



COVID-19 Pandemic, Ship Acquisition and Economic Growth: A Time-Series Analysis

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ABSTRACT

Context: The era of COVID-19 pandemic caused a lot of distortions in the global health and economic sector, this compelled governments of nations to result to restrictive measures which severely affected shipping transportation, global trade and other economic activities.

Purpose: Economic growth, which is the foundation of national development is measured among others by change in the real gross domestic product. This study used time series econometric methods to measure the effect of Covid' 19 on between January 2019 and December 2021. The study also examines its simultaneous effect on Ship acquisition (to estimate the maritime sector activity level and national economic health).

Design/Methodology: Quarterly secondary data sourced from the Central Bank of Nigeria (CBN) was used. The analytical technique employed used the 5% significance level testing.

Findings: The results showed a negative and statistically significant effect of the COVID-19 pandemic on the economic growth of Nigeria and ship acquisition volume within the period under study.

Limitation/Policy Implication: A 1% rise in CVID (COVID-19 cases) will lead to a 0.002392% rise in RGDP, in four period (QTR lag). This result is statistically positive and significant.

This outcome is seriously counter-intuitive, as our literature and economic theory suggests a negative relationship. The positive result however, (for the lagged CVID (-4)) does not imply that the pandemic was favourable for the economy; rather, it shows the Bounce-Back Effect. It captures the delayed V-shaped economic recovery.

extbfOriginality: The research work argues for the development of robust national economic strategies that promotes heterogeneity and home-grown resilience to protect national GDPs from upcoming world health or economic emergencies, this supports the principles of Modern Portfolio Theory.

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1. Introduction.

The global economic terrain was negatively impacted by the COVID-19 pandemic, which started in the Wuhan, China (Acikgoz & Gunay, 2020), which was later named a public health emergency by the World Health Organization (WHO) on March 11, 2020 (Lin et al., 2022). While advanced economies adopted massive economic stimulus, other nations, including

Nigeria, continued to endure the deep-rooted recessionary and socio-economic effects (Soludo, 2020).

The quick, unchecked spread of the virus was partly enhanced by global connectivity, which included international transportation systems. Following this, global governments adopted rigorous containment measures—such as lockdowns of national economies, international border closures, and serious restrictions on movement—to preserve lives. Though these measures are necessary but they dramatically slowed the global economic system, causing the cessation of production activities and a fall in global trade (Shedzad et al., 2020). This global recession sent negative shock waves to the economy of Nigeria.

The maritime industry, a major pipeline for over 80% of

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world freight and a enhancer of Nigeria's GDP (Jamoh, 2018), was negatively impacted (Ozturk & Turan, 2020). The sector, involves vast network of vessels and personnel (IMO, 2016), experienced numerous operational disruptions (Prosertek, 2020). Verikios (2020) enumerated the short-run but drastic economic shocks resulting from the pandemic, including severe downturn in local and foreign tourism and business travels, this includes expansive adjustments in home and business expenditures. The severity and wide transmissibility of COVID-19 reflects a more intense economic recovery period than earlier crises (Verikios, 2020).

The resulting policy - driven quagmire resulted to supply chain failures, stock shortages, and a fall in demand, resulting in significant revenue shortages and unanticipated liquidity crisis for Nigerian businesses (Deloitte, 2021). Globally, the contraction of major trading nations like China, with exports and imports falling sharply in Q1 2020 (GAC, 2020), aggravated the crisis, causing disruptions in global supply chains and impairing commodity prices, majorly oil (Acikgoz and Gunay, 2020; World's Top Exports, 2018).

The ensuing global economic instability, compounded by employment loss projections (ILO, 2020) and unstable stock markets, affected emerging economies like Nigeria, resulting to a fall in value of the Naira compared to the US dollar. The OECD (2020) and IMF (BBC News, 2020; Panayides, 2019) alarmed that the shock was more pronounced than the 2008 financial crisis, forecasting a global recession. Meanwhile, advanced economies showed drastic production contractions in mid-2020, a slow recovery of economic activities started as restrictions were lifted (Verikios, 2020).

Ship acquisition, which is a capital-intensive mechanism for financing Nigeria's participation in the maritime industry (Woo et al., 2019) is critical to the country's economic performance. During this period of pandemic, the industry struggled with contractual obligations, market instability, and fluctuations in volumes of trade and interest rates (Belitski et al., 2022). Economic Growth, which is measured by the real gross domestic product (RGDP), depends on a stable political economy, strategic planning, and a welcoming business environment for development and investments (Iyiola et al., 2012). The Covid' 19 challenged all these foundational elements.

Considering that numerous prior studies centered broadly on the pandemic's effect on the overall macro-economy, a critical research lacuna remains in evaluating the cause-effect relationship between the COVID-19 pandemic and economic growth of Nigeria simultaneously with its influence on ship acquisition. This research work is therefore designed to ascertain the effect of the COVID-19 pandemic on the economic growth of Nigeria (rgdp). This leads to the development of the research hypothesis:

1.1. Hypothesis.

No significant relationship exists between the COVID-19 pandemic and Nigeria's Real Gross Domestic Product.

The outcome will contribute to policy development and formulation for government and private sector critical stakeholders, leading to the development of resilient strategies to protect,

safeguard and enhance the country's GDP during such emergency.

2. Literature Review.

This section reviews concepts, theories and empirical findings as it concerns the study.

2.1. Conceptual Review.

2.1.1. Corona-virus Pandemic.

The pandemic known as COVID-19, created an atmosphere of fear, worries and great concerns, and widespread fatalities, that exceeded previous pandemics. The implementation of world-wide lockdowns and restrictions of persons and cargoes —pre-vaccine development measures— led to the total breakdown of numerous economic structures. Advanced nations adopted heavy economic stimulus plans and packages, to prevent severe recession, while, emerging economies resulted to the provision of meaningful palliatives. Overall, the COVID-19 pandemic era is understood conceptually, as a season of severe economic instabilities and uncertainties accompanied with acute health challenges (Susilawaiti & Agus, 2020).

2.1.2. Ship Acquisition Business.

This is a highly capital-intensive business of trade, Ship acquisition encompasses the entire spectrum of methods and options used to procure the necessary funds for the business of shipping transport. These options range from bank loans, to high-yield bond issuance, and arrangements for public-private concessions. The viability of the various options is directly proportional to the degree of economic stability. During periods of uncertainty, financial institutions, pursue a risk-averse stance, and are less willing to issue credits. Therefore, ship acquisition is essentially the means and method of capital access to stir, stimulate and maintain the vital maritime transport trade.

2.1.3. Economic Growth.

Economic growth is necessary for meeting the pressing demands of a growing and thriving population. It involves growth in manufacturing activities, investments, and employment opportunities. It is measured using increase in Gross Domestic Product (GDP) over a period of time usually a year, economic growth is the foundation of national development, distinguishing developing from developed nations. It necessitates a bedrock of stable and strong political economy, strategic planning, and a beneficial environment both for domestic and Foreign Direct Investments (FDIs). Socio-cultural and political uncertainties, common in many growing economies, gravely slows down sustainable growth and development (Iyiola et al., 2012).

2.2. Empirical Review.

A concerted review shows restricted studies directly relating the COVID-19 crisis, ship acquisition, and economic growth of Nigeria.

Lin et al. (2022) discovered that international shipping industry, inspite of the pandemic, found a rise in stock prices. Their analytics identified that financial result was the major driver of the sector's response to the COVID-19 shock and ESG criteria, with key performance lacunas in metrics like Earnings Per Share (EPS) and timely delivery. The authors recommended concentrating on gross profit margins and human (social) distancing policies to address these gaps.

Greick et al. (2011) noted that performance of international shipping firms stocks are often high. However, the period of the pandemic (2020-2021) introduced acute stock price volatility (Divailo et al., 2021; Lee et al., 2019; Wu et al., 2020; Albertyn, et al., 2011), underscoring the uncertainty of high returns during the financial crises.

Susilawaiti and Agus (2020) highlighted the pervasive negative impact of COVID-19 on the global economy, with the household unit as the most affected, apart from transportation and trade. They pointedly recommended the regulation of interest rates and controlled fees for lending and deposit facilities as a way to stabilize and strengthen the economy and control inflationary trends. Susan et al. (2022) observed the disequilibrium negative effect of lockdowns on small and growing businesses in Australia and offered a positively promising outlook, noting that the economy could show resilience once the virus is contained and lockdowns are fully lifted (Ellis, 2021).

2.3. Theoretical Review.

The theory that supports this study is the Modern Portfolio Theory (MPT), developed from the broader Investment Portfolio Theory (Lin et al., 2022).

2.3.1. Modern Portfolio Theory (MPT).

Propounded by Markowitz (1952), MPT shows a model for developing an asset portfolio that maximizes expected returns for a set risk level. The bedrock assumption is that people that invest in businesses are risk-averse; they will always accept portfolios that shows lower risk for a comparable outcome. The main strategy of MPT is heterogeneity (diversification), which serves as a necessary tool to take up unexpected shocks, which includes major pandemics, thereby protecting investment returns and minimizing losses (Iyiola et al., 2012).

Investment decisions are formed by two major types of market financial analysis: Fundamental Analysis, which evaluates underlying business realities such as financial health, managerial qualities, and commendable and competitive advantages, with Technical Analysis, which measures market parameters and investor viewpoints (Iyiola et al., 2012).

The shipping sector's continuous growth and high performance (Hsieh et al., 2021; Syriopoulos, 2019) have fundamentally made it attractive investment. Studies reveal that shipping stocks can improve the overall return-per-risk ratio of a traditional formal portfolio (Greick et al., 2011). Given this basics on strategic financial arrangement, the application of MPT techniques is pivotal to ship acquisition and assessing its risk-return profile, especially when considering its contribution to the national economic development (Otheitis & Kunc, 2015).

3. Materials and Methods.

3.1. Research Design and Data:

An Ex post-facto research design was used with quarterly secondary data covering January 2019 to December 2021. Data for the Nigerian economy were collected from the Central Bank of Nigeria (CBN), Nigeria Centre for Disease Control (NCDC), and the Nigeria Maritime Safety & Administrative Agency (NIMASA).

3.2. Operational Variables:

- Dependent Variable: Real Gross Domestic Product (RGDP), adjusted for CPI (inflation), will be used to measure the economic growth of Nigeria.
- Independent Variables:
 - Covid-19 Confirmed Cases (CVID), measured as the ratio of cases to life expectancy.
 - Commercial Credit to Private Sector (CRTD), measured as the ratio of credit to GDP, serving as the proxy for ship acquisition.
 - Cargo Throughput (CRTP), represents port activity.
 - Interest Rate (INTR), is the cost of funding (borrowing).
 - Transport Sector Foreign Exchange use (SUFEX), representing foreign exchange utilization.

3.3. Model Specification:

The Ordinary Least Squares (OLS) regression method will be used to model the relationship, with RGDP as the dependent variable. The regression is functionally stated as:

$$RGDP = \beta_0 + \beta_1 CVID + \beta_2 CRTP + \beta_3 CRTD + \beta_4 SUFEX + \beta_5 INTR + \mu$$

The apriori expectation for β_1 (CVID) is negative and significant, suggesting that pandemic collapses economic growth.

3.4. Diagnostic Tests:

Prior to OLS estimation, the series underwent diagnostic checks, including Descriptive Statistics (Table 1), Stationarity Test (ADF, Table 2), and Serial Correlation Test (Breusch - Godfrey LM Test, Table 3).

4. Results and Discussion.

4.1. Diagnostic Test Results:

Table 1: Descriptive statistics.

Statistic	CRDT	CRTP	CVID	INTR	RGDP	SUFX
Mean	0.087982	0.982358	323.5377	13.28528	1.238687	39.81222
Median	0.084848	0.949254	80.32300	12.52500	2.110000	14.25000
Maximum	0.258878	1.334708	1378.969	18.23000	5.010000	111.8800
Minimum	0.005363	0.619410	0.000000	11.15000	0.100000	3.190000
Std. Dev.	0.083293	0.088898	441.7344	1.937427	2.118314	35.44146
Skewness	1.176571	1.388488	1.774347	1.890173	-1.174647	0.886777
Kurtosis	3.025308	7.198165	3.298835	2.258112	3.521201	1.728317
Jarque-Bera	21.07168	40.15589	9.128116	5.118317	9.868256	5.092045
Probability	0.000027	0.000000	0.010429	0.078234	0.012995	0.078362
Sum	2.447355	34.54488	11647.36	478.2700	44.52000	1397.240
Sum Sq. Dev.	0.155213	0.328821	8831381.	131.3781	340.5542	46492.08
Observations	36	36	36	36	36	36

Source: Author's Eviews12 Computation, 2025.

The data confirms the extreme nature of the COVID - 19 shock. The CVID variable exhibits high dispersion (Mean - 323.54, Std. Dev. 441.79) with a vast range (Min 0.00 to Max 1379.99), indicating periods of rapid, sharp increases in pandemic severity followed by low or zero values. Similarly, the RGDP variable, with a Mean of 1.24%, records a severe minimum value of -6.10%. This negative value directly evidences the deep economic contraction or recession experienced in Nigeria during at least one quarter of the study period due to the pandemic's impact.

Table 2: Unit-root test results.

Variable	ADF statistics	Test Critical Value @5%	Probability	Integration
RGDP	-5.6407	-3.5485	0.0003	I (1)
CVID	-8.8992	-3.5578	0.0000	I (1)
CRDT	-7.3387	-3.5485	0.0000	I (1)
CRTP	-6.7183	-3.5485	0.0000	I (1)
INTR	-8.5266	-3.5485	0.0000	I (1)
SUFX	-19.2989	-3.5530	0.0000	I (2)

Source: Author's Eviews12 Computation, 2025.

A critical observation is the non-normality of the key variables. The Jarque-Bera probability values for CRDT (0.000027), CRTP (0.000000), CVID (0.010429), and RGDP (0.012996) are all significantly less than the 0.05 threshold. This leads to the rejection of the null hypothesis of normal distribution. This is common for financial and crisis-era economic data, suggesting the presence of fat tails (high Kurtosis, especially for CRTP at (7.19) and asymmetric distribution (positive Skewness for CVID and CRDT; negative for RGDP), which necessitates the use of robust time series modeling techniques like co-integration to avoid biased standard errors.

The diagnostic results confirm the suitability of the time series data for modeling. The Unit Root Test (Table 2) shows that all key variables (RGDP, CVID, CRDT, INTR, CRTP) are non-stationary at levels, integrated of order one I(1), while SUFX is I(2).

Table 3: Serial-correlation test.

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
Test	Statistic	Probability	Value
F-statistic	0.246172	Prob. F(2,24)	0.7837
Obs*R-squared	0.643263	Prob. Chi-Square(2)	0.7250

Source: Author's Eviews12 Computation, 2025.

The Breusch - Godfrey Serial Correlation Test (Table 3) yielded a high probability (0.7837), confirming the absence of serial correlation in the residuals. This validates the efficiency and reliability of the estimated Ordinary Least Squares (OLS) model presented in Table 4 for capturing short-run dynamics.

4.2. Hypothesis-Testing Results: Effect on Economic Growth.

Table 4: OLS regression results.

Dependent Variable: RGDP				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24.08630	5.209655	4.623397	0.0002
CRDT(4)	-32.36941	5.129592	-6.310328	0.0000
CRTP(-4)	-6.098572	3.499014	-1.742940	0.0967
CVID(-4)	0.002392	0.000895	2.671678	0.0147
SUFX(-3)	0.089916	0.017697	5.080774	0.0001
INTR(-6)	-1.400476	0.364251	-3.844813	0.0010

Source: Author's Eviews12 Computation, 2025. (See appendix 1)

The OLS Regression results (Table 4) reveal a significant, counter-intuitive, and crucial finding regarding acquisition (financing) during the crisis: the Commercial Credit to the Private Sector (CRDT (-4)) has a highly significant negative coefficient (-32.37). This implies that a policy of credit expansion, lagged by four quarters, which was associated with a dramatic decline in Real GDP (RGDP). This outcome suggests that credit was likely used for non-productive purposes like loan restructuring, debt servicing, or survival, rather than genuine investment in vessel acquisition that boosts economic output, rendering the immediate credit response to the pandemic largely ineffective for stimulating growth.

The influence of the pandemic (CVID) on economic growth (RGDP) is complex and lagged. The CVID (-4) variable shows a positive and significant coefficient (+0.0024). This seemingly paradoxical result is critical to understanding the post-shock economy: it likely captures the delayed "bounce-back" effect, where economic activity begins to recover four quarters after the peak of the immediate viral shock or lockdown measures have been eased, or it reflects a structural shift where sectors adapted or benefited from the pandemic conditions. Furthermore, the Interest Rate (INTR (-6)) has a highly significant negative impact (-1.40), confirming the classic economic principle that high borrowing costs stifle investment and economic expansion.

In summary, the combined results imply that Nigeria's economic growth during the crisis period was highly vulnerable to both monetary policy and external shocks. The strong negative coefficients on CRDT(-4) and INTR(-6) suggest that high borrowing costs and poorly targeted or utilized credit were major drag factors on the economy. Conversely, the Transport Sector's use of Foreign Exchange SUFX (-3) showed a highly significant positive coefficient, underscoring the vital role of the maritime trade sector, funded by FX, in driving the country's economic activity and resilience against external crises.

Table 5: Co-integration trace results.

Series: CRDT CRTP CVID INTR RESID RGDP SUFX				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace		Prob.**
		Statistic	Critical Value	
None *	0.688220	248.3853	125.6154	0.0000
At most 1	0.608780	143.2083	95.75366	0.0000
At most 2	0.622375	85.74870	69.81889	0.0016
At most 3	0.575384	41.09710	47.85613	0.1844
At most 4	0.381988	23.33378	29.79707	0.2207
At most 5	0.207581	12.01375	15.49471	0.1635
At most 6	0.133886	5.933884	3.841466	0.0600
Trace test indicates 3 cointegrating equation(s) at the 0.05 level.				

Source: Authors.

Crucially, the Co-integration Trace Test (Table 5) identifies three co-integrating equations, establishing a valid long-run equilibrium relationship among the non-stationary variables.

4.3. Discussion and Interpretation.

The regression results (Table 4) revealed a significant relationship, leading to the rejection of the null hypothesis (H_0), concluding that the Covid-19 Pandemic significantly impacts the Real Gross Domestic Product in Nigeria.

The coefficient for the pandemic variable, CVID(-4) (at 4 lags), is 0.002392 with a p-value of 0.0147, indicating a positive and significant impact on RGDP at the 5% level. This unexpected positive finding, which contradicts the apriori expectation of a negative effect, aligns with the results of Greick *et al.* (2009) regarding global pandemics. This outcome could be alluded to several reasons: namely (1) The data period (Jan 2019 - Dec 2021) captured phases where government stimulus or initial policy rollouts might have temporarily buoyed GDP. (2) The non-linear nature of the pandemic's economic effects, where certain sectors (e.g., communications, healthcare) experienced unexpected growth.

More importantly, the ship acquisition (financing) proxy, CRTD (4) (Commercial Credit to Private Sector at 4 lags), shows a coefficient of -32.36941 with a p-value of 0.0000, which is highly significant at the 5% level. This indicates a negative and highly significant impact of credit to the private sector on the economic growth of Nigeria. This result suggests that commercial credit, intended to spur investment in sectors like vessel acquisition, may not be optimally directed or productively utilized. The lack of a direct, positive relationship indicates a disconnect where general private sector credit growth does not effectively translate into GDP gains, possibly due to structural inefficiencies, leakages or corruption, or a focus on non-productive, short-term ventures.

Furthermore, Transport Sector foreign exchange Use (SUFX (-3)) has a positive and significant impact (Coefficient: 0.089916, Prob. 0.0001), indicating that foreign currency utilization for maritime operations is a strong contributor to GDP. The high R-squared value confirms the explanatory power of the model.

4.3.1. Effect on Economic Growth.

A 1% rise in CVID (COVID-19 cases/severity) will lead to a +0.002392% rise in economic growth, four quarters lag. This result is positive and statistically significant.

Critical Interpretation

This is a highly paradoxical finding, as surrounding economic theory suggests a negative correlation. The positive coefficient for the lagged CVID (-4) does not imply the pandemic was satisfactory or good for the economy; rather, it suggests:

1. The Paradoxical (Bounce-Back) Effect: It likely captures the delayed V-shaped recovery. Economic activity (measured by RGDP) was actually depressed immediately following the initial shock waves of the pandemic. Four quarters (one year) after a surge in cases, restrictions were typically lifted, leading to a strong, base-level recovery that signals as a positive association in the lagged model.
2. Shifts in Structure: The statistic (coefficient) may reflect the growth of industries that benefited from the crisis,

such as digital sector, healthcare, essential goods manufacturing, which started to show recovery growth a year after the initial shockwave.

Overall, the immediate shock was negative, however, the model shows that the economic recovery phase that started about a year after the peak of the crisis was so strong to create a positive relationship in the time series analysis.

5. Conclusion and Recommendations.

The study summarizes that the COVID-19 pandemic strongly and significantly affected Nigeria's economic growth trends, setting up a long-run correlation (co-integration) among the major maritime and macroeconomic variables. Analytically, the standard credit response rate to the pandemic was found to be ineffectual or counterproductive in the immediate-to-medium run, as commercial credit expansion lag by four quarters is reflective of a significant decline in economic growth. The findings underscore the point that Nigeria's economic resilience during global emergencies is strongly dependent on the strength of its maritime trade sector (SUFX) and the sector's ability to maintain a low-interest rate regime, showcasing the requirement for targeted, as well as productive credit policies and stable foreign exchange for trade.

5.1. Recommendations.

- a. Policies regarding Crisis-prone Commercial Credit Policy should be restructured. The Government and monetary authority (Central Bank) should shift from blanket credit expansion to targeted and monitored credit facilities disbursements, on sectors that demonstrate clear, short-term-boosting capacity (e.g., local manufacturing, healthcare, pharmaceutical, essential logistics, or even agriculture).
- b. FX Allocation for business and Maritime trade Infrastructure development should be prioritized. The monetary authority should vigorously pursue a prioritized and expedited allocation system for the maritime and transport sectors, with special focus on spare parts, fuel, and essential imports necessary for cargo throughput.
- c. The government and monetary authority should adopt a Counter-Cyclical, Stable Monetary approach such as interest rate stabilization, or even gradual rate reduction during global emergencies such as the pandemic. This will encourage private sector investment and assist to offset the economic meltdown.

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Appendix.

Full OLS regression output.

Dependent Variable: RGDP				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	24.08630	5.209655	4.623397	0.0002
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CRTP(-4)	-6.098572	3.499014	-1.742940	0.0967
CVID(-4)	0.002392	0.000895	2.671678	0.0147
SUFIX(-3)	0.089916	0.017697	5.080774	0.0001
INTR(-6)	-1.400476	0.364251	-3.844813	0.0010
R-squared	0.801229	Mean dependent var		0.611154
Adjusted R-squared	0.751536	S.D. dependent var		3.437581
S.E. of regression	1.713502	Akaike info criterion		4.114130
Sum squared resid	58.72177	Schwarz criterion		4.404460
Log likelihood	-47.48368	Hannan-Quinn criter.		4.197734
F-statistic	16.12365	Durbin-Watson stat		2.364661
Prob(F-statistic)	0.000002			

Source: Authors.