Innovations

Export diversification and economic growth in developing countries: a case of Nigeria

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Abstract

The current fluctuations in the world market which affected oil pricesresulted in income variation in the country which also affected economic activities world-wide especially developing economies.Nigeria is however not exempted from this shock as the economy is highly over dependent on oil as her major source of income after the neglect of other sectors. There is therefore the need for Nigeria to diversify her bundle in order to generate more sustainable income and achieve sustainable development goal 9. In light of this, this paper examines the impact of export diversification on economic growth in Nigeria, using time series data from 1983 to 2020. The autoregressive distributed lag method of analysis was used to examine the impact of vertical and horizontal diversification on economic growth. The result shows that diversifying economic bundle horizontally will only improve growth of the country in the long run while in the case of vertical diversification, only manufacturing export positively and statistically increases economic growth both in the short run and in the long run. Other variables used in examining vertical diversification were negatively related to economic growth in Nigeria. This shows the nature of mono-product economy we have in Nigeria. Therefore, this study recommends that government should improve diversification to other sectors like agriculture, service and infrastructure which shows a negative relationship to growth in Nigeria.

Keywords: *1.Horizontal diversification, 2.Vertical Diversification, 3.Economic growth, 4.Nigeria*

1. Introduction

Nigeria is a country that is blessed with abundant natural resources which are not well utilized for growth and development of the country at large. Before the discovery of oil in the 1970s, agriculture has been the main source of income for Nigeria. However, the discovery of oil in the 1970s caused the neglect of other sectors in the economy and the overdependence on oil revenue as the major source of wealth. Statistics shows thatas at 2019,agriculture only contributed 21.91% to Nigeria's GDP while oil constitute over 87% on total export (NBS (2019); Statista, 2020; Trading Economy, 2020). The current fluctuationsof oil price in world market affected the income generated from oil which calls for a serious attention in addressing the problem of income generation. In a bid to solve the problem there is need thereof for Nigeria to diversify the economy bundle and stop the self -reliance on crude oil.

Export diversification can be basically classified into horizontal diversification and vertical diversification. Horizontal diversification is the expansion of a country's export through the increase in the share of product in the market or by creation of additional new goods that will be attractive in the world market(Matthee & Naude, 2007). Vertical diversification on the other hand implies the transformation in value-adding of primary exports(Agosin, 2007, Lugeiyamu, 2016).

Several studies (Adeyemi and Adewole (2016); Dokiand Tyokohol(2019)) has been carried out on diversification of export and growth in Nigeria which shows a mixed results concerning the effect of export diversification on growth on the economy. Most of these studies also did not focus on horizontal and vertical diversification which are important considerations forexport diversification to result in maximal economic growth.Only few studies (Kenji and Mengstu, 2009) examinedeither horizontal or vertical export diversification which suggests limited research exits in the literature in general and in Nigeria specifically.

Also, recent studies(Adeyemi and Adewole (2016), Duru and Ehidiamen (2018) and Dokiand Tyokohol(2019)) on diversification of exports and growth in Nigeria's economy are few of such studies that investigated either horizontal exports diversification or vertical exports diversification alone. However both horizontal and vertical export diversification are essential for Nigeria to maximally benefit from export diversification and hence need to both be examined in this study. Furthermore, the current pandemic (COVID-19) as well as previous economic crises exposes the lapses of overdependence on crude oil. This calls for serious attention in literature that Nigeria in particular need to diversify her bundle of product instead of relying on crude oil. Based on the aforementioned, this study examines export diversificationthrough vertical and horizontal approach to determine growth of Nigerian economy.

2. Literature Review

In order to conceptualize the idea of export diversification and economic growth, figure 1 shows the output of an economy(Nigeria), which is the total produced, manufactured in the country takes the form of output from agriculture sector, manufacturing sector, Services sector, and other productive sectors of the Nigeria economy. Such output of Nigeria's economy will be either sold domestically within Nigeria or exported to the international market. Through exporting in increased volumes various products, horizontal export diversification will be achieved. Similarly, through exporting the output of her various sectors, vertical export diversification will also be achieved by Nigeria. Consequently, Nigeria will achieve economic growth as she maximally benefits from horizontal as well as vertical export diversification which results in increased revenues from exports in the form of foreign exchange which is used to improve living standards in the Nigeria economy. Nigeria's increased economic growth through export diversification, does not in anyway, negate the contribution of domestic sales to economic growth although the role of the domestic market is not the focus of this study.

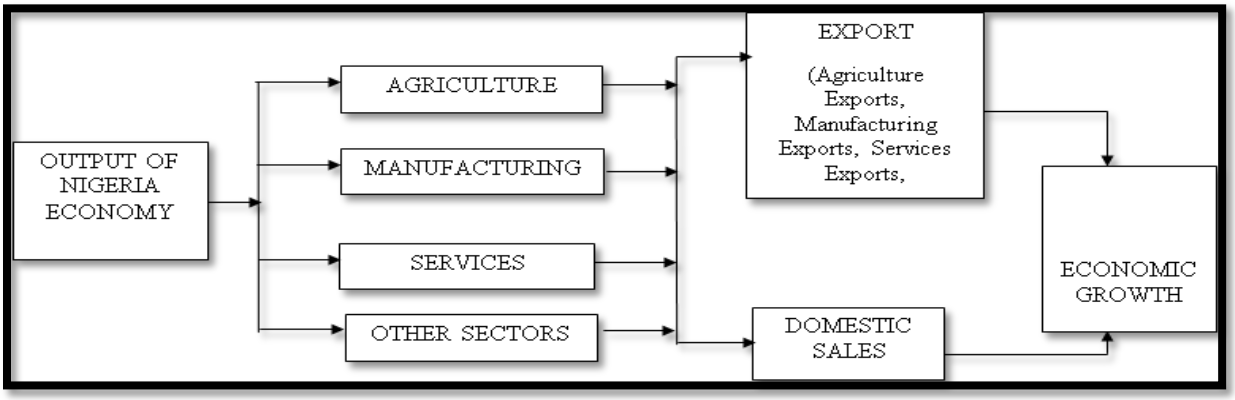

Fig 1: Conceptual framework illustrating the function of Export Diversification for Economic Growth. Source: Author (2021)

Using different methods, studies as and Heiko (2008)and Nwanne (2014) employed the contribution of respective sectors of the economy to exports or to the economy in capturing export diversification, while studies as Adeyemi and Adewole (2016) employ a diversification index to capture export diversification. In addition, different estimation techniques have been employed by previous researchers investigating the economic growth effects of export diversification, including Vector Auto Regression (VAR) (Forgha, Sama and Atangana, 2014), Vector Error correction model (Mudenda, Choga, and Chigamba 2014), Ordinary least squares (Owan, Ndibe, and Anyanwu (2020), Autoregressive Distributed Lag (ARDL) (Duru and Ehidiamhen, 2018). Thus, there exist mixed results concerning the effect of diversification of export on the growth of the economy.

Lugeiyamu(2016) applied an augmented Solow growth model in a cross-section dataset for the period of 1998 to 2009 with all three trade variables tested under a single framework. The study analyzed the influence of diversification of exports in defining economic growth differences across Africa and it tests its robustness in different samples and estimation techniques compared to other variables of trade namely, trade openness and export growth. The study found that countries generally speedy up economic growth with more diversified exports; therefore, variation in export diversification levels explains the observed growth differences across Africa. The results show that both export diversification and export growth are robust determinants of regional economic growth rates while trade openness is not. The findings have a strong bearing on trade policy by emphasising the importance of more diversified exports to mitigate the negative impacts of global economic shocks to a region's economic growth.

In a country study of the effect of export diversification on economic growth from 1980to 2016 in Nigeria by Duru and Ehidiamhen (2018), the study suggests the movement of the country from horizontal based to vertical based export diversification and the ARDL result showed that trade openness has a negative effect on economic growth.

3. Methodology

The study adopts the neoclassical growth model as the theoretical framework in order to analyse the effects of export diversification on economic growth, using an augmented Cobb-Douglass production function. The data covered a period of 40 years, 1980 to 2020. The study period provided an opportunity for comprehensive assessment of all the major policy on export diversification in Nigeria. The equation is stated as follows:

$$Y = f(K^{\propto}, L^{\beta}, A) \qquad (1)$$

Where: Y is the growth rate of the gross domestic product; K represents capital formation; and A is the total factor productivity. The study introduces export diversification as the model for horizontal diversification

The model specified for horizontal export diversification is stated thus:

$$EG_t = \propto_0 + \propto_1 EXD_t + \propto_2 HCF_t + \propto_3 CAPF_t + \propto_4 INFR_t + \varepsilon_t \qquad (2)$$

Where; EG is the GDP per capita growth rate; EXD is the export diversification; HCF is the human capital formation, proxy by School enrolment, tertiary (% gross) to capture labour; CAPF is the Capital Formation, proxy by Gross capital formation (% of GDP); INFR is the infrastructure spending, proxy by general government final consumption expenditure (% of GDP); and ε is the Error term.

In order to examine vertical diversification, equation 2 is modified by replacing export diversification with exports by respective major sectors in Nigeria which are agriculture, manufacturing and services measured by their percentage contribution of the GDP thus:

$$EG_t = \beta_0 + \beta_1 AGRX_t + \beta_2 MANX_t + \beta_3 SERX_t + \beta_4 HCF_t + \beta_5 CAP_t + \beta_6 INFR_t + \varepsilon_t \qquad (3)$$

Where; EG is the GDP per capita growth rate; AGRX is the agriculture exports; MANX is the manufacturing exports; SERX is the service exports; HCF represents human capital formation; CAPF stands for capital formation; INFR is the infrastructure spending; and ε is the error term. Parameters β_0 - β_6 in equation 3

represents the constant of the model as well as impact of unit changes in each respective independent variable. The subscripts t represent the time period of observations.

To estimate the models formulated for this study, the Autoregressive distributive lag (ARDL) estimation technique was used. The reason for using ARDL technique was due to the fact that the result of the unit root test conducted indicated that the variables had mixture of integration of order zero I(0) and one I(1). ARDL technique was developed by Peseran and Shin (1999) and extended by Peseran, Shin and Smith (2001) to investigate the short-run and the long-run relationship among the variables. The generalized *ARDL(p, q)* model is presented below :

$$Y_t = \beta_0 + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{j=0}^{q} \propto_j X_{t-i} + \varepsilon_t \qquad (4)$$

Where Y_t is the endogenous variable, $X_t$represents the explanatory variables, βo is the constant, β and α are parameters to be estimated, and p and q are optimal lag orders, and εt is the error term. Using Akaike Information Criterion (*AIC),* the optimal lag was determined (Pesaran and Shin 1999; Pesaran et al. 2001).

Table 1: Indicators

Variables	Indicators	Source
Economic Growth	GDP per capita growth rate	WDI
Export Diversification	Export Diversification Index	UNCTAD
Agricultural Export	Agriculture raw material export	WDI
Manufacturing export	Manufacturing export	WDI
Service Export	Service export	WDI
Human capital	Tertiary school enrolment	WDI
Capital	Gross fixed capital formation	WDI
Infrastructure	Total government capital expenditure	Central Bank of Nigeria Statistical bulletin

Source: As compiled by the authors

4. **Results and Discussion**

The model in this study was subject to econometrics and statistical analysis and the results were presented in this section. Table 2 presents the descriptive analysis of the time series properties of the variables included in this study. The table showed that the mean values of economic growth rate (EG), export diversification (EXD), agricultural export (AGRX), capital formation (CAPF), human capital formation (HCF), infrastructural spending (INFR), manufacturing export (MANX), and service export (SERX) were 0.56; 0.84; 0.85; 36.65,6.36; 3.67; 1.78, and 5.75 respectively. While economic growth rate reached its maximum with 12.46 in the year 2002 which may be due to reforms policy of export diversification introduced at the time, with its minimum of -15.45 in the year 1981 which may be largely due to the fall in the global oil prices at the time. On the other hand, export diversification did not reflect any significant changes as the mean value stood at 0.84 while the maximum value and the minimum values stood at 0.89 and 0.80respectively.

Table 3 showed the results of the unit-root test using Augmented Dickey Fuller (ADF) approach. The results shows that the variables had mixture of integration of order zero I(0) and one I(1). Specifically, economic growth rate (EG), export diversification (EXD), capital formation (CAPF), infrastructure spending (INFR) and manufacturing export (MANX) were stationary at level, I(0) while human capital formation (HCF), agricultural export (AGRX), and service export (SERX) were all stationary at first difference at 5% significance level. Having noted that the variables were integrated of different orders of level and first difference, the study therefore applied Autoregressive Distributed Lag technique (ARDL) in line with the work of Pesaran et al. (2001) since some of the dependent variables (HCF, AGRX and SERX) were non-

stationary at level; none of the variable was I(2) in normal condition (ADF test); and none of the variable was I(2) in structural break.

Table 2: Descriptive Statistics of Variables

	EG	EXD	AGRX	CAPF	HCF	INFR	MANX	SERVX
Mean	0.563	0.841	0.845	36.653	6.357	3.673	1.782	5.750
Maxi	12.457	0.888	7.268	89.381	10.491	9.448	6.686	14.011
Mini	-15.450	0.802	0.006	14.904	1.842	0.911	0.023	2.080
Std. Dev.	5.324	0.028	1.593	19.234	3.171	2.853	1.880	2.648

Source: Author's Computation, 2021

Table 3: **Augmented Dickey Fuller Unit root Test**

	EG	EXD	AGRX	CAPF	HCF	INFR	MANX	SERVX
ADF t-statistic	-2.951	-2.957	-3.533	-3.544	-2.941	-1.951	-3.533	-3.54
Probability	0.0011	0.0197	0.0000	0.0006	0.0000	0.0307	0.0006	0.0000
Level of Integration	I(0)	I(0)	I(1)	I(0)	I(1)	I(0)	I(0)	I(1)

Source: Author's Computation, 2021

Table 4: ARDL Estimation Results of the effects of Horizontal and Vertical Export Diversification on Economic Growth

4a		**4b**	
Variables	Horizontal Diversification	Variables	Vertical Diversification
Short-run coefficients			
D(EXD)	-38.49 (28.509)	D(EG(-1))	-0.304 (0.121)
D(EXD(-1))	-41.403 (25.73)	D(MANX)	1.0399*** (0.451)
D(CAPF)	-0.411*** (0.115)	D(SERVX)	-0.0318 (0.235)
D(HCF)	0.1309 (0.643)	D(AGRX)	-0.284 (0.423)
D(INFR)	-0.1149 (0.477)	D(CAPF)	-0.412*** (0.102)
ECM(-1)	-0.856*** (0.166)	D(HCF)	-0.304 (0.607)
		D(INFR)	-0.336 (0.431)
		ECM(-1)	-0.689*** (0.182)
Long-run coefficients			
EXD	97*** (2.58)	MANX	1.5097*** (0.657)
CAPF	-0.212*** (-3.49)	SERVX	-0.046 (0.346)

	-0.552		-0.412
HCF	(0.333)	AGRX)	(0.649)
	-0.013	CAPF	-0.598***
INFR	(0.976)		(0.161)
	24.597		0.442
C	(35.22)	HCF	(0.824)
		INFR	-0.488
			(0.584)
			37.97
		C	(11.93)
ARDL Bounds Test			
F-statistic	4.37	F-statistic	1.43
I0 Bound@5%	3.47	I0 Bound@5%	2.87
I1 Bound@5%	4.57	I1 Bound@5%	4
Breusch-Godfrey Serial Correlation LM Test			
	0.4204		0.5382
F-statistic	[0.5214]	F-statistic	[0.5904]
ARCH Heteroscedasticity Test			
	0.6701		0.6469
F-statistic	[0.6490]	F-statistic	[0.7475]
CUSUMQ	Stable	CUSUMQ	Stable

Source: As compiled by the authors

Note: * indicates a 1% level of significance, ** indicates a 5% level of significance, and *** indicates a 10% level of significance. The standard error is in parenthesis (), while probability is in [].

4.3 Result of the effects of Horizontal Export Diversification on Economic Growth

Table 4a explained the short-run relationship between horizontal export diversification and economic growth. This was confirmed by the negative and significant P- value and t-statistic of the coefficient of Error Correction variable (*ECM (-1)*) which explained the speed of adjustment that took short-run periods to converge to long-run periods. It indicated that it would take 86 per cent of all the variables to converge to long-run relationship.

The short-run coefficient of horizontal export diversification was negative and statistically insignificant at the 5% level. The negative sign exhibited by the coefficient of horizontal export diversification in relations to economic growth indicated that horizontal export diversification in Nigeria has not been increasing economic growth. The coefficient of gross capital formation which was the only significant variable was also negative at 5% significance level. This indicated that a unit increase in gross capital formation brought about 0.41 decrease in economic growth. The implication of this was that gross capital formation in Nigeria has not been adding value to economic growth. The coefficient of human capital formation was positively signed but not significant at 5% significance level. This implied that the teaming population of graduates and labour force has not significantly contributed to the growth of Nigerian economy in the short-run for the period under consideration. The coefficient of infrastructure spending was also negatively signed and statistically insignificant at 5% level, meaning that government spending on infrastructure has no positive effects on Nigerian economic growth for the period reviewed.

On the other hand, the long-run coefficient of horizontal export diversification had positive sign and statistically significant at the 5% level. The positive sign exhibited by the coefficient of horizontal export diversification in relations to economic growth indicated that a unit per cent increase in horizontal export diversification has led to 14% increase in economic growth rate of the Nigerian economy for the period under

review. The coefficient of gross capital formation was significant but negatively signed at 5% significance level. This indicated that a unit increase in gross capital formation brought 0.21 decrease in economic growth. The implication of this was that gross capital formation in Nigeria has not been adding value to economic growth. The coefficient of human capital formation and infrastructure expenditure were negatively signed and not significant at 5% significance level. This implied that government spending on infrastructure and the teaming population of graduates and labour force has not significantly contributed to the growth of Nigerian economy in the long-run for the period under consideration.

The ARDL bond test of the relationship between horizontal export diversification and economic growth in the second section of Table 4a shows there is long run relationship as the F-statistic is greater than the bound at level (I (0)). The diagnostic tests results were also presented at the bottom of the table to confirm the authenticity of the results emanated from ARDL technique. These tests were carried out to determine whether the results are normally distributed, free from serial autocorrelation problem, had constant variance or suffer from functional form misspecification when it does not properly account for the relationship between the dependent and observed explanatory variables. All the tests are significant at 5% significance level.

Result of the Analysis of the Effects of Vertical Export Diversification on Economic Growth

Table 4b explained the short-run relationship vertical export diversification and economic growth. The negative and significant t- Statistic value (-3.79) and P-value (0.0008) of the coefficient of Error Correction of all the variables (*ECM(-1)*) confirmed that the short run changes in economic growth arising from vertical export diversification reverted to its equilibrium position on the long run. The short-run coefficient of manufacturing export and gross capital formation had positive and negative sign respectively and statistically significant at 5% level. The positive sign exhibited by the coefficient of manufacturing exportation in relations to economic growth indicated that a unit increase in manufacturing exportation lead to an increase in the economic growth rate. Thus, a unit increasein manufacturing export results in 1.04% increase in the economic growth rate. On the other hand, the negative sign of the coefficient of gross capital formation indicated that a unit decrease in gross capital formation led to 0.41% significant decrease in the economic growth rate of Nigeria in the short run. Further, the coefficients of service export, agricultural export, human capital formation and infrastructural expenditure were negatively signed and statistically not significant at 5% level. The negative signs exhibited by these variables showed that there was inverse relationship between these variables and the economic growth rate and these relationships were as well statistically insignificantly contributed to the growth rate of the Nigerian economy.

The results of the long-run relationship among variables of vertical export diversification and economic growth rate were presented in the second segment of Table 4b. The long-run coefficient of manufacturing export was positively signed and statistically significant at 5% level. It evidently showed that the positive relationship exhibited by the coefficient of manufacturing export in the long run had a significant influence on economic growth rate. Thus, a unit increase in manufacturing export led to 1.51 per cent rise on economic growth rate on the long-run. The coefficient of human capital formation was positively signed but statistically not significant at 5% level. The coefficient of other variables, namely, service export, agricultural export, gross capital formation and infrastructure were negatively signed but only gross capital formation was significant at 5% level. The implication was that a unit per cent decrease in gross capital formation led to 0.6% decrease in the economic growth rate.

The ARDL Bound test was not significant and lower than the critical value bounds of I(0) Bound and I(1) Bound at 5% significant level. This showed that the variables in the model do not have long-run co-movement among themselves. Hence, there was no long-run relationship among the variables. The value of all the diagnostic tests however showed that the results were statistically acceptable at 5% level.

5 Summary and Conclusion

The short run analysis of the effect of horizontal export diversification on economic growth rate using the Autoregressive Distributed Lag revealed that the short-run coefficient of export diversification had negative sign and statistically insignificant at 5% level. The outcome of this result implied that export diversification did not influence economic growth rate in Nigeria in the short-run for the period under review. This may be due to the fact that Nigerian major export is the crude oil, which accounted for more than 85% of its total annual revenue, while other real sectors were neglected. This result agreed with previous study of Isukul, Chizea, &Agbugba, (2019) but it refuted the short run findings of ClaverKouakou, &N'Zué, (2020) and Oyelami, &Alege, (2018). The long run analysis of the effect of horizontal export diversification revealed that horizontal export diversification had positively increased Nigerian economic growth rate by 14% for the period under review. Forward and backward integration in the real sector and export diversification led to significant growth rate. This result conforms to previous study of Oyelami, &Alege, (2018).

Analysis of the short-run effect of the vertical export diversification on economic growth revealed that manufacturing export had increased economic growth rate by 1.04%, while agricultural export and service export, human capital formation and infrastructural expenditure has not significantly increased growth rate of the Nigerian economy for the reviewed period. On the other hand, the long run analysis revealed that manufacturing export had influenced economic growth rate by 2% while other variables has not succinctly influenced Nigerian economic growth rate for the period under review. This is evidently the true picture of the Nigerian mono-product economy. The service sector is dominated with foreign investors who normally repatriate the huge profits made to their home country, the agriculture sector is under served why it can barely produce enough for Nigerians. This study conforms to the similar study by Mudenda, Choga, &Chigamba, (2014).

In conclusion, the findings of this study showed that in Nigeria horizontal export diversification has not increased growthin the short run while in the long run horizontal export diversification has led to 14% increase in economic growth rate. Furthermore, the result of vertical diversification indicated thatmanufacturing export positively and statistically influence economic growth in Nigeria both in the short run and long run while service export, agricultural export, gross capital formation and infrastructure were negatively related to economic growth.

This study therefore recommends that government should diversify both horizontal and vertically with more effort on vertical diversification variables like agriculture, human capital among others which are still contributing negatively to the growth of the country

Declarations

Availability of Data and Materials

The datasets used and analysed during the current study are available from World Bank

Competing interests

The authors declare that they have no competing interests.

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Authors' Contributions

Busayo Aderounmu conceptualizing the idea and writing, OluwoleAdeyemidata analysis and writing, and Divine-favour Nwaguconceptualizing the idea. All authors read and approved the final manuscript

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