Impact Of Covid'19 Pandemic On Ports Operations In Nigeria

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ARTICLE INFO	ABSTRACT
	Purpose: This research investigated the impact of Covid'19 Pandemic on Port operations and Economic Growth of Nigeria. *Design/Methodology:* The work used quarterly series secondary data obtained from the National Bureau of Statistics, National Centre for Disease Control and the Port Liner Shipping Connectivity index between July 2019 to February 2022. The study employed real gross domestic product (proxy for economic growth), cargo throughput, ratio of Covid'19 infection to life expectancy rate and Port liner shipping connectivity index as variables and tested the parameters using ordinary least square regression and ranked co-integration tests at the 5% chosen level of significance. *Findings:* The result of this investigation showed a positively significant impact of the Covid'19 Pandemic on Nigeria's Port operations while it is negative but significant economic growth, and concludes that there exists a positive and significant impact of Covid'19 on port activities measured by cargo throughput and gross registered tonnage. *Research Limitations:* This research used only Nigeria time series quarterly data generated during the first, second and third wave of the pandemic in Nigeria. *Practical implications:* If we allow a 1% rise in port activities measured by GRT and CRTP, Covid'19 cases will rise by 0.000112%, leading to 0.0177% decline in ship/port influx measured by the port liner shipping connectivity index and a corresponding 0.0138% decline in the country's GDP. *Social implications:* Social distancing, regular washing of hands, and other general health-protection procedures should be encouraged in port infrastructures and operations. *Originality:* This research adds to current literature and ties sensitive port operations indicators novel to this study in investigating Covid'19 Pandemic impact on Port operations in Nigeria.

1. Introduction.

The uncertainties and aftermaths of Covid'19 pandemic are worse than the danger it portends to human health. The outbreak of Covid'19 pandemic broke out as a rude shock to the whole world. Based on its deadly and contagious nature, several measures were designed and improvised by World Health Organization (WHO) to contain the unrestricted spread across the globe. Such measures include lock down of international borders which culminated into a regulation of international trade and travels between nations (WHO, 2020). Consequent upon the implementation of Covid'19 protocols, virtually, every sector of the global economy was negatively affected and ports operations in Nigeria were not excluded.

To complement the efforts of WHO towards addressing the health challenge posed by Covid'19, national governments (Nigeria inclusive) also rolled out drastic measures accompanied with sanctions for its enforcement (NCDC, 2020). These measures further strengthened the restrictions to both international and local transportation and trades. Hence, it was a big blow to economic activities that resulted to hunger, idleness, isolation and compounded servitude. It was on this basis, that governments of developed countries (USA, UK, etc) devised palliative

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measures to cushion the resultant hardship faced by the people. However, in less developed countries (LDC) such as Nigeria, the story was pathetic and resulting to total neglect because of bad governance structure with associated corruption. It was interesting and sarcastic to state that the politically motivated palliatives provided by government were hijacked by her cronies at the expense of the impoverished masses.

The emergence of Covid'19 led to the shutdown of educational activities for over six months across the globe (UN Report, 2020; Giorgio, Hilligje& Trine, 2020). The hardship caused by the pandemic outbreak aggravated the twin maladies of financial stress and inactivity in Africa (Soludo, 2020). Cremades (2019) observed that global pandemic leads to disruptions in investments, decline in oil price and food security. Soludo (2020) equally held that continuous lockdown was not a panacea to Covid'19 pandemic but will prolong the techno-economic-health disruptions. The sudden occurrence of Covid' 19 was declared a global pandemic on 11 March, 2020 (Sorin et al., 2020) and the index-case (Nigeria), was discovered in Lagos on 27 February, 2020 (NCDC, 2020; MacLean & Dahir, 2020).

The Nigeria's central government also imposed total lockdown of economic, educational, social and religious activities with exception to essential services. Due to the lockdown and measures as well as social distancing procedures, there were panic purchases, disrupted consumption patterns and market variabilities (Warwick & Roshen, 2020). It was contended in (Warwick & Roshen, 2020) study that Covid'19 affected trade, land, air and sea transport systems. There was a decline in macroeconomic transactions in the world. It created volatility in demands and posed several economic challenges (Adesoji & Simplice, 2020; Alex et al., 2020). The tempo of economic activities was slowed down, causing the global economy to contract by 3% and further shranked by 4.9% (IMF, 2020a, 2020b).

According to Brodeur et al., (2020), pandemic portends negative effects on global economy in the short term. Covid'19 also led to multiple economic woes such as reduction in household's incomes and demand-supply uncertainties (Gourinchas, 2020; Baldwin, 2020). Mulligan (2020) found that Covid'19 shutdown resulted to the loss of $7 trillion USD and compounded the rate of unemployment (Carlsson-Szlezak & Swartz, 2020). Report has shown that over two million seafarers are employed in the maritime sector which carry more than 80% of the global trade (UNCTAD, 2020). As a result of Covid'19 hit on the Egyptian economy, demand for goods and services were restricted. The port industry in Egypt is confronted with competition and economies of scale, fast IT platforms development, global economic uncertainties, safety and security among others (Zeinab & Zeinab, 2021).

Nigeria, being a coastal nation is naturally endowed to harness the gains from maritime trade. Seaborne trade is transacted through the eight major ports and terminals in Nigeria (Edih, Igemohia & Faghawari, 2022). Omoke et al., (2019) argued that the vessels gross registered tonnage contributes significantly to GDP of Nigeria. According to (UNCTAD, 2015), 80% of goods entering West and Central Africa comes to Nigeria by sea. Nigeria accounts for 55% of the total private sec-

tor investments in Sub-Saharan Africa ports. Ports operations serve as means of diversifying the Nigerian economy and stimulate investments and increase revenues (Lazarus, 2013; Peretomode, 2014). Osadume and Edih (2020) also contend that total revenue to gross registered tonnage affect economic growth positively and Obed (2006) affirms that there exists a positive relationship between maritime operations and economic growth and national interest.

It is on this account that this study seeks to investigate Covid' 19 pandemic impact on ports operations in Nigeria. The first null hypothesis states thus; there is no significant impact of Covid'19 pandemic on economic growth of Nigeria. While the second null hypothesis argues for a non-significant impact of Covid'19 Pandemic on port operations captured by cargo throughput and port liner shipping connectivity index. It is believed that the outcomes/recommendations of this study would tremendously assist policy makers to address possible challenges that hitherto hamper ports operations especially during global emergencies.

1.1. Empirical Studies.

In Lijin et al.,(2021), the consequence of covid'19 pandemic are profound on world economy. The study combined economic theory and epidemiology framework to develop an an interdisciplinary framework, where labour supply was constrained by pandemic situations. It was found that the discovery of infectious diseases reduce supply of labour which in turn affect economic output negatively. The study recommended that, government should balance the prevention of pandemic and control cost since a controlled pandemic situation accompanied with stimulus package will activate productive activities and encourage economic recovery.

Henry (2021) examined the effect of covid'19 on Nigeria's economic growth. A cross-sectional survey research-design and mix method were employed for data collection. It was found that, economic growth and circulation of income flow were stunted by the actions of covid'19 induced lockdown. To avoid economic recession, the paper suggested that, drastic and realistic measures be taken to stem the tide of the pandemic.

Yunfeng, et al., (2021) examined pandemic outbreak on economies, using business history context. The approach used both qualitative and quantitative analyses on the economic consequences on Coordinated Market Economies (CMEs) and Liberal Market Economies (LMEs). Results showed that the coronavirus pandemic was more deadly in liberal market economies, LME but moderate in coordinated market economies (CME) due to governments interventions. It was therefore, suggested that government authorities should intensify measures toward curtailing the spread of the pandemic.

Adekola (2021) analyzed perspectives of the covid'19 pandemic impact on global and African maritime transport sectors in short and long-term scenarios. It discovered that, there was a drop in the volume of trade via shipping, disruptions of shipments, maritime defaults and stranded seafarers in the short run. The study saw that it was premature to ascertain the impact of covid'19 on global scale but failed to enumerate its findings on the long run effects on the maritime industry. However, the

paper suggested that a multi-stakeholder governance approach was appropriate for the Sub-Saharan Africa transport system in post pandemic era.

Panagiotis and Michaelis (2021) focused on unexpected event of covid'19 pandemic on the maritime industry. The study employed a theoretical and critical examination of initiatives taken by governments and private sectors entities. Findings showed that, covid'19 diseases acted as catalysts for the development of the shipping sector while some measures taken by administrators had temporary effect on the maritime sector. It was proffered that, ship registries, (governments) and private sector should adopt a scientific, systematic formula to arrest unexpected events in the future.

1.2. Theoretical Framework.
1.2.1. The Susceptible-Infective-Susceptibile (SIS) Model.

This study adopts the classical theoretical framework in the field of infectious diseases known as susceptible - infective - susceptible (SIS) model. The model is however, modified to suit the chosen variables (independent and dependent variables) for the study. According to literature, mathematical-modelling of the dynamic spread process of infectious diseases was the handiwork of Kermack and McKendrick (1927 as cited in Lijin et al., 2021).

In Almond (2006), infectious diseases directly affect health cost of residents, hampers outputon of human capital, shortens labour hour/time, and shows negative outcome on economic growth. It has been held that dynamic spread of infectious diseases affect fluctuations of macro-economic variables. The SIS model assumes that infected persons can be cured at certain interval and be reintegrated into the susceptible population since the entire human population is not free or immuned from being infected. It is also presumed that some infectious-diseases can be immunized and such categories is divided into two; susceptible - infective - recovered (SIR) and susceptible - infective - recovered - susceptible (SIRS). These latter subdivisions of infected persons presuppose two variant conditions such as; the cured population who obtained permanent immunity applies to SIR model while the cured population who obtained temporary immunity applies to SIRS model.

It is evident and clinically affirmed that covid'19 is one the infectious diseases with diverse variants-Delta variant and others, with no medical assurance that there would be an end to infectious diseases in the world. Covid'19 jabs have been applied to the human person in doses at several stages, which are no total cure to it. The entire universe is susceptible to the deadly corona virus. Based on this, we adopted the SIS dynamic spread framework to represent the universal coverage of the covid'19 pandemic and to demonstrate the negative impact on the global macro-economy (especially, maritime operations) in the study.

2. Methodology.

2.1. Research Design.

Ex-posit facto design method was adopted in this work and the data collection design covered the three waves of Covid'19 Pandemic in Nigeria [NCDC, 2022];

Covid'19 global outbreak - Covered 2019 / month 07 - 2019 / month 12 [Not Applicable in Nigeria yet]

The first wave - Covered 2020 / month 01 - 2020 / month 10 [All datasets applicable to Nigeria]

The second wave - Covered 2020 / month 11 - 2021 / month 05 [All datasets applicable to Nigeria]

The third wave - Covered 2021 / month 06 - 2022 / month 02 [All datasets applicable to Nigeria]

2.2. Data and Model Specification.

Secondary data were employed in the study and obtained from the national bureau of statistics, National Centre for Disease Control, and Port liner shipping connectivity index database. This study will adopt the model of Omoke, Aturu, Nwaogbe, Ajiboye, and Diugwu (2018) with moderate modifications;

$$GDP = \beta_0 + \beta_1(GRT) + \beta_2(THROUGHPUT) + \beta_3(NOV) + \beta_4(NOE) + e \tag{1}$$

Where;

GDP = The Gross Domestic Product:

GRT = Gross Registered Tonnage of the Port (in tonnes);

THROUGHPUT = Cargo Throughput (in tonnes);

NOV = Number of Vessels;

R^2 = Coefficient of Determination;

β_0 – is the intercept;

β_{1-4} – are the slope coefficients for the independent variables;

e_n – is the error term.

Translating the above, our model becomes;

$$RGDP = \beta_0 + \beta_1 PCI + \beta_2 NCDC + \beta_3 THROUGHPUT + U_t \tag{2}$$

$$RGDP = \beta_0 + \beta_1 PCI + \beta_2 COLE + \beta_3 CRTP + U_t \tag{3}$$

$$CRTP = \beta_0 + \beta_1 PCI + \beta_2 COLE + \beta_3 RGDP + U_t \tag{4}$$

Where RGDP = Real Gross Domestic Product (in quarterly rates).

PCI = Port Liner Shipping Connectivity index, measured quarterly;

NCDC = National Centre for Diseases Control data (Nigeria) measured as ratio of Covid' 19 to Life expectancy = COLE;

THROUGHPUT = Cargo Throughput quarterly figure = CRTP;

β_0 – the intercept;

$\beta_1 - \beta_4$ – the slope coefficients for the independent variables;

U_t – the error term.

Data source: National Bureau of Statistics, National Centre for Disease Control and Port liner shipping connectivity index database, 2022.

GROSS REGISTERED TONNAGE, REAL GROSS DOMESTIC PRODUCT, CARGO THROUGHPUT - SOURCE: NATIONAL BUREAU OF STATISTICS, 2022; Covid'19 to Life expectancy = COLE - SOURCE: NATIONAL CENTRE FOR DISEASE CONTROL, 2022; PORT CONNECTIVITY INDEX (PCI) - SOURCE: PORT LINER SHIPPING CONNECTIVITY INDEX, 2022

Hence, equations (3) and (4) will be tested and analyzed in the subsequent sections with expected Apriori outcome being negative and significant impact.

2.3. Selected Diagnostics Tests.

The following diagnostic tests will be carried out for the following reasons;

1. Descriptive Statistics: This will be carried out on the data in the study to describe the basic features of the data. It provides simple summaries about the sample such as skewness, kurtosis, Jarque-Bera and probability, and the measures of the central tendency and dispersion.

2. Unit root Tests: Unit root tests are used to determine whether trending data should be first differenced or regressed on deterministic functions of time to render the data stationary. It is a measure used to determine how much stationarity time series model has.

3. Breusch-Godffrey Serial Correlation Tests: This test is used to assess the validity of some of the modelling assumptions inherent in applying regression-like models to observed data series.From the Breusch-Godffrey tests results, we can infer that there is evidence of serial correlation in the residuals of the regression. This is as a result of the p-values for both the F-statistic and the R-squared statistic are 0.0000, which is less than the chosen level of significance of 5%.

4. Heteroskedasticity Tests: This test is carried out once there is a suspicion that the variances of a time series data are not homogeneous. A representation of the residuals against the explanatory variables may reveal heteroskedasticity, it is therefore imperative to perform a test for heteroskedasticity.

5. Ramsey Reset: The Ramsey Regression Equation Specification Error Test (RESET) test is a general specification test for the linear regression model. It performs such role as tests whether non-linear combinations of the explanatory variables assist in explaining the response variable. In essence, it tells us whether the relationship between the dependent variable and the independent variables should be linear or whether a non-linear form would be more appropriate.

3. Results.

In this segment, various diagnostic treatments were carried out to make the data in the series fit for the various econometric and analytical procedures and presentation.

3.1. Data Analysis.

3.1.1. Descriptive Statistics.

The table 1 reveals that the mean, mode and media are well clustered or dispersed the data in the series are. The mean values of CRTP, RGDP and PCI are wide apart from the mean value of COLE, and their standard deviations show similar characteristics with respect to the referenced variables in the series.

Table 1: Descriptive Statistics Result.

	COLE	CRTP	PCI	RGDP
Mean	323.5377	0.962358	63.34645	1.236667
Median	80.32300	0.949254	63.10451	2.110000
Maximum	1379.989	1.334706	74.33565	5.010000
Minimum	0.000000	0.819440	58.73985	-6.100000
Std. Dev.	441.7944	0.096898	3.963616	3.119314
Skewness	1.224347	1.536568	1.597400	-1.174647
Kurtosis	3.296935	7.186465	5.504324	3.521201
Jarque-Bera	9.126416	40.45599	24.71758	8.686256
Probability	0.010429	0.000000	0.000004	0.012996
Sum	11647.36	34.64488	2280.472	44.52000
Sum Sq. Dev.	6831381.	0.328621	549.8587	340.5542
Observations	36	36	36	36

Source: Authors.

Over 75% of the variables in the series show a kurtosis greater than 3, being Platykurtic while the rest 25% exhibits leptokurtic characteristics. The probabilities of the parameters in the series were all significant, below the chosen 5% level of significance. This outcome depicts strong correlation between the chosen datasets and thus justifies their inclusion in the model in studying subject relationship.

3.1.2. Unit Root Tests.

Table 2: Unit Root Tests Result.

Variable	ADF statistics	Test Critical Value @5%	Probability	Integration
RGDP	-5.640683	-3.548490	0.0003	I (1)
PCI	-5.070261	-3.557759	0.0014	I (1)
COLE	-8.899210	-3.557759	0.0000	I (1)
CRTP	-5.858462	-3.552973	0.0002	I (1)

Source: Author's E-Views 12 Computations.

All the variables of the series in table 2, all show a significant probability being below the 5% chosen level of significance and well integrated at the first levels. A high level of stability have been achieved by the series variables at the first level of difference.

3.1.3. Breusch-Godffrey Serial Correlation LM Tests.

The null hypothesis believes that for autocorrelation to exit, the various probabilities should be less than the chosen level of significance of 5%, otherwise, there is no autocorrelation. The result in Table 3, thus indicates the absences of autocorrelation

Table 3: Result of Breusch-Godffrey Serial Correlation Tests.

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	1.370145	Prob. F (2,10)	0.2979
Obs*R-squared	5.807388	Prob. Chi-Square (2)	0.0548

Source: Author's E-Views 12 Computations.

in the series, as their output of P-values are higher than the 5% level of significance.

3.1.4. Heteroskedasticity Tests.

Table 4: Result of Heteroskedasticity Tests.

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	0.627726	Prob. F(14,12)	0.7986
Obs*R-squared	11.41421	Prob. Chi-Square(14)	0.6532
Scaled explained SS	1.261690	Prob. Chi-Square(14)	1.0000

Source: Author's E-Views 12 Computations.

Table 4 indicates that heteroskedasticity does not exist in the series and model as p-values of F-statistic (0.7986) and Chi-square p-value (0.6532) are both greater than the chosen level of significance of 5%.

3.1.5. Ramsey Reset Tests.

Table 5: Ramsey Reset Tests Result.

Ramsey RESET Test			
	Value	df	Probability
t-statistic	1.700606	11	0.1171
F-statistic	2.892062	(1, 11)	0.1171
Likelihood ratio	6.302402	1	0.0121

Source: Author's E-Views 12 Computations.

This test reveals how stable the model is, and with the probabilities of the t-statistics (0.1171) and F-statistics (0.1171) greater than the 5% chosen level of significance, the model and series are well reset and fit for the research work. The outcome reveals that the model in which the probabilities of the t-statistic as well as F-statistic are greater than the chosen level of significance of 5% (as in above - 01171 each), exhibits a linear relationship between the explanatory variables and the dependent variable.

3.2. Hypothesis Testing.

In this sub-section, the relevant hypothesizes are tested to determine whether there is any impact of Covid'19 on ports operations in Nigeria using available data;

The first objective of this study is to assess the impact of Covid'19 pandemic on the economic growth of Nigeria (to be captured by real gross domestic product, indicator for economic activities). Such an impact will be tested for in the short-run, using a suitable short-run test analytical tool such as the ordinary least square regression (OLS) and in the long-run of the relationship, employing a long-run analytical tool of trace and maximum-eigen Co-integration test. This is akin to a double test in one hypothesis. Similarly, the second objective which attempts to evaluate the impact of Covid'19 Pandemic on Port operations in Nigeria (to be captured by cargo throughput and port liner shipping connectivity index), will adopt similar tools as in the above, using OLS and Co-integration analytical tests. This procedure is based on the premise that Covid'19 will impact both economic activities and Port operations activities (IMF, 2020a, 2020b).

3.2.1. Hypothesis Testing One.

H_0: Covid'19 had no significant impact on Nigeria's Economic growth captured by real gross domestic products in the short and long-run periods.

H_1: Covid'19 had significant impact on Port and Economic activities in Nigeria captured by gross domestic products in the short and long-run periods.

Table 6: Ordinary Least Square Regression Result 1.

Dependent Variable: RGDP				
Method: Least Squares				
Included observations: 31 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25.02321	7.354243	3.402554	0.0021
CRTP(2)	11.19884	3.652780	3.065840	0.0049
COLE(-3)	0.003312	0.000784	4.226837	0.0002
PCI(2)	-0.557731	0.089026	-6.264830	0.0000

Source: Author's E-view's 12 computation (See appendix 1).

The outcome in table 6 for the ordinary least square result shows a 71.89% R^2 and 68.76% of the adjusted R^2 indicating a goodness of fit of the selected model and its capacity to accept more variables. A Durbin Watson of 1.876 for this series is considered very adequate, being approximately 2, showing least or no autocorrelation.

At a lead of 2, CRTP (p = 0.0049) shows a positive and significant impact along with Port liner shipping connectivity index (p = 0.0000) but inversely significant impact of the Covid'19 pandemic, at a lag of 3 (p = 0.0002) on the rgdp of Nigeria.

While table 7 for co-integration (trace) tests indicates the existence of two co-integrating vectors in the series (p = 0.0061, & p = 0.0381) at the 5% level of significance, the co-integration (maximum eigen value) in table 8, shows no co-integrating vector at the 5% significance level.

Decision: We reject the null hypothesis, and accept the alternative that the Covid'19 Pandemic exerted a significant impact on Nigeria's economic growth in the short and long-term periods.

Table 7: Cointegration Rank Tests (Trace).

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.531229	56.56999	47.85613	0.0061
At most 1 *	0.398309	30.81019	29.79707	0.0381
At most 2	0.291551	13.53782	15.49471	0.0965
At most 3	0.052088	1.818784	3.841465	0.1775
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				

Source: Author's E-view's 12 computation.

3.2.2. Hypothesis Testing Two.

H_0: Covid'19 had no significant impact on Port operations in Nigeria captured by Cargo throughput and Port liner shipping connectivity index.

H_1: Covid'19 had significant impact on Port operations in Nigeria captured by Cargo throughput and Port liner shipping connectivity index.

Table 8: Cointegration Rank Tests (Maximumeigen value).

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.531229	25.75981	27.58434	0.0840
At most 1	0.398309	17.27237	21.13162	0.1595
At most 2	0.291551	11.71903	14.26460	0.1216
At most 3	0.052088	1.818784	3.841465	0.1775
Max-eigenvalue test indicates no cointegration at the 0.05 level				

Source: Author's E-view's 12 computation.

The OLS regression tests in Table 8 reveals a negative and significant impact of Covid'19 Pandemic on Nigeria's economic growth (p-value = 0.0077 and a negative coefficient of 0.013845) and a significant impact on cargo throughput and a negative and significant impact on Port liner shipping connectivity index (p-value = 0.0014 and a negative coefficient of 0.017669). The Durbin Watson as in Table 6 showed a no-autocorrelation scenario with 1.7155 value at the 5% chosen level of significance.

Table 9: Ordinary Least Square Regression Result 2.

Dependent Variable: CRTP				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.065794	0.309136	6.682468	0.0000
PCI(-2)	-0.017669	0.004974	-3.552509	0.0014
RGDP(2)	-0.013845	0.004824	-2.869957	0.0077
COLE(-2)	0.000112	4.73E-05	2.367208	0.0251

Source: Author's E-view's 12 computation.

The trace co-integration tests in table 9 revealed the existence of three (3) co-integrating vectors with p-values less than the 5% chosen level of significance. Similarly, the co-

integration Rank test for maximum eigenvalue revealed the existence of one (1) co-integrating vector. Hence, there are ample evidence of a co-integration between Covid'19 Pandemic and economic growth and Port operations in Nigeria.

Table 10: Cointegration Rank Test (Trace).

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.807346	104.2276	69.81889	0.0000
At most 1 *	0.513418	54.82180	47.85613	0.0097
At most 2 *	0.449300	33.21129	29.79707	0.0195
At most 3	0.298699	15.31435	15.49471	0.0532
At most 4 *	0.144150	4.669812	3.841465	0.0307
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				

Source: Author's E-view's 12 computation.

Decision: We reject the null hypothesis and accept the alternative that the Covid'19 Pandemic had a significant and negative impact on Port operations, captured by cargo throughput and Port liner shipping Connectivity index and economic growth of Nigeria.

3.3. Discussion of Findings.

The research set out to confirm the Covid'19 Pandemic impact on Port Operations in Nigeria and employed variables include real gross domestic product (RGDP), Cargo Throughput (CRTP), Port liner Shipping Connectivity index (PCI) and ratio of Covid'19 Pandemic to life expectancy (COLE), using ordinary least square and co-integration at the 5% chosen level of significance, and two hypothesis were tested employing these econometric tools.

The research revealed among others that for the first objective we set out to investigate, to assess the impact of Covid'19 on Nigeria's economic growth proxy by RGDP, CRTP and COLE demonstrated a significant influence on economic growth of Nigeria [this was in line with global realities], indicating that the pandemic virus [COLE] spread with increase national economic activities and growth in port businesses. This accounts for the closure of production and economic activities as well as shut down of port activities to contain the virus spread. The second objective was to evaluate the impact of Covid'19 on Port operations in Nigeria captured by Cargo throughput and Port liner shipping connectivity index; again we discovered a positively significant impact of the Covid'19 pandemic on cargo throughput and cargo operations at the seaports, showing that the ratio of Covid'19 to Life expectancy (COLE), increased with increase in port operations and seaport activities. Hence, to contain the spread, seaport operations had to be shut down during such periods of national emergencies, bringing activity level to the bearest minimum, leading to significant drop in Port liner shipping connectivity index. The study concludes that there exists a combined significant impact of the independent variables on the economic growth of Nigeria proxy by RGDP in both the short-term and the long-term period in the first hypothesis, as

well as significant impact on port operations and connectivity indices in the second hypothesis, and these outcomes agrees with the supporting theory of susceptible-infective-susceptible (SIS) model and corroborates the findings of Henry (2021), Adekola (2021) and Yunfeng, et al., (2021) of a significant and negative impact of Covid'19 Pandemic on business Operations and economic growth.

The implication of this outcome from table 8, is that 1% rise in Covid'19 level in Nigeria, will lead to a 0.01385% fall in Nigeria's RGDP being proxy for economic growth, this also, impacts global shipping accessibility and activities into the Nigerian Ports negatively resulting to a decline of 0.01767% in Port liner shipping connectivity index.

Table 11: Cointegration Rank Test (Maximum Eigenvalue).

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.807346	49.40584	33.87687	0.0004
At most 1	0.513418	21.61051	27.58434	0.2411
At most 2	0.449300	17.89694	21.13162	0.1337
At most 3	0.298699	10.64454	14.26460	0.1729
At most 4 *	0.144150	4.669812	3.841465	0.0307
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				

Source: Author's E-view's 12 computation.

Conclusions.

The outcome of this study reveals that the Covid'19 Pandemic had severe impact on Port operations and the Nigeria economy, a very significant impact, which had its tow on Port liner shipping connectivity index, cargo throughput and the overall economic growth of the country. Based on the above conclusion, we recommend that;

1. There should be full implementation of health-protection measures as prescribed by the World Health Organization (WHO) and the national authorities of their host nation in all port operation complexes and environment.
2. There should be adequate national standby emergency plans to cater for pandemic situations like Covid'19. This will include provision of food reserves for the masses, health infrastructures of international standard, provisions of financial palliatives to individuals and maritime institutions.

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Appendix.

Table 12: Ordinary Least Square Regression Output 1

Dependent Variable: RGDP			
Method: Least Squares			
Included observations: 31 after adjustments			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25.02321	7.354243	3.402554	0.0021
CRTP(2)	11.19884	3.652780	3.065840	0.0049
COLE(-3)	0.003312	0.000784	4.226837	0.0002
PCI(2)	-0.557731	0.089026	-6.264830	0.0000
R-squared	0.718878	Mean dependent var		0.976129
Adjusted R-squared	0.687642	S.D. dependent var		3.271911
S.E. of regression	1.828637	Akaike info criterion		4.164933
Sum squared resid	90.28568	Schwarz criterion		4.349964
Log likelihood	-60.55647	Hannan-Quinn criter.		4.225249
F-statistic	23.01459	Durbin-Watson stat		1.875645
Prob(F-statistic)	0.000000			

Table 13: Ordinary Least Square Regression Output 2

Dependent Variable: CRTP				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.065794	0.309136	6.682468	0.0000
PCI(-2)	-0.017669	0.004974	-3.552509	0.0014
RGDP(2)	-0.013845	0.004824	-2.869957	0.0077
COLE(-2)	0.000112	4.73E-05	2.367208	0.0251
R-squared	0.371072	Mean dependent var		0.957772
Adjusted R-squared	0.303687	S.D. dependent var		0.094857
S.E. of regression	0.079153	Akaike info criterion		-2.118389
Sum squared resid	0.175427	Schwarz criterion		-1.935172
Log likelihood	37.89423	Hannan-Quinn criter.		-2.057658
F-statistic	5.506744	Durbin-Watson stat		1.715554
Prob(F-statistic)	0.004215			

Source: Author's E-views 12 computation.