

# Examine the Effect of Agricultural, Manufactured and Services (Value Added) on GDP Per Capita

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*Abstract—The study aimed at examining the Effect of Agricultural, Manufactured and Services (Value Added) on GDP Per Capita. In this study, the authors analysed secondary data from archives of government and international development agencies. The Solow growth model was modified to incorporate the non-oil export product diversification, while using an autoregressive distributed lagged model and granger causality test. Results from all the co-integration tests confirmed evidence for a long-run co-integration since the computed F-Statistics for Wald test value exceeds both the upper bounds and lower bounds critical values for all level of significance in Nigeria. The results of the long-run and short-run ARDL model on the impact of agriculture, manufacture and services value added on output performance reveal that the effect of services value added on GDP per capita is positive and insignificant, while the impact of manufacturing value added is negative and significant. Hence, there is need for further consolidation of Nigeria's traditional sectors with greater emphasis on the production of higher-value-added products, which entails investment in modernizing the technology base for these sectors. Thus, future studies should identify further economic performance variables with respect to specific countries and consider how these variables play their roles for better economic performance.*

Keyword— Export Diversification, Economic Growth, Gross Domestic Product, Per Capita Income

## 1. INTRODUCTION

The background of this research consists of a brief review of literature on export diversification, decomposition of export diversification and the examination of the decomposed variables of export diversification such as the following; agricultural value added exports, manufacturing value added exports and services value added exports. In addition, the impact of the decomposed variables on gross domestic product per capita in area of economic performance was also examined. In the next section of this study is the methodology, followed by the research analysis, discussion of results, and conclusion of the study. Thus, the main objective of this study is to examine the effect of agricultural, manufactured and services (value added) on GDP per capita in Nigeria.

## 2 REVIEW OF LITERATURE

### 2.1 Export Diversification

Export diversification has been variously defined as the change in the composition of a country's existing export product mix or export destination (Yonghui, 2003; Xu and Lu, 2007), or as the spread of production over many sectors (Berthelemy and Chauvin, 2000). However, as part of an export led growth strategy, export diversification is conceived as the progression from traditional to non-traditional exports (Agasha, 2009; Spence et al., 2012). Thus, by providing a broader base of exports, diversification can lower instability in export earnings, expand export revenues, upgrade value-added, and

enhance growth through various areas. These include: improved technological capabilities (Ajagbe and Ismail, 2014; Ajagbe et al., 2012) via broad scientific and technical training as well as learning by doing, facilitation of forward and backward linkages within output of some activities which then become input of some other activities; increased sophistication of markets, scale economies and externalities, and substitution of commodities with positive price trends for those with reducing trends in price (Barthelemy and Chauvin, 2000; Adeogun and Ajagbe, 2018). Given, the scope of this current study, the next section depicts the trend analysis of Non-oil export product diversification in Nigeria.

### 2.2 Decomposition of Export Diversification

Ayanwale (2007) categorized the Nigerian local sector into the oil and non-oil sector. However, this study focuses exclusively on the non-oil sector of the economy; that is the whole of the economic activities less oil and gas sub-sector. It covers agriculture, industry and the services sub-sector, including transport, communication, distributive trade, financial services, insurance, government, etc. in a very broad terminology. Each constituent is adequately profiled and analyzed as follows.

#### 2.2.1 Agricultural (Value Added) Exports

The traditional export sector in Nigeria consist of mainly agricultural/farm produce and is usually regarded as her traditional non oil export commodities (Onayemi and Ishola., 2009). These are cocoa, rubber, oil-palm, coffee, cotton, wood products, cassava, ginger, fish and shrimps

etc. Thus, it is important to mention that cocoa exports had pre-eminence as Nigeria's most exportable non-oil agricultural commodity (CBN 2015; NEPC 2013). However, the growing importance of global value chains in the international organisation of production increasingly challenges the traditional way of measuring a nation's export performance and hence international competitiveness (Frimpong, 2014; CBN 2015).

**2.2.2 Manufactured Export**

Frimpong (2014) argues that export of manufactured products is an essential route through which economic diversification could be achieved. The author added that it is also a key contributor to long term sustainable growth and poverty reduction as described by the theory of endogenous growth. Ayanwale (2007) notes that export of manufactures acts as a catalyst to transform the economic structure of countries, from simple, slow-growing and low-value activities to more productive activities that enjoy greater margins driven by technology and having higher growth prospects (Ajagbe et al., 2016; Adeogun, 2017; Iyoha and Oriahki, 2002; Abiso and Ajagbe, 2018). According to NEPC (2013), Nigerian manufactured exports to the international export market consists of textiles, chemical products, beer and beverages, urea-ammonia, insecticides, soap and detergents, plastics and non-metallic mineral products and processed skin etc.

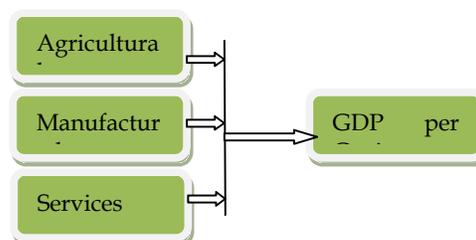
**2.2.3 Services Value Added Export**

Shin et al. (2012) suggests that the factors influencing national growth has often been a subject of investigation in the economic literature, and recently the growth of China and India has brought this argument to the fore. The aforementioned countries have taken two different routes to achieve annual growth rates of nearly 7 percent. Though China has adopted a more traditional manufacturing-led growth approach, the growth strategy of India has been driven by expansion in the service sector (Cabral and Viegas, 2010; Shin et al., 2012). The Indian experience has motivated researchers to view the conventional notion that industrialization is the only feasible avenue to rapid economic development (Frimpong, 2014). Even though manufacturing sector has continued to be a dominant driver of growth, recent developments indicates that the service sector must be included in the discussion (Xu and Lu, 2007; Yonghui, 2003).

**2.3 Economic Performance**

Adeogun (2017) posited that economic performance is the assessment of an economy in relation to the achievement of her objectives. Ajagbe et al. (2015) stressed that the objectives could be long term, such as sustainable growth and development, or short term, such as the stabilization of the economy in response to sudden and unpredictable events, known as economic shocks. It has been rightly established that export diversity is one of the critical

indicators of economic performance as it enhances employment generation through the development of export oriented industries, increase foreign exchange earnings and improves balance of payment position of a given economy (Onayemi and Ishola, 2009; Frimpong, 2014). Some studies argued that sustainable increase in income per capita is better achieved under export promotion policy (Basu and Das, 2011; Iyoha and Oriahki, 2002; Onayemi and Ishola, 2009). Hence, the main objective of this study is to examine the effect of agricultural, manufactured and services (value added) on GDP per capita in Nigeria. In figure 1 which reveals the research conceptual framework, consisting of the relationship among agricultural, manufactured and services value added on GDP per capita which translates to economic performance in Nigeria.



**Figure 1: Research Conceptual Framework**

**3 METHODOLOGY**

**3.1 Theoretical Framework of the study**

This study augmented the Standard Solow growth model (Adeogun, 2017). The Solow growth model assumes savings, population growth and technological progress as exogenous with two inputs in the form of capital and labour. A formal analytical framework for deriving the determinants of output performance in which export product diversification is included is developed. The initial step in the process is the specification of an explicit Cobb-Douglas production function of the usual form (Al-Marhubi, 2000). The study also in deriving the equation used incorporated relevant growth determinants variables such as major non-oil value added (Agriculture, Manufacturing and Services). This is done in order to underscore whether there are different effects for incorporating these macroeconomic series in modeling the relationship between export product diversification and output performance in Nigeria.

**3.2 Measuring Export Diversification**

In this study, Herfindahl-Hirschman index was used in line with previous studies (Al-Marhubi, 2000; Agosin, 2007; Hesse, 2008). The product diversification index in this study was computed using the Herfindahl-Hirschman procedure. Herfindahl-Hirschman Index (HHI) is the most widely used measure of output, trade and commodity diversification or concentration. For export product diversification, HHI is obtained thus;

$$HHI = \frac{\sum_{i=1}^N \left[ \frac{x_i}{X} \right]^2}{N} - 1 \dots\dots\dots (9)$$

Where,  $x_i$  is the export value of a specific product  $i$ ,  $X$  is the Nigeria total export while  $N$  is the number of products. The formula ensures that the value of the HHI ranges from 0 to 1. A higher HHI indicates greater concentration or penetration to fewer products in Nigeria. Data on export product in Nigeria was obtained from World Integrated trade Solution (WITs, 2001) database using the number of products exported at the three-digit SITC level.

**3.3` Estimation Techniques**

This present study embraces a time series data in Nigeria within a framework of theoretical linear autoregressive distributed lag model (ARDL). The model of ARDL helps researchers to capture both linear effect in the non-oil export product diversification relationship in both short run and long run (Asika, 2004; Adeogun, 2017). The study performs analysis at three different level of estimation to include; pre-estimation, model estimation and post estimation analysis. Preliminary tests would be performed before the main estimation of the model. This includes the uses of descriptive tests (including mean, median, mode and standard deviation), skewness and kurtosis of the series (Asika, 2004). Finally, Jarque-bera test statistic is used to establish the normality features of the series. Also, standard unit root and correlation analysis was performed in order to determine the stationarity and whether we can include all the series in a single estimable model. This study performs a test for the presence of co-integration among the variables using a bounds testing approach (Pesaran et al., 2001; Shin et al., 2012). Thereafter, the estimation of ARDL was done to determine both short and long-run estimable model. Then the study performed the Wald test of the null hypothesis  $\omega_0 = \omega_1 = \omega_2 = \omega_3 = 0$  to Short-run additive linear relationship. Also, we check the goodness of fit for the bounds through stability tests such as cumulative sum (CUSUM) and cumulative sum squares (CUSUMSQ). In addition, a number of post estimation diagnostic tests are conducted to include serial correlation test, linearity test, heteroskedasticity and the Autoregressive Conditional Heteroskedasticity (ARCH) effect. The hypothesis of this study was tested at 0.05 level of significance.  $H_{01}$ : Agricultural, manufacture and services (value added) have no significant effect on Gross Domestic Product per capita.

**4 DATA ANALYSIS**

Results of the descriptive analysis of the variables used in the regression analysis shows the mean, standard

deviation, skewness and kurtosis coefficients and the Jarque-Bera statistics to test the null hypothesis that all our variables are normally distributed among others. It is found that variability is highest for GDP per capita (GDPPC), but lower for Agricultural value added (AGRIC), Manufacturing (MAN) and Services value addition (SER) respectively. However, all the series are positively skewed except our measure of diversification, agriculture and manufacturing value added, that are negatively skewed and the Jarque-Bera statistics reject the null hypothesis of normality for SER at statistical significant level. Moreover, the Jarque-Bera statistics of other series accept the null hypothesis of normality. However, the pairwise correlation analysis of the variables used in the estimation is important to establish the level of association between GDP per capita and other determinants variables which has implication for their inclusion in the same model (Papageorgiou and Spatafora, 2012; Pesaran et al., 2001). The results suggest that the correlation coefficient between the variables are moderate and can co-exist in the same model. The results of the correlation analysis exert both positive and negative signs and coefficient for all variables. Specifically, GDP per capita (GDPPC), manufacturing (MAN) and services value added (SER) all exerts a moderate negative relationship with agricultural value added (AGRIC). Also, the estimated correlation result for Nigeria shows that only agricultural value added (AGRIC) exerts a positive relationship with non-oil export product diversification over the estimated period. Interestingly, services value added (SER) also depict a positive relationship with output per capita (GDPPC) in Nigeria.

In this study, the standard unit root test are conducted in order to determine the stationarity of all variables used in the regression analysis. The unit root test is conducted using both Augmented Dickey-Fuller (ADF) test and Phillips-Perron. The result shows that none of the series is of higher integrated of I(2). Test for stationarity shows that all variables are integrated of order I(1). Following from the theoretical framework and the results of the unit roots in the direction of mixture of stationarity – which justified the uses of autoregressive distributed lag model. This study proceeds to estimate different model based on the objective of the study. Moreover, under different estimated models, some variables were excluded in order to avoid the collinearity problem that is associated with some of them. Therefore, the results obtained from the analysis are presented based on the objective stated as follows.

**5 DISCUSSIONS OF FINDINGS**

**Effect of Agricultural, Manufactured and Services (value added) on GDP per Capita**

Proceeding to the co-integration test for the objective of the study; the empirical result from the bounds test co-

integration for the effect of agricultural, manufactured and services value added on GDP per capita in Nigeria is presented in table 1 below. The result reveals the computed F-Statistics for Wald test to be 13.97 on approximation. The value exceeds both the upper bounds and lower bounds critical values for all level of significance. Therefore, the statistics test yields evidence of a long-run relationship between agricultural, manufactured, services value added, GDP per capita at all levels of significance in Nigeria.

**Table 1: Bounds Testing for Co-integration Analysis**

Computed Wald F-Statistic: 13.9685 (AIC Lags = 1)		
Bounds level:	Lower I(0):	Upper I(1):
1% critical bounds value	2.65	3.97
5% critical bounds value	2.14	3.30
10% critical bounds value	1.88	2.99
Notes: for the Wald F-Statistic; Asymptotic critical value bounds are obtained from Table C1 (iii) Case III: unrestricted intercept and no trend for k = 9 (Pesaran et al., 2001, pg. 300).		

**Source: Author’s computation**

Hence the null hypothesis of no co-integration is rejected and long-run co-integration relationship is established among the variables in this model. In the ARDL results obtained from the empirical analysis of the effect of agricultural, manufactured and services value added on GDP per capita in Nigeria. The dependent variable is the logarithms of GDP per capita while the independent variables are the logarithms of AGRIC, MAN and SER. All variables were logged and estimation period is from 1981-2015. Looking at the model’s post estimation diagnosis tests, the residual series are normally distributed as suggested by the Jarque–Bera statistics, while the Breusch–Godfrey LM test statistics indicate that the model does not have significant serial correlation problem. Moreover, the ARCH test and the Ramsey RESET test respectively show that the residuals are homoscedastic and the model has correct functional form. The results of the long-run and short-run ARDL model on the impact of agriculture, manufacture and services value added on output performance were also tested. The long-run results reveal that the coefficient of agriculture value added is statistically insignificant, even though the sign of the coefficients of the variables is negative. The results show that the effect of services value added on GDP per capita is positive and insignificant, while the impact of manufacturing value added is negative and significant. Thus, a 1.0% rise in services value added raised the level of growth by about 0.125%. The short-run ARDL model shows that the major factor for the high growth of

economic performance was manufacturing value added, while agricultural value added, is less important in driving growth process. Thus, 1.0% increase in past value of manufactured value addition leads to about 0.244% rise in total growth. In general, the fit of the regression equations in this study is quite good ( $R^2 = 0.99$  and adjusted  $R^2 = 0.99$ ) as can be seen in the study analysis. The R-squared shows that all the independent variables in our model explain approximately 99% of the variations in growth process in Nigeria (dependent variable) in the period under consideration. Also, the joint F-test statistic was found significant (0.0004) at 1%, showing the test for testing jointly the independent variables. Pertinent to the above, the Durbin-Watson (DW) statistic (measure for the presence of autocorrelation in the model) is 3.369, it is noticed therefore, that our model is free from autocorrelation as the value is above 2. This means that the model is reliable in explaining the dynamics between agricultural, manufactured, services value added and GDP per capita in Nigeria. This results are consistent with the findings of Ayanwale (2007) that export of manufactures acts as a catalyst to transform the economic structure of countries, from simple, slow-growing and low-value activities to more productive activities that enjoy greater margins driven by technology and having higher growth prospects (Ajagbe et al., 2016; Adeogun, 2017; Iyoha and Oriahki, 2002).

**6 CONCLUSION AND RECOMMENDATIONS**

This study examined the type and strength of the relationship that exists between non-oil exports diversification and growth performance in Nigeria between the period of 1981 and 2015. The results of the long-run and short-run ARDL model on the impact of agriculture, manufacture and services value added on output performance reveal that the effect of services value added on GDP per capita is positive and insignificant, while the impact of manufacturing value added is negative and significant. The short-run ARDL model showed that the major factor for the high growth of economic performance was manufacturing value added, while agricultural value added, is less important in driving growth process in Nigeria while a deviation from the long-run equilibrium is corrected for on a yearly basis. Interestingly, the impact of non-oil export product diversification on output performance recorded a positive significant effect on growth in Nigeria. This study suggests that there should be further consolidation of Nigeria’s traditional sectors with greater emphasis still being placed on the production of higher-value-added products, which entails investment in modernizing the technology base for these sectors. Hence, future studies should identify further economic performance variables with respect to specific countries and consider how these variables play their roles for better economic performance.

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