757232	0.0891
D(ICT)	0.082316	0.165385	0.497722	0.6223
D(EDB)	0.531978	0.223547	2.358063	0.0146
D(TXR)	-0.918973	0.417268	-2.202358	0.0355
ECM(-1)	-0.718664	0.164032	-4.503162	0.0001

R-squared	0.779374	Mean dependent var	0.001203
Adjusted R-squared	0.690623	S.D. dependent var	3.319228
S.E. of regression	3.401265	Akaike info criterion	4.265045
Sum squared resid	156.9758	Schwarz criterion	4.185734
Log likelihood	-71.30944	Hannan-Quinn criter.	4.006561
F-statistic	6.810755	Durbin-Watson stat	2.032103
Prob(F-statistic)	0.000081		

The Error Correction Mechanism [ECM (-1)], which gauged the long-run effect, satisfied all its conditions as indicated in table 4.5. The estimated coefficient of ECM (-1) at 0.71 was highly germane at over 90 percent confidence level and it was rightly signed. The ECM term is indicative of the speed of adjustment to equilibrium when there was a shock. This means that deviations from equilibrium were restored by about 71 percent over the first period. In addition, the outcome of the ECM term revealed that a long-run relationship existed between economic growth and all the employed explanatory variables which are constituents of a conducive environment for economic diversification. All the included independent variables are correctly signed. Also, the independent variables are statistically significant at between 1 and 4 percent level of confidence except HDI

and ICT, which are not significant at 5 percent level. Although, HDI is significant at 10 percent level, while ICT is not. Ease of Doing Business (EDB) - an institutional proxy variable, Agricultural Output (AGRQ), Human Development Index (HDI) are statistically and positively significant in determining the growth rate of output in Nigeria for the period under consideration. The tax variable has an inverse relationship with growth rate however, it is statistically significant. From the results, all the variables expected to aid diversification and contribute meaningfully to economic growth are positively signed except ICT and EDB which indicate a negative relationship with the dependent variable. The results show that AGRQ, HDI, and TXR will positively impact on the economy.

Policy Implication

The non-significance of ICT variable, the low level of significance of the HDI variable to the growth rate of output, has some policy implications. With respect to the non-significance of ICT, the implication is that the role expected in the form of technological transmission and transfer within and across border is not visible. ICT should be a critical medium for enhancing the endogenous nature and the level of technical change of a nation. It is therefore pertinent for government to make, in terms of cost and accessibility of ICT an inclusive infrastructure.

The HDI was critical to the growth rate of the Nigerian as suggested by the result. It shows the weakness and inefficiency in the nation's education and health infrastructure as a critical mass in the growth trajectory of the economy. Again, this variable is recognized in the endogenous model as key to the endogenous nature of technical change, which is a strong determinant of productivity and economic growth. The results have shown that there is need to upgrade education and health infrastructure as fundamental instruments for sustainable economic development. The Ease of Doing Business (EDB) is fundamentally critical to economic diversification and serves as a strong impetus in attracting Foreign Direct Investment in Nigeria as empirical evidence has revealed from the Rwandan model.

Recommendation and Conclusion

The policy makers in Nigeria should re-tooled macroeconomic policy instruments to ensure emphases are placed on these three major policy variables. Firstly, efforts should be made at developing the agricultural sector of the economy to ensure that output in the sector is not only increased, but the associated value chains are developed. Secondly, there be improvement in education and health care provision as this will help to scale up the human development index in the country. Finally, the ease of doing business should be given stepped up as this easily attracts foreign direct investment as well as increase domestic investment exponentially.

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