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COVID-19 Pandemic and Nigeria's Economic Growth: A Comparative Analysis of Pre and Post 2020

[1]**Anyadike, Kennedy &** [2]**Mgbomene, Chukunalu**
[1]*Department of Business Administration, Imo State Polytechnic, Omuma*
[2]*Department of Economics, Imo State University, Owerri Nigeriat*

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Abstract

The outbreak of COVID-19 pandemic affected the global economy, Nigeria inclusive. As a result, economic forecasts predicted a global recession for the year 2020 and possibly beyond. Hence, this study aims to examine the extent to which covid-19 pandemic has affected the growth of the Nigerian economy by doing a comparative analysis of pre and post 2020 covid-19. Monthly time series data was employed from the period January 2018 through October 2022. The model specified used real gross domestic product as the dependent variable while the regressors were agricultural output, industrial output and services sector output. COVID-19 was used as an economic growth interruption variable rather than a real quantitative variable and its effect in the model was evaluated using the Chow break-point test. The stated hypotheses were tested using the t-test, F-test and coefficient of multiple determination (R^2). Other tests conducted were stationarity test and the ARDL Bounds test for co-integration. The Chow test revealed that structural break existed at the specified break point period of May 2020. Hence, we estimated the model parameters before and after the break-point period. The result revealed that the agricultural sector increased real GDP significantly before and after the month of May 2020. The industrial sector's output was positive but not significant before the pandemic, it became significant after the pandemic. The services sector did not significantly increase real GDP before the pandemic, but afterwards, the sector's contribution to GDP slipped to negative. The study concluded that the Nigerian economy has obviously been largely affected by the covid-19 pandemic with the services sector being highly affected. It was recommended that government should make deliberate favourable policies that will further enhance the agricultural and industrial sectors output and that the government should serve as encouragers in the services sector as this will make young entrepreneurs to invest more in myriads of services available in the services sector in this period of post covid-19 recovery.

Keywords: *COVID-19, Pandemic, Structural break, Nigerian economy*

Corresponding Author: **Anyadike, Kennedy**

Background to the Study

The COVID-19 pandemic adversely affected the global economy. Specifically, the pandemic affected the global travel business, national health care systems, the food industry, events industry, education and global trade. As a result of the COVID-19 pandemic, economic forecasts predicted a global recession for the year 2020 and possibly beyond. The IMF's World Economic Outlook, April 2020 puts the global economy to contract by 3% during 2020, although a rebound of 5.8% GDP growth was witnessed in 2021, as economic activity normalizes post-COVID.

Nigeria's total GDP in 2020 for instance, was reported at N432.29 billion from N448.12 billion in 2019. In the first quarter of 2021, Nigeria's GDP was recorded at 0.51%, The Q1 2021 growth was slower than the 1.87% growth rate recorded in Q1 2020 but higher than 0.11% recorded in Q4 2020, indicating a gradual but steady growth (CBN, 2021). Based on the premise of projected recovery in crude oil output and price levels; real GDP growth in 2021 increased to 2.5%, according to the IMF (2022).

Prior to the COVID-19 pandemic, Nigeria's agriculture industry contributed approximately 26.95% (22.6 trillion) to the country's GDP of 104 trillion dollars at the end of the fourth quarter of 2020. Unfortunately, the pandemic prevented this contribution from having any effect on the economy, as hunger and inflation rates remained high. To address this, the government implemented feeding palliative measures, which were ineffective due to the length of time between pronouncement and execution. Subsequently, in October 2020, when the warehouses containing these palliatives were found, citizens scrambled for their share of the national cake, causing widespread panic, death, and damage to property (Dushime and Osele, 2021).

In March 2021, the agricultural sector accounted for 22.35% of total GDP, up from 21.96% in the first quarter of 2020 but down from 26.95% in the fourth quarter of 2020 (CBN, 2021). In real terms, the agricultural sector increased by 2.28% in the first quarter of 2021, a gain of 0.07% points over the same time in 2020, but a decline of -1.14% points over the previous quarter, when it grew by 3.42%. The agriculture industry increased at a rate of –28.61% Quarter-on-quarters (CBN, 2021). The manufacturing sector, according to the CBN (2021) as part of the industrial sector recorded negative growth due to the fact that manufacturing activities in Nigeria was halted in response to the government's shutdown directives, affecting a variety of businesses that are directly or indirectly related to manufacturing, such as the cement, steel, metal, plastic, and glass production industries. Many of these enterprises suffered from low income due to employee-related issues like premature death, absenteeism, and productivity losses, which resulted in a negative supply shock caused by global supply chain disruptions and factory closures.

Manufacturing employment stood at 56.4%. However, by June 2020, employment levels had dropped by 33.69%, to 37.4 points, and decreasing. Aside from the effects on production and employment, business activities in the sector fell for the sixth consecutive month in October, dropping to 46.0 points from 56.4 points in February 2020, a decline of 18.44% (CBN, 2021).

Despite the events of the previous year, the Manufacturing sector's real GDP turned positive at 3.4%, leading overall growth of the non-oil sector by 0.79% in Q1 2021 following three consecutive quarters of negative growth since the last growth in Q1 2020 at 0.4%, marking the highest growth recorded since Q1 2018 (World Bank, 2021). The improvement in 2021 reflects the sector's steady recovery from the COVID-19 pandemic, aided in part by the government's lifting of the country's mobility and travel restrictions, allowing for the resumption of commercial operations. In addition, the many policy initiatives enacted by the government to support economic recovery also assisted the sector's revival. Furthermore, gains from export via open borders and increased credit supply to businesses operating in the sector also relieved some of the harsh effects of the pandemic. Consequently, in February 2021, manufacturing PMI increased to 48.7 points from 44.9 points in January 2021 albeit still lower than pre-COVID levels (World Bank, 2021).

The shock impact of the COVID-19 pandemic hit the oil and gas industry hard, resulting in a significant reduction in demand for products, as well as plummeting prices and income. In Q4 2020, the industry contributed 5.87% to total real GDP, down 19.81% from the previous quarter's contribution of 7.32%. The industry's contribution to GDP has progressively decreased from Q1 2020 to Q4 2020, at 9.50%, 8.93%, and 8.73%, respectively. Finally, in Q1 2021, the oil sector's contribution to the country's GDP increased to 9.25% (World Bank, 2021). One of the most significant effects of COVID-19 on the Oil and Gas sector has been to persuade the government of the need to diversify the economy and revenue streams (Farayibi and Asongu, 2020).

The services sector was almost halted as a result of the restrictions. Considering the financial sector for instance; during the early phases of the pandemic, there was a clear correlation between the scale of the pandemic and financial and stock market volatility. The bigger consequences of this volatility affected credit markets, banks, and other financial institutions, and may have resulted in more severe economic downturns if the CBN had not pursued monetary stimulus so aggressively. The Financial and Insurance Services sector grew by –0.46%, or –21.26% points lower from the rate recorded in the first quarter of 2020, but 3.16% points higher than the rate recorded in the preceding quarter. Quarter-on-quarter growth in real terms stood at 5.78% (CBN, 2021). The sector's contribution to real GDP was 3.77%, lower than the contribution of 3.81% recorded in the first quarter of 2020 by –0.04% points, but higher than 3.07% recorded in Q4 2020 by 0.70% points. Financial Institutions under Financial and Insurance Sector grew by 0.15% in Q1 2021 from -2.48% in Q4 2020 and 24.00% in Q1 2020 (NBS, 2021).

Tourism was hit the worst by the virus since it had the most direct contact with humans, and as a result, it was shut down earlier than other businesses in Nigeria. Travel restrictions on international and domestic flights have had a significant impact on the tourism industry, with about 96% of tourist destinations throughout the world applying travel restrictions (Nweze and Nnadi, 2021).

The transportation sector experienced the worst contraction at 21.89% in the first quarter of 2021. Due in part to the work from home (WFH) policy adopted by several companies in

Nigeria in response to the COVID-19 pandemic and majorly to the growing insecurity on Nigerian roads. Year on year, the industry contributed 1.18% to real GDP in 2020 (CBN, 2021). Demand for public transportation soared in Q1 2021, as the entire state was thrown back onto the streets from the first day of the easing of the lockdown rules. Consequently, traffic increased 3 times more than what it was before the lockdown.

Telecommunications services throughout experienced a rise as a consequence of increased demand for voice and data, which was fuelled by the country's lockdown regulations (World Bank, 2021). Telecommunications & information services sector grew by 7.69% in Q1 2021 from 17.64% in Q4 2020 and 9.71% in Q1 2020. Motion pictures, sound recording, and music production sector grew by 2.21% in Q1 2021 from 2.51% in Q4 2020 and 0.33% in Q1 2020 and broadcasting to grew by 2.45% in Q1 2021 from 4.42% in Q4 2020 and 1.81% in Q1 2020 (NBS, 2021).

Statement of the Problem

Before the pandemic in 2020, the Nigerian economy had witnessed unstable growth caused by insecurity, unemployment challenges and the likes (Dushime et al, 2021). With covid-19 therefore, did the Nigeria economy become more unstable or not owing to the fact that there was total lockdown which led to the closure of many businesses? In addition, another problem that necessitated this study is the need to ascertain the response of GDP growth rate to the changes experienced in the various sectors that make up the GDP. Because according to Onyekwena and Ekeruche (2020) the IMF revised the 2020 GDP growth rate from 2.5% to 2%, as a result of relatively low oil prices and limited fiscal space. Therefore, can we safely conclude that the economic growth rate was unaffected by the covid-19 pandemic and the components of GDP were also unaffected? This creates a known and quantifiable research problem which we subjected to econometric analysis as we try to explore the true position of the economic growth indicator now that the pandemic has eased economic movements around the world.

Objectives of the Study

The main objective of this study is to determine the extent to which covid-19 pandemic has affected Nigeria's real gross domestic product. While the specific objectives are, to analyse the extent to which the agricultural sector contributed to Nigeria's economic growth before and after the covid-19 pandemic; to investigate the effect of the industrial sector on economic growth of Nigeria before and after the covid-19 pandemic; to ascertain the contribution of the services sector to Nigeria's economic growth before and after the covid-19 pandemic.

Statement of Hypotheses

The hypotheses to be tested in this study are stated in their null forms as follows:

H_{01}: The agricultural sector had no significant effect on the economic growth of Nigeria before and after the covid-19 pandemic.

H_{02}: There was no significant effect of the industrial sector on Nigeria's economic growth before and after the covid-19 pandemic.

H_{03}: The services sector had no significant effect on economic growth of Nigeria before and after the covid-19 pandemic.

Significance of the Study

This study will satisfy the curiosity of the academic community because it will empirically analyse the sectorial effect of the covid-19 pandemic on Nigeria's economic growth. This will provide ample theoretical and empirical literature to future researchers in the field of economics and beyond.

Again, the government can use the findings made here to shape future economic policies that will help accelerate the economic recovery plans of the federal government. Stakeholders and investors in the Nigerian economy will get to know the true state of the Nigerian economy as regards the covid-19 pandemic and use same knowledge to shape their analysis and future investments in the economy.

Literature Review

The Keynesian theory holds that a recession is caused by an aggregate demand shock. In the first quarter of the year 2020, the Nigerian government announced a first phase of complete lockdown to stop the virus's spread (NCDC, 2020). After the announcement, all industries, hotels, gyms and offices were closed and restricted. This situation, firstly, affected the aggregate demand at any level of prices. It decreased the current preferred consumption; consistently, an increase in the current preferred saving was witnessed. According to the Keynesian theory, COVID-19 has created a scenario in Nigeria where the supply and demand for goods and services have temporarily halted. The spread of COVID-19 caused a reduction in demand (for goods and services), bringing countries on the verge of economic recession.

On the other hand, the coronavirus (COVID-19) outbreak resulted in a long-term decrease in productivity. The government of Nigeria shut down all industries for a specific period. The other reason was that if the government permitted people to work, several companies and private sector players did not want their employees to work because of low demand. They could not afford the high cost of production being met with low demand and low prices. Manufacturing and production investment are positively connected to collective needs. Businesses invest more when they expect to get high returns on their investments, and the profit ratio is high when predictable demand is high. The decreases in investment further decreased production progress and, alternatively, collective need, and the cycle continues.

Ozili (2020), analysed the COVID-19 situation in Nigeria, its effect on the economy and the structural causes that worsened the coronavirus (COVID-19) crisis. Using content analysis, the findings revealed that the economic downturn in Nigeria was triggered by a combination of declining oil price and spill overs from the COVID-19 outbreak, which not only led to a fall in the demand for oil products but also stopped economic activities from taking place when social distancing policies were enforced. The government responded to the crisis by providing financial assistance to businesses and a small number of households that were affected by the coronavirus (COVID-19) outbreak. The monetary authority adopted accommodative monetary policies and offered a targeted ₦3.5trillion loan support to some sectors. The study concluded by asserting that the scope and severity of the economic crisis in Nigeria, caused by the fall in oil price and the COVID-19 pandemic, was a clear signal that growth and development reforms were needed in Nigeria.

Ayooluwa (2020), examined COVID-19 and Nigeria's Services Sector. The study showed graphical representation of the impact of the pandemic on the services sector. He observed that prior to the pandemic, the services sector experienced modest growth as it grew by 2.22% in 2019 from 1.83% in 2018 and -0.91% in 2017. During the 2016 recession (which was due to a decline in commodity prices), the services contracted by 0.82% underscoring the expected downturn in sectoral activity as the nation's economy headed towards another recession. In the aftermath of the 2016 recession, activity in the sector picked up as it rebounded from two consecutive years of negative growth rate. The study held that indeed, as the pandemic took hold in Nigeria, with more cases seen, the services sector started showing early signs of decline.

Farayibi and Asongu (2020) reviewed the macroeconomic impact of the Covid-19 pandemic in Nigeria. The study used daily data on Covid-19 pandemic for the period of Feb 28th to June 20th 2020 for Nigeria. Figures on total confirmed cases, total discharged, total fatalities (death) and total number of laboratory tests carried out were used. The macroeconomic variables used were GDP growth rate, inflation, unemployment, exchange rate and crude oil price. Some of the macroeconomic data were disaggregated in daily frequency to ensure uniformity. They analysed the data using trend analysis and the dynamic ordinary least square technique. From the findings, while the number of infected cases reflects significant correlations with economic activity from the perspective of a trend analysis, the estimates from dynamic ordinary least squares (DOLS) showed that nexus between the number of confirmed cases and attendant macroeconomic outcomes were largely insignificant with the expected signs. The study therefore showed that the Covid-19 pandemic had insignificant negative impacts on basic macroeconomic variables in Nigeria such as inflation, employment, exchange rate, GDP growth, among others.

Nweze and Nnadi (2021), did an empirical Assessment of the effect of Covid-19 lockdown on the Nigerian economy. The study adopted survey design using structured questionnaires administrated to Nigerians of different ranks in selected states. The data collected with the aid of questionnaires were analysed using statistical package for social sciences (SPSS) version 20. Two hypotheses were formulated and tested using Godden Statistical tool. The result of the study revealed a significant positive relationship between Covid-19 economic lockdown and Nigerian economy. The study also found that government policy had significant positive effect on the economy of Nigeria. They recommended that Covid-19 has made it possible for best practice in global health management to be entrenched and this should be strictly observed in practice so as to reduce its impact and grow the economy.

Abdulyakeen (2021), examined the impact of COVID 19 pandemic on the Nigerian economy. Secondary data on NSE all share index, crude oil price, government revenue, FDI and remittances was used and subjected to discussions. No further analysis was made on the data. The study opined that the market self-correcting mechanisms may fail for both the commodity and more specifically, the financial markets. The conclusion was that the response made by the Nigerian policy makers to reduce the impact and the lessons learnt from the pandemic by Nigerian government is being confronted with impediments such as short run in nature, lack of wider reach etc.

The United Nations (2021) did a survey on the impact of covid-19 on business enterprises in Nigeria. A total of 3,000 (2,100 formal and 900 informal) establishments were selected to participate in the study. 2,158 formal and 806 informal establishments responded to the questionnaire for the survey. Thus, the report was based on a sample of 2,964 enterprises which were spread across the country and across the main sectors that make up the Nigerian economy. They concluded that it is likely that many businesses were unable to withstand the shock of the pandemic. As many as one in three enterprises interviewed reported knowing of an enterprise similar to theirs that permanently closed due to operational challenges brought about by the pandemic.

Inegbedion (2021), examined respondents' perception of the effect of the covid-19 pandemic on economic growth in Nigeria, using a cross-sectional survey research design and a mixed method for collecting research data. The secondary data were analysed using percentage changes while the primary data were analysed using a one sample t-test and least square method. The result indicated that the covid-19 induced lockdown has significantly constrained economic activities and the circular flow of income. The study recommended the need for policy makers to take drastic measures to curtail the pandemic and forestall a recession that may be consequent upon the pandemic.

Research Methodology

This study adopts the *ex-post-facto* research design as it deals with secondary data which were collected from CBN Statistical bulletin of 2021 edition. The study uses monthly data on GDP, agricultural sector output, industrial output and services sector output for the period of January 2018 to October 2022. It is important to state here that key sectors like, financial institutions, health and education sectors are captured under the Services sector as defined by CBN (2021).

The unit root test, cointegration and the Chow forecast test were used to estimate the model parameters. The Chow (1960) test is a structural break analysis which tests the true coefficients in two linear regressions on different data sets and whether they are equal or not. It is commonly used in time series analysis to test for the presence of a structural break at a period which can be assumed to be known a priori (Wooldridge, 2009).

Model Specification

We applied the general linear regression model with K explanatory variables where the components of GDP are the explanatory variables while GDP remains the dependent variable. Again, according to Chow (1960) a series of data can often contain a structural break due to a change in policy or sudden shock to the economy. Therefore, we further take pandemic which is a sudden shock that interrupted economic activities; as an economic interruption variable where we try to determine its impact prior to and after the month of impact. Here, we identified the month of May as the month when the pandemic supposedly impacted on the economy, subject to test of significance in our Chow model. We therefore specify thus:

Period before May 2020: $RGDP_{t-1} = f(AGR_{t-1}, IND_{t-1}, SVC_{t-1})$ [1]

Period after May 2020: $RGDP_{t+1} = f(AGR_{t+1}, IND_{t+1}, SVC_{t+1})$ [2]

Where:

RGDP = Real Gross domestic product growth
AGR = Output of the agricultural sector
IND = Output of the industrial sector
SVC = Output of the services sector

By expanding the equations [3.1] and [3.2] above, we obtain the econometric model:

before May 2020: $RGDP_t = \alpha_0 + \alpha_1 AGR_t + \alpha_2 IND_t + \alpha_3 SVC_t + \mu_{1t}$ [3]
After May 2020: $RGDP_t = \beta_0 + \beta_1 AGR_t + \beta_2 IND_t + \beta_3 SVC_t + \mu_{2t}$ [4]

Where α_0 and β_0, are the intercepts, α_1, α_2, α_3, β_1, β_2 *and* β_3 are the unknown parameters to be estimated, μ_t is the stochastic error term.

Data Presentation and Analysis

Data Presentation

Table 1: Monthly data on real gross domestic product, agricultural sector output, industrial sector and services sectors output from January 2018 through October 2022.

Year/month	Real gross domestic product ₦ billion	Output of the Agricultural sector ₦ billion	Output of the industrial sector ₦ billion	Output of the services sector ₦ billion
Jan, 2018	5,683.75	1,445.58	1,248.49	2,989.68
Feb, 2018	5,713.63	1,448.61	1,259.18	3,005.84
Mar, 2018	5,741.79	1,451.64	1,269.12	3,021.03
Apr, 2018	5,768.24	1,454.64	1,278.32	3,035.28
May, 2018	5,792.98	1,457.64	1,286.78	3,048.57
Jun, 2018	5,816.00	1,460.61	1,294.48	3,060.91
Jul, 2018	5,837.31	1,463.58	1,301.45	3,072.29
Aug, 2018	5,856.91	1,466.53	1,307.67	3,082.72
Sep, 2018	5,874.79	1,469.46	1,313.14	3,092.19
Oct, 2018	5,890.96	1,472.38	1,317.87	3,100.71
Nov, 2018	5,905.41	1,475.29	1,321.85	3,108.27
Dec, 2018	5,918.15	1,478.18	1,325.09	3,114.88
Jan, 2019	5,929.18	1,481.06	1,327.58	3,120.54
Feb, 2019	5,938.49	1,483.93	1,329.33	3,125.24
Mar, 2019	5,946.09	1,486.77	1,330.33	3,128.99
Apr, 2019	5,951.98	1,489.61	1,330.59	3,131.78
May, 2019	5,956.15	1,492.43	1,330.10	3,133.62
Jun, 2019	5,958.61	1,495.24	1,328.86	3,134.51
Jul, 2019	5,959.35	1,498.03	1,326.89	3,134.44
Aug, 2019	5,958.39	1,500.81	1,324.16	3,133.42
Sep, 2019	5,955.70	1,503.57	1,320.69	3,131.44
Oct, 2019	5,951.31	1,506.32	1,316.48	3,128.51
Nov, 2019	5,945.20	1,509.05	1,311.52	3,124.62
Dec, 2019	5,937.37	1,511.77	1,305.82	3,119.78
Jan, 2020	5,835.23	1,514.13	1,269.77	3,051.34
Feb, 2020	5,827.86	1,516.83	1,263.82	3,047.22
Mar, 2020	5,822.67	1,519.54	1,258.36	3,044.77
Apr, 2020	5,819.65	1,522.24	1,253.40	3,044.00
May, 2020	5,818.80	1,524.95	1,248.94	3,044.90
Jun,2020	5,820.12	1,527.66	1,244.98	3,047.48
Jul, 2020	5,823.61	1,530.37	1,241.51	3,051.73
Aug, 2020	5,829.27	1,533.07	1,238.54	3,057.66
Sep, 2020	5,837.11	1,535.78	1,236.07	3,065.26
Oct, 2020	5,847.12	1,538.49	1,234.09	3,074.53
Nov, 2020	5,859.30	1,541.20	1,232.61	3,085.48
Dec, 2020	5,873.65	1,543.91	1,231.63	3,098.11
Jan, 2021	5,890.17	1,546.62	1,231.14	3,112.41
Feb, 2021	5,908.86	1,549.33	1,231.15	3,128.38
Mar, 2021	5,929.73	1,552.04	1,231.66	3,146.03
Apr, 2021	5,952.77	1,554.75	1,232.67	3,165.35
May, 2021	5,977.98	1,557.46	1,234.17	3,186.35
Jun,2021	6,005.36	1,560.18	1,236.17	3,209.02
Jul, 2021	6,034.91	1,562.89	1,238.66	3,233.36
Aug, 2021	6,066.64	1,565.60	1,241.66	3,259.38
Sep, 2021	6,100.54	1,568.31	1,245.15	3,287.08
Oct, 2021	6,136.60	1,571.03	1,249.13	3,316.45
Nov, 2021	6,174.84	1,573.74	1,253.62	3,347.49
Dec, 2021	6,215.26	1,576.45	1,258.60	3,380.21
Jan, 2022	13,255.67	1,579.17	1,263.58	3,412.92
Feb, 2022	15,296.08	1,581.88	1,268.56	3,445.64
Mar, 2022	20,669.83	1,584.60	1,273.54	3,478.36
Apr, 2022	25,210.24	1,587.31	1,278.52	3,511.08
May, 2022	29,750.65	1,590.02	1,283.50	3,543.79
Jun,2022	34,291.06	1,592.74	1,288.48	3,576.51
Jul, 2022	38,831.47	1,595.45	1,293.46	3,609.23
Aug, 2022	43,371.89	1,598.17	1,298.44	3,641.95
Sep, 2022	47,912.30	1,600.88	1,303.42	3,674.66
Oct, 2022	52,452.71	1,603.59	1,308.40	3,707.38

Source: Monthly Real Sector Growth Indicators Published by the Central Bank of Nigeria (2021) edition. (Updated by the Researcher using E-views 10 software)

The data were subjected to various analyses prior to the model estimation. Initially, the default data were used and the result was not permissible. This led to the transformation of the data into their natural logarithm forms in order to ensure standardization and uniformity. This process gave an acceptable result and hence the researcher worked with the standardized variables.

Data Analysis

The analysis of the effect of covid-19 on the economy of Nigeria uses monthly data spanning January 2018 through October 2022. The data have time series properties hence the need for fitting an econometric analysis. As is traditional in every econometric time series analysis, we start with the test for stationarity of the variables using the Augmented Dickey Fuller unit root test. This is followed by the long run test before the structural break analysis. These tests carried out are summarized as follows:

Unit Root Test

Table 2: Unit Root Test Result

		ADF Test statistics			
Variable		**At Level**	**1st Difference**	**Decision**	**Order of Integration**
RGDP		2.2560	-5.3318	Stationary at 1st difference	I(1)
AGR		-6.3609	-3.4807	Stationary at Level	I(0)
IND		-1.7691	-3.5171	Stationary at 1st difference	I(1)
SVC		2.1743	-3.5387	Stationary at 1st difference	I(1)
Critical Values	1%	*-4.1611*	*-4.1611*		
	5%	*-3.5064*	*-2.5064*		
	10%	*-3.1830*	*-3.1830*		

Source: Researchers' Computation using E-Views 9.0

The unit root test above was carried out with constant and trend and only one lag length at 5% level of significance. The lag length was based on the Schwarz information criterion (SIC). The result reveals that real gross domestic product (RGDP), industrial output (IND) and services sector output (SVC) became stationary after first differencing and are said to be integrated of order one, I(1). Only agricultural sector output (AGR) was stationary at level and is said to integrated of order zero i.e. I(0). Based on the mixed order of stationarity, we test for the existence of a long-run relationship or cointegration amongst the variables using the ARDL Bounds test approach.

ARDL Bounds Test Approach to Cointegration

Null hypothesis (H_0): No long run relationship exists amongst the variables (no cointegration)
Alternate hypothesis (H_1): There is long run relationship amongst the variables

Table 3: Summary of the ARDL Bounds Test

Test Statistic	Value	k
F-statistic	4.384450	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Source: Researchers' Computation using E-view 9

The table above summarizes the ARDL Bounds test for cointegration. The criteria for decision here is that the F-statistic must be greater than the 5% critical values at the I(0) and I(1) bounds. Therefore, since the F-statistic value of 4.3845 is greater than 3.23 and 4.35, we reject the null hypothesis and conclude that there is long run relationship between agricultural sector output, industrial output, services sector output and real gross domestic product. In other words, the components of growth have long run effect on the Nigerian economy.

Test for Structural Break Using the Chow Breakpoint test

One conditionality for estimating the Chow forecast test is that a break point must be pre-determined. Having identified May 2020 as the month the covid-19 effect started manifesting in the global economy as it trickled down to Nigeria, we shall now test whether the point of break i.e. May 2020 had significant effect on the growth trend of real gross domestic product in Nigeria. If the break point is confirmed to have significant effect on growth, we go ahead to estimate the effect before and after the break point. However, if the break point had no significant effect on growth trend, we only estimate the parameters of the model for the entire period without taking the break point into consideration (Chow, 1960).

The null hypothesis for the structural test using the Chow approach is:

Null Hypothesis (H0): No breaks exist at the specified breakpoint
Alternate Hypothesis (H1): Structural break exist at the specified breakpoint

Table 4: Chow Test

F-statistic	16.96465	Prob. F(4,42)	0.0000
Log likelihood ratio	48.07622	Prob. Chi-Square(4)	0.0000
Wald Statistic	67.85860	Prob. Chi-Square(4)	0.0000

Source: Eviews 9 Output

The F-statistic value of 16.965 with probability value of 0.0000 is very significant at 5% level of significance. Therefore, we reject the null hypothesis and accept the alternate hypothesis. To this effect, we conclude that structural break exists at the specified break point. In other words, it is confirmed that the period of May 2020 resulted to structural break in economic growth trend as a result of the covid-19 pandemic. We now estimate the effect of the sectorial indices on real GDP before and after the break point period.

Nigeria's economic growth before the covid-19 pandemic

As seen in the Table 4 below, agricultural sector exerted positive effect on real GDP before the covid-19 pandemic hit the economy worst in May 2020. Agricultural sector contributed about 0.2616 units to the economy before May 2020 and this was also found to be significant given the *p-value* of 0.0000. The Table 4 is summarized below:

Table 5: Period before May 2020

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNAGR	0.261649	0.001425	183.6362	0.0000
LNIND	0.231834	0.202704	1.143707	0.7439
LNSVC	0.505801	0.484416	1.044146	0.2186
C	1.040756	0.006701	155.3162	0.0000
R-squared	0.912997	Mean dependent var		8.678324
Adjusted R-squared	0.897796	S.D. dependent var		0.014090
F-statistic	23.80822	Akaike info criterion		-18.04083
Prob(F-statistic)	0.000000	Durbin-Watson stat		1.595768

Source: Eviews 9 Output

Furthermore, the industrial sector increased real GDP by 0.2318 units but the probability value of 0.7439 meant that the positive effect of the industrial output on growth before the covid-19 was not significant. The same scenario played out for the services sector as it increased growth by 0.5058 units but the positive effect was not significant, p-value = 0.2186. The economic growth indicators jointly contributed to Nigeria's real gross domestic product (*f = 23.81*) and they accounted for approximately 90 per cent increase in real GDP prior to May 2020.

Summarily, prior to the month of May 2020, only the agricultural sector increased real GDP significantly in Nigeria. The other two sectors i.e. industrial and services sectors increased growth but it was not a significant increase. Economic growth trend still maintained positive trend without the sectorial growth indices increasing by 1.0408 units.

Table 6: Period After May 2020 (Chow Forecast Test)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNAGR	1095.544	413.7470	2.647860	0.0175
LNIND	4.851353	1.788296	2.712835	0.0154
LNSVC	-3.793557	1.435857	-2.642017	0.0178
C	-84.37654	31.55636	-2.673836	0.0166
R-squared	0.591822	Mean dependent var		8.732958
Adjusted R-squared	0.515288	S.D. dependent var		0.179888
F-statistic	7.732949	Akaike info criterion		-1.140304
Prob(F-statistic)	0.002052	Durbin-Watson stat		1.628361

Source: Eviews 9 Output

In the ensuing period after the covid-19 had devastated the economy leading to the wave of recession at the period, the Nigerian economy started on a recovery trend with the agricultural sector increasing real GDP by as high as 1095.544 units. The huge increase was also found to be significant with *p-value* of 0.0175. The industrial sector grew real GDP by 4.851 units and the *p-value* of 0.0154 also showed that the positive effect of industrial output on the economy after the covid-19 pandemic was also significant.

However, the services sector has still not recovered from the shocks of the covid-19 pandemic and it shows inverse relationship with real gross domestic product. The services sector decreased real GDP by 3.794 units and the decrease was a significant one with *p-value* of 0.0178. The intercept of the model shows that real GDP will decrease by 84.377 units when the sectorial growth indices are held constant at zero. Also, the sectorial growth indicators had joint effect on real GDP and they jointly account for only 51.53 percent of the changes in real GDP. This is a very low joint effect and goes a long way to prove that the key sectors of the economy still have not been on a steady growth path since after the pandemic.

Test of Research Hypotheses

The hypotheses were tested using the t-statistic values of the parameter estimates. The hypotheses to be tested are re-stated as follows:

H_{01}: The agricultural sector had no significant effect on economic growth of Nigeria before and after the covid-19 pandemic.

H_{02}: There was no significant effect of the industrial sector on Nigeria's economic growth before and after the covid-19 pandemic.

H_{03}: The services sector had no significant effect on economic growth of Nigeria before and after the covid-19 pandemic.

Table 7: Summary of the t-statistics

Variable	Before		After		Decision
	t-statistic	***p-value***	**t-statistic**	***p-value***	
AGR	183.64	0.0000*	2.6479	0.0175*	Significant before and after
IND	1.144	0.7439	2.7128	0.0154*	Not Significant before but Significant after
SVC	1.044	0.2186	-2.6420	0.0178*	Not Significant before but Significant after

Source: Eviews 9 Output

We reject the null hypothesis (H_{01}) and conclude that agricultural sector had significant positive effect on economic growth of Nigeria before and after the covid-19 pandemic.

For hypothesis two (H_{02}), we conclude that there was no significant effect of the industrial sector's output on Nigeria's economic growth before the covid-19 pandemic. However, after the pandemic, industrial sector's output had significant effect on Nigeria's economic growth.

For hypothesis three (H_{03}), we conclude that there was no significant effect of the service sector's output on Nigeria's economic growth before the covid-19 pandemic. However, after the pandemic, service sector's output had significant effect on Nigeria's economic growth but the significant effect was negative.

Test for Autocorrelation

Using the Durbin Watson statistic, for both periods, the DW values were 1.596 and 1.628 respectively. This means that there is negative autocorrelation in both models since the DW values tend towards 2.

Discussion of Findings

The tests carried out were the unit root test, ARDL Bounds test and the Chow break point test. The unit root test confirmed the mixed order stationarity of the variables while the ensuing ARDL Bounds test confirmed the existence of long run relationship amongst the variables. The test of structural break using the Chow test showed that there was break point in real GDP occasioned by the covid-19 in the month of May 2020. This was in agreement with the work of Kanu (2020) and Ozili (2020) who in their separate works proved that the economic downturn in Nigeria was triggered by a combination of declining oil price and spill overs from the COVID-19 outbreak. Consequently, we carried out the Chow forecast test which estimated the model parameters before and after the break point period (May 2020).

The estimates showed that agricultural sector exerted positive effect on real GDP before the covid-19 pandemic hit the economy worst in May 2020. Agricultural sector contributed about 0.2616 units to the economy before May 2020 and this was also found to be significant. After

the month of May 2020, Nigerian economy started on a recovery trend with the agricultural sector increasing real GDP by as high as 1095.544 units. The huge increase was also found to be significant with *p-value* of 0.0175. This can be attributed to government policies as it relates to agriculture which Nweze and Nnadi (2021), confirmed in their study that government policy had significant positive effect on the economy of Nigeria immediately after the covid-19 pandemic. For instance, government banned the importation of foreign rice in order to encourage local production; soft loans and improved seedlings are also made available to farmers to boost their production.

Furthermore, the industrial sector increased real GDP by 0.2318 units but the probability value of 0.7439 meant that the positive effect of the industrial output on growth before the covid-19 was not significant. This can be attributed to the harsh business and political environment in Nigeria which have caused most business persons and investors to leave the country thereby worsening the unemployment situation in Nigeria and leading to insecurity. After the covid-19 pandemic hit the economy, the positive effect of industrial output on the economy became significant. This is as a result of government move to remove all non-fiscal barriers to investment and ensuring a healthy business environment that encourages investment.

Similar scenario played out for the services sector as the sector increased growth by 0.5058 units but the positive effect was not significant. After the pandemic affected the economy, the services sector has still not recovered from the shocks of the covid-19 pandemic showing inverse relationship with real gross domestic product, decreasing real GDP by 3.794 units and the decrease was a significant one. Ayooluwa (2020) observed that prior to the pandemic, the services sector experienced modest growth and aftermath of the 2016 recession, activity in the services sector picked up as it rebounded from two consecutive years of negative growth rate. Ayooluwa (2020), concluded that the services sector started showing early signs of decline and this present study has confirmed, using updated data, that the services sector has still not shown the potentials to grow the economy since after the pandemic effect started manifesting. This cannot be unconnected to mismanagement of the economy by government; which has continuously increased poverty and subsequently affects the consumption of most of these services negatively. And again it has reduced the quality of our health care and education systems while strike is the order of the day. These have resulted to doctors, lecturers and other technocrats leaving the country in their numbers for greener pastures in developed countries. Be that as it may, the communication sector was highly patronized during and after the pandemic however its effect was not strong enough to have influenced the entire service sector which is holistic at the time of this study.

Conclusion

The conclusion emanating from the study is that the Nigerian economy has obviously been largely affected by the covid-19 pandemic and this effect has shown on the sectorial growth indices. The services sector has been mostly hit by the devastating effect of the pandemic and its recovery can only take a longer time but definitely not in the short run period. However, some positives can be taken out from the analysis; and that is the fact that the agricultural sector

has shown positive strides in driving Nigeria's real gross domestic product. This is true give the diversification drive of the government which has seen many policies favouring the agricultural sector. The industrial sector has also not been left out as it shows positive signs after the pandemic. The Nigerian economy only needs time and good policies to recover fully from the harmful economic effects of the covid-19 pandemic.

Recommendations

In order to fully recover the economy of Nigeria post-pandemic and ensure that the key sectors set out on a positive stride, the following recommendations which are stemming from the findings should be considered:

1. The government should make more concerted efforts to grow the agricultural sector by going into full scale commercialization of the sector. The positive effect of the sector on growth will be further enhanced.
2. The industrial sector needs government intervention in terms of subsidies and conducive environment. The present 4.851 units effect of the industrial sector on real GDP can be improved upon through diversification of the raw materials base and promotion of local firms thus giving local manufacturers the impetus to compete in the global market.
3. Most importantly, the services sector needs to be seriously revamped by way of encouraging young entrepreneurs to invest in various services such as transportation, accommodation and food, ICT, entertainment, real estate, social services etc. The current government clamp down on young entrepreneurs who engage in these services is very detrimental to the economy and the result is even telling on the country's GDP. Government need to act as a support rather than a threat in this sector so as to achieve its full potentials.
4. Above all, government need to be sincere in her drive to eradicate poverty, make the business and political atmosphere viable, adequate fund released to all the service sectors for improvement like our health care and education systems so as to dissuade brain drain but rather encourage brain gain.

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