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The Role of Manufacturing Sector in Economic Diversification of Nigeria (1986-2016)

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ABSTRACT

It is widely accepted that an effective manufacturing sector serve as perfect tool for export diversification in developing countries. Therefore, this study investigated the role of manufacturing sector on economic diversification in Nigeria from the period of 1986-2016. In order to achieve the objective of the study, ARDL technique was employed to establish long-run relationship between diversification proxy by Theil index decomposed into Theil Total (TT), Theil Between (TB) and Theil Within (TW) and Manufacturing sector which was proxy by Manufacturing Capacity Utilization(MCU) and Manufacturing Value Added (MVA) controlled by Gross Fixed Capital Formation (GFCF), Foreign Direct Investment (FDI) and Real Effective Exchange Rate (REER). The result revealed that long-run relationship exist among the estimated variables in the three models. MCU, MVA and GFCF promote total diversification and horizontal diversification in the long-run but the coefficients of MCU and MVA are insignificant. On the other hand, only Foreign direct investment and real effective exchange rate promote vertical diversification. The study recommended protection of infant industries, local sourcing of raw materials for production, Government programs that encourage competition among manufacturers in Nigeria and improved infrastructural development in order to enhance the productivity of the manufacturing sector in Nigeria that will position it for global competitiveness.

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Introduction

Manufacturing sector is perceived as the heart of any economy, an engine of growth and catalyst for economic transformation and sustainable development due to its potential in creating wealth, generating employment, contributing to gross domestic product as well as alleviating poverty [1]. The experience of developed and emerging economies such as China, Singapore, North Korea, Malaysia and India demonstrated positive relationship between these known potentials of manufacturing performance on national economic development.

Meanwhile, It has been argued that resource abundant countries suffer from "resource curse" or Dutch disease notably in their lack of incentive to diversify and appreciating real exchange rate which dampens their economy hence, diversification becomes imperative for Nigeria who depends majorly on its oil for most of its earning. In the same vein, countries that heavily depend on primary product are prone to export instability because commodity products are income inelastic which subject them to volatile market prices and negative term of trade. The path of diversification of an economy is important in its development process. According to the stages of diversification follow a sequential path for developing countries, from agriculture to manufacturing then services [2-3].

As mentioned in suggested that resource rich economies should diversify into resource-based manufacturing and processing of primary commodities away from conventional path of low skilled manufacturing that riddled their economy [2,4]. Such diversification has proven efficient in enhancing economic growth as demonstrated in Malaysia who have moved into manufacturing sector as well as processing of their primary products to meet international standard. Export diversification into manufacturing helps developing countries to overcome unfavorable terms of trade associated with primary product, creates job and foster economic development as a whole [2,5]. As well documented in literature, diversification rather than specialization will ensure better and favorable terms of trade identified two effects that make diversification beneficial to growth vis portfolio effect which implies that the greater the diversification the less volatile the export earnings and dynamic effect of diversification which implies learning to produce a wider range of products which invariably spur economic growth [6,7]. These effects are directly associated with manufacturing activities. Empirical literature for example, found that natural resource contributes to export concentration and thus suggested diversification of production structure of the economy as the sure path for export diversification [22]. The difference in growth across Africa can be explained by the variation in the composition of their export basket as country with diversified export tends to grow faster than the others [6].

Despite the known potentials of manufacturing sector in placing the economy for greater diversification and development, Nigeria has always put more emphasis on the agricultural sector in its diversification blueprint with little emphasis on her manufacturing sector. Similarly, very few empirical researches have recognized the role of manufacturing sector in the economic diversification of Nigeria which is the motivation for this study. The basic objective

of this study is to investigate the role of manufacturing sector in economic diversification of Nigeria from 1986 to 2016. In order to achieve this objective, ARDL technique is employed. This paper is structured into five sections. Following this introduction, Section 2 discusses the conceptual, theoretical and empirical discourse, methodology of the study is discussed in section 3 followed by result analysis and discussion in section 4 whilst section 5 concluded the study with recommendations.

Literature Review

Conceptual literature

Manufacturing Sector and Diversification

Extant provisions of federal law in United States defined manufacturing as the process of physically transforming goods [8]. The US government definition of manufacturing sector comprises establishment engaged in mechanical, physical or chemical transformation of materials into new products as well as those engaged in assembling of components parts of manufactured products for purposes other than construction. Manufacturing sector in this study implies any sector of the economy that engage in any form of transformation activities that birth a new product of higher value.

There are three attributes associated to relevance of manufacturing sector in the growth process of any nation [9]. First, it enhances rapid technological changes by providing the channel through which developing countries can absorb knowledge from abroad, second, improves economies of scale through positive externality effect by transferring knowledge to other sectors thus enhancing total output in the economy. Third, it increases the ease of a country's integration into the global network. For Nigeria to become a developed country, a strong and dynamic manufacturing sector is imperative. Simon-Oke and Owoyemi (2010) see manufacturing sector as catalyst for economic growth and development as well as bedrock of every economy. It is an avenue for increasing productivity in relation to import substitution and export promotion, improving foreign exchange earnings, per capital income and employment which broaden aggregate demand in a dynamic pattern.

On diversification that it implies movement into new fields and stimulation and expansion of existing traditional product. They recognize that economic diversification to mean the process of producing varying range of economic output. An economy is said to be diversified when it does not depend on the activity of a single sector for growth. As noted by diversification does not rule out specialization but implies that resources should be channeled into the best alternative uses [10-12].

The process of export diversification can be achieved either by altering export composition pattern or through expanding innovation and technology on existing product thus; diversification takes two-dimension vis vertical diversification which entails the former and horizontal diversification which implies the latter. Horizontal diversification otherwise known as intensive margin implies increasing the quantity of commodity composition in the export basket within a particular sector. It is argued that such diversification reduces the effect of price fluctuation of commodity prices as well as averts adverse economic risk [13, 14, 6].

Similarly, vertical diversification implies completely shifting from one sector to another for example introducing commodities into the export basket that completely differ from the commodities of the usual sector. It implies shifting from primary product to secondary or tertiary production. Diversification of this nature particularly, manufacturing activities exudes positive externality effect in form of innovation, technology and knowledge compare to horizontal diversification [6]. Interestingly, this spill over benefits on other sectors enables the sectors to compete effectively in the world market. The improvement in manufacturing products ensure stabilization in export earnings because manufactured products are less susceptible to price fluctuation compare to primary product [13,15]. Albeit, it is mostly recommended for developing economy such as Nigeria to diversify into manufacturing sector away from agriculture and low skilled services because of higher productivity associated with manufacturing sector compare to other sectors [16,8,17].

Measurement of Export Diversification

There is no common metric used in measuring diversification. Theoretically, economic diversification is linked to income, level of employment and export therefore, economic diversification can be measured as the share of export in GDP, the share of sector in export, the dependence of a country on the export of a good or commodity, and the employment share of a sector [18]. Measurement of economic concentration is considered the best proxies for economic diversification. Notable among these proxies are, Herfindahl Hirschman Index, Gina Index, Thiel Index, etc. Theil index is employed in this study because it can be decomposed into extensive margin (vertical diversification) and Intensive margin (horizontal diversification). It is used in this study to measure the degree of concentration. A higher value implies greater concentration and a lower value implies greater diversification.

Theoretical Literature

Since the time of Adams Smith, the static gain from trade has been recognized as the driver of economic development but emphasis was on specialization and division of labor based on advantages (absolute and comparative) naturally accrued to countries. This view was promoted by Neo-classical economist such as Ricardo, Escher and Ohlin who have stressed the importance of specialization in leaping gains accrued to trade through economies of scale which stem from specialization. The economic down turn in developing countries in 1950 and 1960 leading to deteriorating terms of trade gave rise to the idea of diversification of the productive base by the structural theorists [19].

The proposition of the structural theorists was based on structural transformation of the economy from primary products which is characterized by relative vulnerability and secular hysteresis as against manufacturing activities which possess incredible potentials and strong resilience in an unpredictable world. The structural transformation theory of proposed that increase in manufacturing sector activities lead to absorption of surplus labor from agricultural sector which increases the productivity of the entire economy [17]. The externality effect of this increased production will in turn raise the productivity of agricultural sector hence development becomes inevitable. This theory is in consonance with endogenous theory of growth advanced by which postulate long-run growth as dependent on endogenous factors The endogenous growth theory, justifies the long-run growth rate of a certain economy on the basis of the independent factors; apart from labor and capital as against the exogenous factors of the neoclassical growth theory. The theory stressed the importance of learning by doing, technological progress, Research and development which aid human capital accumulation as the determinant of long-term growth. These factors are invariably linked to manufacturing productivity [20,21].

More so, The Perish–Singer thesis which was jointly propounded by Raúl Prebisch and Hans Singer in 1950 hypothesized that the price of primary commodities has a downward trend in the long run-run compared to manufactured commodities thus, dependence in primary commodities hinders growth, aids negative terms of trade and instability in income which explains the low growth and development in developing countries. Hence, they proposed diversification into manufacturing sector as the solution to low value addition and unstable income. In this regard, identified effects of such diversification that makes it beneficial for developing economy via portfolio effect and dynamic effect of diversification. The former implies that export earnings volatility is curtailed by the degree of diversification of the export basket while the latter has to do with long-run growth that stem from adding varying range of product in the export basket. These effects are linked with manufacturing activities. also demonstrated that countries who are far within the technological frontier can diversify into productive activities and leap the benefit of diversification by learning from other countries and imitating such in own country [7].

Based on the foregoing, this study is hinged on the various theories and hypothesis that stressed manufacturing sector as the ideal path of diversification in developing country like Nigeria.

Empirical literature

Manufacturing Capacity Utilization, Manufacturing Value Added and Diversification

The relevance of manufacturing sector in economic diversification which advances growth and development literally makes it an area for effective exploration. However, this area has not been widely explored in literature. Nevertheless, Simon-Oke found that manufacturing capacity utilization and manufacturing value added exert positive and significant impact on economic growth. In a panel of developing countries found that the higher the industrial base as measured by manufacturing value added as percentage of GDP, the higher the export diversification measured by Thiel index [22].

Macroeconomic Variables and Economic Diversification

Macroeconomic factors give overall picture of the economy and provide a beautiful insight into economic discourse such as diversification. Found positive linkage between investment and diversification. Explored the role of Foreign Direct Investment as well as real exchange rate and domestic investment on diversification using Herfindahl Index and Export count [7,23]. The study revealed that foreign direct investment and exchange rate discourage diversification whilst domestic investment proxy by gross fixed capital formation promotes diversification.

In the same vein, found that domestic investment, foreign direct investment and real exchange rate advance diversification measured by Thiel index from the period of 1985-2015. On the other hand, found a negative relationship between domestic investment and trade diversification from the period of 1970-2017 in Sultanate of Oman [24, 25].

Methodology

Sources of Data and Description of Variable

Secondary annual time series data from 1986 to 2016 was sourced from Central Bank of Nigeria annual activity report of various issues, International Monetary Fund (IMF) and World Development indicators. Diversification is proxies by Thiel index. Thiel Index is decomposed into Thiel Total (TT hereafter) which is used as proxy for total diversification, Thiel Between (TB hereafter) is used in this study as proxy for extensive margin otherwise vertical diversification and Thiel Within (TW hereafter) is used as proxy for intensive margin otherwise horizontal diversification. Thiel index measures export concentration. The higher the index, the lower the diversification and vice versa. Thiel index was sourced from IMF.

Manufacturing capacity utilization MCU was sourced from Central bank of Nigeria (CBN) and it measures manufacturing sector productivity. Similarly, manufacturing value added MVA as a percentage of GDP was sourced from World development indicators and it measures manufacturing sector output in the economy. The study control for other variables that affect diversification. The control variables are Gross Fixed Capital formation (GFCF hereafter), is used as proxy for investment; Foreign Direct Investment (FDI hereafter), is used in this study to capture technology transfer whilst Real Effective Exchange Rate (REER hereafter) which measure effect of exchange rate on diversification in Nigeria. An overvalued exchange rate discourages investment hence, diversification. All the control variables' data are sourced from World Bank development indicators.

Estimation Procedure and Model Specification.

The relationship between manufacturing sector and diversification is achieved through a two-step procedure via pre-estimation which requires the unit root testing and counteraction.

Unit Root Test

Observed that the mean variance and covariance of time series data are time dependent and varying which can deliver unreliable estimated result. Failure to test for stationary in time series analysis may lead to spurious regression. In order to test the stochastic property of the series employed in this study, Augmented Dickey Fuller are employed. The ADF and PP models are stated in equation 1 and 2 respectively [26-28].

$$\Delta W_t = \gamma + \beta W_{t-1} - \sum_{j-1}^{p} \alpha_j \Delta W_{t-j} + \varepsilon_t \quad (1)$$

$$\Delta Z_t = \tau + \varphi_t Z_{t-1} + \varepsilon_t \quad (2)$$

The null hypothesis of unit root is tested against the alternative of no unit root. The null hypothesis is rejected where the value of t-statistic is greater than the critical values at either 1%, 5%or 10% as the case may be. A variable is said to be stationary at level if it is integrated of order 0 I.e, I(0). A variable that is differenced once to be stationary is said to be integrated of order 1 that is I(1).

Cointegration Technique

In order to determine if cointegration exist among the variables of estimation, Auto Regressive Distributed Lag (ARDL hereafter) proposed by Pesaran, was employed. Cointegration implies long-run equilibrium relationship between the regressed and the regressors [29]. ARDL is chosen because of its numerous advantages over other estimation techniques. ARDL is an unbiased long-run estimator, it is efficient for small sample and is also applicable to series that are either integrated at order 1 or are of mixed integration that is, of I(0) and I(1). In addition, ARDL model has parameterization property which generates the error correction model [24]. This technique required testing for cointegration ARDL bound test. Long-run equilibrium relationship is said to exist If the f-statistics is higher than the upper bound I (1) at either 1%, 5% or 10% level of significance. In the same vein, if the value of f-statistics is lower than the lower bound I(0) at the aforementioned level of significance, we conclude that there is no cointegration and if the value of f-statistics is in between I(0) and I(1) bounds then the result will be declared inconclusive.

Post estimation diagnostic test include goodness of fit, normality test, serial correlation test. Heteroskedasticity test, residual specification error (RESET) test stability test and Multicollinearity test.

Estimation Model Specification

The model of Iyoboyi (2019) was adopted with little modification to suit the objective of the study. Three models are specified as follows,

$$T_I=\beta_0+\beta_1 MCU+\beta_2 MVA+\beta_3 GFCF+\beta_4 FDI+\beta_5 REXCHR+\varepsilon_t \quad (3)$$

$$T_B=\beta_0+\beta_1 MCU+\beta_2 MVA+\beta_3 GFCF+\beta_4 FDI+\beta_5 REXCHR+\varepsilon_t \quad (4)$$

$$T_W=\beta_0+\beta_1 MCU+\beta_2 MVA+\beta_3 GFCF+\beta_4 FDI+\beta_5 REXCHR+\varepsilon_t \quad (5)$$

Where, TI,TB and TW represent Theil index total, Theil index for extensive margin and Theil Index for intensive margin respectively. β_0 is constant. $\beta_i = 1,...5$ represent coefficients of the regressors while ε represent stochastic error term and t represent the time trend. It is expected that all the coefficients of the variable carry negative sign which implies inverse relationship with diversification index. As noted earlier, Theil Index measures concentration. The higher the index the more concentration and the lower the index the higher the degree of concentration. Thus, the apriori expectation is stated as β_i:1…5 <0

In order to conserve space ARDL model is specified for only Theil total. It follows thus,

$$\Delta \ln TI_t = \beta_t + \Delta \ln TI_t \sum_{i=1}^{p} \propto_{1_i} \Delta \ln TI_{t-1} + \sum_{i=1}^{q} \alpha_{2i} \Delta MCU_{t-1} + \sum_{i=1}^{q} \alpha_{3i} \Delta MVA_{t-1} + \sum_{i=1}^{q} \alpha_{4i} \Delta GFCF_{t-1} + \sum_{i=1}^{q} \alpha_{5i} \Delta FDI_{t-1} + \sum_{i=1}^{q} \alpha_{6i} \Delta REXCHR_{t-1} + \varepsilon_t \quad (6)$$

Where, Δ represent the difference operator, p represents lag length for the regressed while q represents lag length of the regressor. We proceed to specify unrestricted error correction model as follows:

$$\Delta \ln TI_t + \sum_{i=1}^{p} \propto_{1_i} \Delta TI_{t-1} + \sum_{i=1}^{q} \alpha_{2i} \Delta MCU_{t-1} + \sum_{i=1}^{q} \alpha_{3i} \Delta MVA_{t-1} + \sum_{i=1}^{q} \alpha_{4i} \Delta GFCF_{t-1} + \sum_{i=1}^{q} \alpha_{5i} \Delta FDI_{t-1} + \sum_{i=1}^{q} \alpha_{6i} \Delta REXCHR_{t-1} + \varepsilon_t + \sum_{i=1}^{p} \beta_{1_i} TI_{t-1} + \sum_{i=1}^{q} \beta_{2i} MCU_{t-1} + \sum_{i=1}^{q} \beta_{3i} MVA_{t-1} + \sum_{i=1}^{q} \beta_{4i} GFCF_{t-1} + \sum_{i=1}^{q} \beta_{5i} FDI_{t-1} + \sum_{i=1}^{q} \beta_{6i} EXCHR + ECM_{t-1} + \varepsilon_t$$

Where, α_1:i= 1, 2,…6 are the dynamic short-run coefficients and β_i:i= 1, 2,…6 represent long-run multipliers. The ECM_{t-1} represent the lagged error correction term which implies the speed of adjustment back to equilibrium. Negative and significant lagged error term signifies the existence of long run relationship among the variables of estimation. Others are as specified earlier.

Result Discussion

Unit Root Test Result

The result of unit root tests from ADF and PP are shown in Table 4.1. There is consistence between the two traditional tests on the order of integration of the variables. Variables TI, TW, MCU, MVA, GFCF are stationary at first difference. On the other hand, TB, FDI and REER are stationary at level. As noted in that traditional unit root test such as Dickey Fuller, Augmented Dickey Fuller, Philips and Perron, Kwiatkowski-Phillips-Schmidt-Shin, etc [27]. have low power in the presence of structural break and may confused structural break effect to mean non stationarity, for this reason, this study conducted breakpoint unit root test by employing innovational outlier model to confirm the order of integration of the variables in order to justify the application of ARDL in this study [30]. Innovational outlier model measures a sudden change in the series and also reveal the break date. The break date where the variable becomes stationary is chosen. Innovational outlier model result is shown in Table 4.2.

Table 4.1: Unit root test result

Variables	ADF		PP	
	t-stat	Level of int.	t-stat	Level of int.
TI level 1st difference	-1.600301 -5.418173*	I(1)	-1.314923 -6.997323	I(1)
TB level 1st difference	-5.018382* -6.458678	I(0)	-5.020052* -9.699731	I(0)
TW level 1st difference	-1.536549 -5.352971*	I(1)	-1.260851 -6.933889	I(1)
MCU level 1st difference	-1.181383 -4.291106*	I(1)	-1.326491 -4.370345*	I(1)
MVA level 1st difference	-1.056288 -6.670221*	I(1)	-1.059115 -6.486842*	I(1)
GFCF level 1st difference	-0.861246 -9.529075*	I(1)	-2.273843 -7.743892*	I(1)
FDI level 1st difference	-4.142391* -5.043589	I(0)	-4.042595* -13.70678	I(0)
REXCHR level 1st difference	-3.846128* -6.522229	I(0)	-3.953869* -6.841707	I(0)

Note: * represent 1% level of significance
Sources: computed by the Author.

Table 4.2: Unit Root with Structural Break Result (Innovational Outlier Model)

Variables	Intercept		Trend and Intercept	
	t-stat	Break date	t-stat	Break date
TI level 1st difference	-3.115829 -6.614875*	2005	-4.175418 -6.370384	2005
TB level 1st difference	-5.544881* -9.006064	1998	-5.480176* -8.814706	1998
TW level 1st difference	-3.213467 -6.384238*	2005	-4.287070 -6.267209*	2000
MCU level 1st difference	-3.751077 -5.719550*	2002	-3.737596 -5.559714*	2002
MVA level 1st difference	-3.257363 -8.595582*	1994	-4.188723 -8.595582*	1994
GFCF level 1st difference	-3.052564 -10.05399*	2014	-5.782361* -10.20379	2013
FDI level 1st difference	-5.914860* -8.811693	1994	-5.739744* -8.531058	1994
REER level 1st difference	-4.780376** -15.40110	1998	-6.743229* -15.40110	1998

Note: * and ** represent 1% and 5% level of significance respectively.
Source: computed by the Author.

Similarly, variables TI, TW, MCU and MV are integrated at first difference which is in congruent with the result of ADF and PP tests at both intercept and trend and intercept whilst variable TB, FDI and REER are also consistent with the result of ADF and PP as they are stationary at level. However, the result of GFCF at intercept and Trend and intercept are not consistent. The break dates are consistent for intercept and intercept and trend except for TW and GFCF. In a nutshell, the result confirm that the variables are of mixed order of integration which justify the ARDL technique employed in this study.

Cointegration Test Result

ARDL Bound Testing Result

The result of the ARDL bound test is carried out for the three models. The F-statistics of 4.6, 4.5 and 4.8 for models TI, TB and TW are above the critical values at 1%, 5% and 10% respectively as shown in Table 4.3 which implies that long-run equilibrium relationship among exist among the variables.

Table 4.3: ARDL Bound Testing

TI f-stat	k	TI f-stat	k	TW f-stat	k
4.598690	5	4.461454	5	4.836967	5

Critical value bound

Significance	I(0)	I(1)
1%	2.08	3
5%	2.39	3.38
10%	3.06	4.15

Estimated Long Run Result using ARDL Approach

The estimated long run result is shown in Table 4.4. the coefficients of manufacturing capacity utilization and manufacturing value added carry the expected sign but are insignificant for total diversification (TI) and intensive margin (TW) in the long-run. It implies that manufacturing sector is capable of promoting total diversification horizontal diversification if the sector is properly utilized. All the coefficients are positive but insignificant for extensive margin (vertical diversification) except foreign direct investment which differ but also insignificant. This can be attributable to the fact that Nigerian manufacturing sector is still at the lower stage of industrialization and also depend heavily on importation of raw materials for production instead of locally sourced input which could improve the productivity of other sectors particularly agricultural sector in Nigeria.

The coefficient of GFCF is negative and significant for total Theil and intensive margin which implies that I unit increase in GFCF will lead to 1.99% and 1.93% decrease in concentration respectively. This result is in congruent with the finding of that investment weigh more in economic diversification [7]. FDI and REER are positive but insignificant for total Theil and intensive margin whilst FDI and REER are negative but insignificant for extensive margin. This implies that foreign direct investment and real effective exchange rate play crucial role in vertical diversification but their impact have not been effectively utilized in Nigeria.

Short-run Dynamic and Error Correction Result

The short-run result shown in Table 4.5 revealed that there is no significant short-run dynamic relationship between manufacturing capacity utilization, Manufacturing value added, foreign direct investment, real effective exchange rate and diversification index. on the other hand, the coefficient of gross fixed capital formation is negative and significant for total diversification and intensive margin. Put differently, I% increase in GFCF will reduce concentration by 6.65% and 6.25% for total Theil and intensive margin respectively which implies greater diversification. The Error Correction Model (ECM) is negative and significant for total, extensive and intensive margin which confirm the presence of long run equilibrium relationship among the variables. It implies that 0.57%, 0.91% and 0.56% of the distortion in the previous year is corrected in the current year for total, intensive and extensive margin respectively.

Table 4.4: Long-run estimation result

Variables	TI		TB		TW	
	COEFF.	PROB.	COEFF.	PROB.	COEFF.	PROB.
MCU	-0.003132	0.6359	0.000307	0.4699	-0.003426	0.5917
MVA	-0.023187	0.2220	0.000900	0.3362	-0.023526	0.2059
GFCG	-1.99E-13*	0.0015	1.85E-15	0.4082	-1.93E-13*	0.0017
FDI	0.013184	0.6036	-0.000882	0.5921	0.013637	0.5758
REER	0.001006	0.1559	-7.63E-05	0.1232	0.001024	0.1326
C	7.856805*	0.0000	0.741444*	0.0000	7.051593	0.0000

Source: computed by the Authors

Table 4.5: Short-run Dynamic and Error Correction Result

Variables	TI COEFF.	PROB.	TB COEFF.	PROB.	TW COEFF.	PROB.
D(GFCF)	-6.65E-14*	0.0001	-		-6.25E-14*	0.0001
ECM (-1)	-0.577524*	0.0000	-0.919868*	0.0000	-0.569472*	0.0000

Note: * indicate 1% level of significance.
Source: computed by the Authors

Table 4.6: Diagnostic Test Result

	TI	TB	TW
R^2	0.63	0.56	0.63
Adj R^2	0.61	0.58	0.62
S.E	0.0711	0.0078	0.0067
BPG	8.545397 (0.2870)	7.257737 (0.2977)	6.731364 (0.4574)
JB	2.885 (0.236)	20.963* (0.000)	3.991 (0.136)
DB	2.24	2.26	2.24
RESET	0.925451 (0.3652)	2.659686 (0.1172)	1.618634 (0.2172)

Note: * indicate 1% level of significance; () indicate probability values.
Source: computed by the Author.

S.E is standard error of regression, JB, Jarque-Bera statistics, BPG, Breusch-Pagan-Godfrey heteroskedasticity test, DB Durbin-Watson serial correlation test, RESET residual specification error test.

The diagnostic test revealed that 61%, 58% and 62% variation export diversification (Total, extensive and intensive respectively) are explained by manufacturing capacity utilization, manufacturing value added, gross fixed capital formation, foreign direct investment and real effective exchange rate. Model TI and TW are normally distributed as revealed by Jarque-Bera statistics and their associated p-values whilst model TB is not normally distributed. It is interesting to say that the models are free from serial autocorrelation as shown by Durbin-Watson values which fall within the zone on no autocorrelation. Similarly, the models are homoscedastic as confirmed by Breusch-Pagan-Godfrey test.

The models do not suffer specification bias as revealed by Ramsey RESET. The result of variance inflation factor as shown in Table 4.6 also revealed that the total diversification model is not multicollinear.

The stability test result from CUSUM and CUSUM of squares shown in Appendix A figure 1A through 3B show that the models are stable as the plots do not cross the 5% level of significance. This implies that policy implication drawn from the models will be reliable. Multicollinearity test result is shown in Appendix B.

Conclusion and Recommendations

It has been long established that manufacturing sector in any economy drives the economy to sustainable growth and development. To ascertain this claim in Nigeria, this study investigated the role of manufacturing sector in economic diversification of Nigeria from 1986, the period Nigeria transform the structural composition of its entire economy to 2016. In order to achieve the objectives of the study, ARDL techniques was employed due to its robustness in estimating long-run relationship among variables regardless of whether those variables are integrated of order 1 or are of mixed order of integration that is I(0) and I(1) and its efficiency in case of small sample size.

The result from the ARDL revealed that only gross fixed capital formation has short run dynamic relationship with diversification both for total diversification and intensive margin index. The error correction term for the three models are negative and significant which affirm long-run convergence among the variables. In a nutshell, almost 58%, 92% and 57% of the distortion in the previous year is corrected in the present year for total, extensive margin and intensive margin respectively.

However, in the long-run, manufacturing capacity utilization, manufacturing value added, gross fixed capital formation is found to promote diversification for both total and intensive margin but only gross fixed capital formation was significant. Foreign direct investment and real effective exchange rate promotes concentration for both total and intensive margin but their coefficients insignificant. On the other hand, all the variables promote concentration for extensive margin except foreign direct investment which promote diversification in the long-run but their coefficients are insignificant which can be attributable to low industrialization and overdependence on imported raw materials for production instead of locally sourced materials which militate against the development of other sectors particularly agricultural sector.

This finding supported the view that manufacturing sector in Nigeria is next to nil. It is burdened by low capacity utilization and low productivity which explain why it has not impacted in the development of other sectors (agricultural sector) in particular. Given the relevance of manufacturing sector in economy, it will be foolhardy to neglect the sector thus the following recommendation becomes imperative [31-37].

i. Laws should be in place to protect infant industries in Nigeria such that the importation of products that the country is capable of producing be discouraged so as to raise the demand for local products. this will encourage local industries to keep producing and get better through learning by doing. More so, local sourcing of materials for industries that operate in Nigeria should be mandated. This will also pave way for them to easily expand production and diversify into high technology product as we have seen that diversification is path dependent.

ii. Investment in infrastructures particularly rail construction, energy supply etc, should be foremost in policy formulation. Infrastructural development enhanced the activities of the manufacturing sector thus placing it in its right position.

iii. Government can organize programs where manufacturers exhibit their products and those with unique and quality products are recognized and rewarded. This will make manufacturing sector more competitive leading to production of quality products that meet international standard. Stabilizing real effective exchange rate will encourage investment in productive sectors that will enhance diversification. Foreign direct investment should be utilized efficiently to enhance resource allocation and productivity.

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