

The Impact of Agriculture, Industry and Services sectors on Gross Domestic Product in Nigeria

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Abstract

This study analyzed the impact of Agriculture, Industry and Service sector on Gross Domestic Product (GDP) in Nigeria from 1981 to 2019. The study was designed to examine the performance of the activity sectors and to determine its impact to Nigerian's GDP for the period under study using two-way analysis of variance. This study revealed conclusively that the impacts of the three activity sectors to Nigerian's GDP from Agriculture, Industry and Services are significantly different. It is recommended that the Nigerian government should come up with a strategic master plan to diversify the economy using the Agriculture, industry and service sectors since the Nigerian economy from our analysis is grossly dependent on the impact of Services to GDP.

KEYWORDS: Agriculture, Industry, Services, Gross Domestic Product (GDP) and ANOVA model

1. INTRODUCTION

Agriculture, industry and services has been generally accepted as the surest and most direct route to economic development of any country like Nigeria. Their potentials, if properly harnessed, has the capacity to grow a Nation income. On one hand, agriculture serves as a means to provision of food; source of raw materials; provision of employments; source of income; earning of foreign exchange; creation of market for industrial product; provision of income for industries and a source of labour for industries.

In Nigeria, the agricultural sector was neglected during the oil boom. In fact, the contribution of the sector to total GDP has fallen over the decades. From 1960 to 1970, the sector contributed 55.8% to GDP but fell drastically to 28.4% in 1971 to 1980. Fortunately, successive governments in Nigeria have beginning to give priority to agriculture. And in 1981 to 1990 the agricultural sector contribution to GDP rose to 32.3%; while in 1991 to 2001 and 2001 to 2009 the sector contributed 34.2% and 40.3% to GDP respectively (Mohammed, 2012). To be precise in 2008, economic activity in Nigeria was dominated by Agriculture, which accounted for 42.1% of GDP, followed by industry (22%), wholesale and retail trade (17.3%), services (16.8%) and, Building and construction (1.8%). The share of Agriculture in Nigeria's GDP increased by 11.6% points during the last twenty five years, that is, from 30.5% in 1984 to 42.1% in 2008. While within the same period, the share of industry in Nigeria's GDP decline from 42.4% to 22% given a loss of 20.4% points (Ikoku, 2010). Recently, the Government of Nigeria has made facilities available to help farmers in providing them fertilizers, and other farm inputs through the local and State governments. All these efforts are geared towards diversification of the economy.

Industrialization is another way a country like Nigeria can diversify her economy. In Nigeria indigenization policy has been formulated and implemented to serve as a process of promoting industrialization through indigenes and indigenous means. The country have employed some strategies to encouraged industry development in Nigeria, they include import substitution strategy; export promotion strategy; small-scale verses large scale industrial development and balance growth strategy. Other strategy are introduction of high tariff on some importation of goods to discouraged importation and campaign for Nigerians to patronize made in Nigeria goods. Because of the positive impact of industrialization to GDP growth, the Nigerian government through the Ministry of Trade and Investment is partnering with other nations of the world in setting up industries in Nigeria. Also the government is addressing security issues to promote peace and political stability; all these efforts are geared towards industrialization the Nigerian economy.

Sector plays a critical role in modern economy and its benefits are crucial for economic transformation. Sectorial is relating to the various economic sectors of a society or to a particular economic sector. As a matter of fact, sectorial creates an avenue for increase in productivity through import replacement and export expansion, creating foreign exchange earning capacity, creation of employment and raising the per capita income, which spurs unique consumption patterns (Beckerman, 2007).

According to Benneth and Anyanwu (2015) the contributing factors to this abysmal performance includes restrictive access to loanable funds, inadequate funds for manufacturing existing industries as well as insufficient funds for expansion. The lack of funds and enabling environment for industrialists has greatly denied the nation the capacity of achieving significant industrial growth and development in Nigeria.

The impact of the various activity sectors to GDP can never be emphasized. The value of Nigerian GDP has been on a steady increase, it becomes pertinent to study how agriculture, industry and Services sectors contribute to GDP based on the huge amount of budgetary allocation by the government to these key sectors of the economy in line with the transformation agenda of the present Federal government. The idea of GDP came out of the Great Depression and World War II (Dickson, 2011).

To put in perspective, The Nigerian economy stated experiencing serious difficulty in furthering its industrial development following the discovery of oil in the late 1960s. These difficulties can be attributed to: a weak raw material base, inadequate technical manpower, poor policy implementation, poor entrepreneurship, political instability, corrupt government institutions and poor technical know-how.

The vision of making Nigeria one of the top twenty economics of the World can only be possible if the Nigerian economy is diversified. This study seeks the performance of industrial sector to Nigerian GDP using Two-way ANOVA model industrial contribution to GDP and the development process of the economy.

1.1 Previous Research

Liu and Liu (2014) examined the determinants of economic growth and industrialization based on the growth identity equation. This identity links total output growth with the performance of the three economic sectors (agriculture, industry and Services) measured by their sectorial rates of output growth and weighted by each sectors output share in GDP. Using the data from 164 countries from 1970 to 2010, the study reveals that there exists a nexus between economic growth and industrialization.

Usman and Ijaiya (2011) studied budgetary allocations and sectoral contributions to economic development in Nigeria using a Vector Autoregressive (VAR) model to estimate the impact of the sectors on GDP, they examined the underlying factors responsible for the poor performance of sectoral allocation to key sectors (Agriculture, Education, Health and Transport) of the economy. Their result showed a clear response of the GDP to budgetary allocations on Education, Health and transport except Agriculture. To increase the sectors contribution to the economy, they suggested that more budgetary allocation should be provided for the key sectors. Marwan et (2010) estimated Real GDP growth

Uchechukwu and Elizabeth (2015) carried on sectorial contributions to Nigeria Gross Domestic Product by Agriculture, Industry and Services sectors of the economy using a vector Auto regression (VAR) approach. The test of



stationarity using Augmented Dickey Fuller ADF showed that all the variables were integrated of order one. Granger causality was used to find the linkages among the variable under consideration. The result showed bilateral causality between GDP and sectoral contribution to GDP by industry. Therefore the unrestricted VAR parameter estimate was obtained for GDP and sectoral contribution to GDP by Industry. In conclusion, it is recommended that the Nigerian government should come up with strategic master plan to diversify the economy using the Agriculture and services sectors since the Nigerian economy from our analysis is grossly dependent on sectoral contributions of industry to GDP.

Anyanwu, Kalu and Alexanda (2015) analyze the effect industrial development on the Nigeria's economic growth 1973 to 2013. The result of funds reveals that the influence of industrial output on economic growth is not statistically significant. Savings has a positive relationship and also significant impact on the economy. Inflation has a negative relationship while net foreign direct investment is positively significant on the impact of economic growth.

Akpan, Riman, Duke II and Mboto, (2012) identified the role industrial sector plays in driving the GDP in Nigeria. They used VECM to establish the cointegration relationship between industrial production, non-oil exports and GDP. Their work revealed the existence of a positive and significant uni-directional relationship that runs from industrial production to non-oil exports. They also showed that the current policies on industrial production in Nigeria do not sufficiently encourage non-oil export. They recommended that remedial measures should be taken to strengthen the ailing industries and that the Agricultural credit Guarantee Scheme in Nigeria should be strengthened as well.

2. MATERIALS AND METHODOLOGY

The data for the study was collected from Central Bank of Nigeria Statistical bulletin 2019. The data was arranged on yearly basis and was collected for a period of Thirty-nine years (1981 – 2019). The data showed Nigerian GDP impacts to GDP from Agriculture, Industry and Services all expected in billions of naira. The two-way analysis of variance (ANOVA) model was used in this study. The test were carried out with the aid of a statistical package, Minitab.

2.1 The Two-way Analysis of Variance (ANOVA)

Nwachukwu (2008), is a Statistical method for determining the existence of differences among several population means. The aims of ANOVA are to detect differences among several population means and to test the significance difference based on treatments and observations.

2.2 Assumptions of ANOVA

- i) The Normality $N(0, \sigma^2)$
- ii) The equality of population variances i.e σ^2
- iii) The independence of observations

2.3 The two-way ANOVA model

According to Nwobi (2003), the model for the two-way ANOVA is given by

$$X_{ij} = \mu + t_i + \beta_j + e_{ij} \quad \begin{matrix} i = 1, 2, \dots, a \\ j = 1, 2, \dots, b \end{matrix}$$

Where,

- μ = the overall mean
- t_i = the fixed row (Factor A or years 1981 – 2019)
- β_j = the fixed column (Factor B or activity sectors)
- e_{ij} = the error term associated with mean, 0 and variance, σ^2

The necessary computations for determine of the test statistic for two-way ANOVA (without interaction) can be summarized in an ANOVA table as shown in table 2.1.



Table 2.1: The two-way ANOVA (without interaction)

Source of Variation	Degree of freedom	Sum of Squares	Mean Squares	F-ratio
Factor A (treatment)	a - 1	SS _{treatment}	MS _{trt} = SS _{trt} /a - 1	MS _{trt} / MS _e
Factor B (block)	b - 1	SS _{block}	MS _{blk} = SS _{blk} / b - 1	MS _{blk} / MS _e
Error	(a - 1)(b - 1)	SS _{error}	MS _e = SS _e / (a - 1)(b - 1)	
Total	ab - 1	SS _{total}		

Critical value

The critical value of a two-way ANOVA is given by

$$F_{\alpha}^A (a - 1)[(a - 1)(b - 1)]$$

And

$$F_{\alpha}^B (b - 1)[(a - 1)(b - 1)]$$

Decision Rule

If $F^A - ratio \geq F_{\alpha}^A (a - 1)[(a - 1)(b - 1)]$ we reject H_0^A and accept H_1^A (Factor A)

And

If $F^B - ratio \geq F_{\alpha}^B (a - 1)[(a - 1)(b - 1)]$ we reject H_0^B and accept H_1^B (Factor B)

Conclusion:

Rejection of the null hypothesis means that there is significant difference among the population means ($P < 0.05$) and acceptance of the null hypothesis means that there is no significant difference among the population means ($P < 0.05$).

3. RESULTS AND DISCUSSIONS

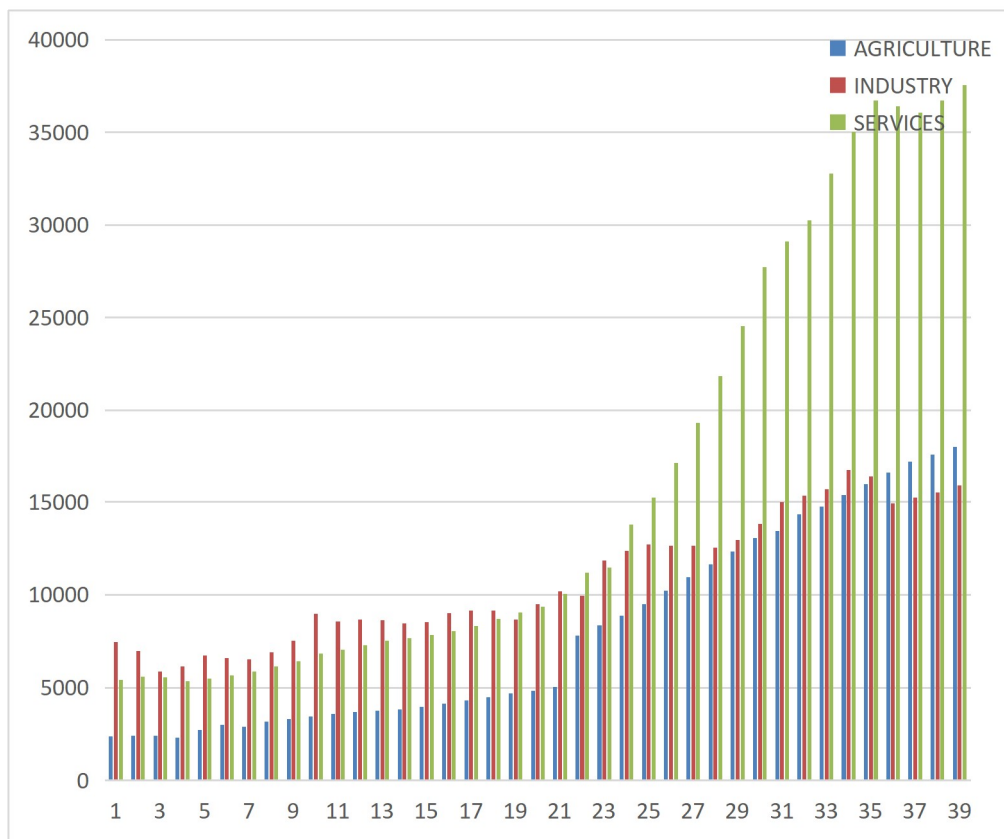


Fig.3.1: A bar chart showing Nigeria's GDP of various activity sectors (in billions) Years (1981- 2019)



Interpretation:

The above analytical result reveals that Industries contributed higher than services to GDP while Agriculture has the least impact until the year 1999 when impact of Services supersedes that of the industries till date. Worthy of note is that agriculture has the least contribution to GDP except in the year 2016 when the contribution of agriculture supersedes that of the industry while services maintains the highest contributor to GDP.

Table 3.1: ANOVA: Two Factor without replication

YEARS	COUNT	SUM	AVERAGES	VARIANCE
1981	3	15258.01	5086.00	6608942
1982	3	14985.07	4995.02	5423893
1983	3	13849.73	4616.58	3682206
1984	3	13779.26	4593.09	4085486
1985	3	14953.91	4984.64	4193288
1986	3	15237.99	5079.33	3493755
1987	3	15263.92	5087.97	3727131
1988	3	16215.37	5405.12	3873318
1989	3	17294.68	5764.89	4769209
1990	3	19305.62	6435.21	7768708
1991	3	19199.07	6399.69	6510737
1992	3	19620.19	6540.06	6643334
1993	3	19928.00	6642.67	6610534
1994	3	19979.13	6659.71	6115068
1995	3	20353.20	6784.40	6033481
1996	3	21177.93	7059.31	6659419
1997	3	21789.1	7263.03	6732435
1998	3	22332.86	7444.29	6658379
1999	3	22449.41	7483.14	6829419
2000	3	23688.28	7896.09	7004456
2001	3	25267.54	8422.51	8664680
2002	3	28959.71	9653.24	2914243
2003	3	31709.45	10569.82	3684021
2004	3	35020.54	11673.51	6319450
2005	3	37474.94	12491.65	8225108
2006	3	39995.50	13331.83	12261115
2007	3	42922.41	14307.47	19599672
2008	3	46012.51	15337.50	31906506
2009	3	49856.10	16618.70	47337825
2010	3	54612.26	18204.09	68307612
2011	3	57511.04	19170.35	74480902
2012	3	59929.90	19976.63	79413018
2013	3	63218.71	21072.90	103109859
2014	3	67152.78	22384.26	120404205
2015	3	69023.93	23007.98	140750304
2016	3	67931.24	22643.75	142757893
2017	3	68490.99	22830.33	132472487
2018	3	69799.95	23266.65	1370159039
2019	3	71387.83	23795.94	142894290

Interpretation: The above result reveals that yearly impact of agriculture, industries and services to GDP fluctuates as the years go by. This is based on the fact that the yearly sum, average and variance are not stable as they change as the years go by.

Table 3.2: Statistical summary according to sector

SUMMARY	COUNT	SUM	AVERAGE	VARIANCE
AGRICULTURE	39	310313	7957	28619641
INDUSTRY	39	420475	10781	11532129
SERVICES	39	622148	15953	136039441



Interpretation: The above result reveals that on the average, services has the highest impact, followed by the industries and lastly agriculture. Also there is variation on the yearly impact of agriculture, industries, and services of which services has the highest, followed by agriculture while industries have the least.

Table 3.3: The Two-way ANOVA Table

SOURCE OF VARIATION	DF	SS	MS	F	P
Factor A (Years 1981 – 2019)	38	5187858676	136522597	6.88	0.000
Factor B (Activity sectors)	2	1282472352	641236176	32.33	0.000
Error	76	1507407364	19834307		
Total	116	7977738393			
S = 4454 R-Sq = 81.10% R-Sq (adj) = 71.16%					

Interpretation: The above result reveals that on the average, services, industries and agriculture significantly contributed to GDP. The rate of their contribution to GDP is 81.1%.

4. CONCLUSION

The impacts of the three activity sectors to Nigeria's GDP for the period under study (1981 – 2019) are significantly different. Also, the yearly contributions across the activity sectors has been different.

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