Port Revenue Performance and Economic Growth: The Nigerian Ports Authority Experience, 2010-2019

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Abstract: The Study examined Port Revenue Performance and Economic Growth: The Nigerian Ports Authority Experience, 2010 to 2019. The objective of this study is to examine the effect of Port Revenue Performance on Nigeria's economic growth by critically evaluating the Nigerian Ports Authority Performance. The neoclassical growth theory was employed in the study and the Nigeria Ports Authority was chosen as its sample, covering the period from 2010 to 2019. The study used secondary time series data sourced from the Nigeria Ports Authority and the National Bureau of Statistics and used the ordinary least square regression and the Engle-Granger co-integration to test the variables at the 5% level of significance. The findings showed that total revenue to gross registered tonnage had positive and significant effect on economic growth while operating surplus to operating revenue showed a negative but significant effect and operating surplus to cargo throughput showed insignificant effect; there was no co-integration between the variables. The study concludes that Port revenue performance affects economic growth in the short-run only, and it recommends amongst others that policy makers should formulate appropriate and implementable regulatory framework that will address infrastructural deficits at the ports and stimulate increased utilization by major foreign vessel companies.

Keywords: Revenue generation, ports performance, Nigeria ports authority, cargo tonnage, gross registered tonnage

1. Introduction

Economic growth and development of any country largely depends on the performance metrics of its international trade and investments because no single country can exist on its own. Domestic and foreign trades will be difficult without efficient transportation system to convey marketable goods and maritime business presents opportunity for the transportation of large volume of cargo. Records have shown that over 80% of the volume of international trade is transported by sea. This necessitate the importance of ports operations to countries endowed with coastal features

[1]. Ports have been seen as catalysts and gateways for economic growth and development [2-4]. Scholars and Maritime experts have noted the need to private port operations as major reform in the maritime sector in Nigeria pointing out that, with globalization, the government alone cannot effectively manage a modern seaport successfully [5,6]. The performance of ports in the generation of revenue among other contributions to national economy hinges on several factors. The problem of ports capacity and congestion, high level of demurrage, competitive structures, lack of facilities, level of investment and management deficit are issues confronting the smooth operation of ports activities, thereby stifling the quantum of revenue generation to the nation`s treasury [7-9].

These quantum of studies have not agreed on the effect of revenue performance of an ideal port authority on economic growth, and presents a gap to be resolved by this study. The main objective of this study is thus, to determine whether revenue performance of port authorities affect economic growth of their countries, and the specific objective of this study is to evaluate the effect of Nigeria port authority revenue performance on the economic growth of Nigeria. Such a study attempts to answer the question such as – Does Port revenue performance affect a country`s economic growth? It is expected that answer to such a question apart from adding to empirical literature on subject, will also assist maritime policy makers to make effective ports administration and management decisions. The hypothesis to such a research question will usually be in the null form;

H₀: Nigeria Port Authority Revenue Performance does not affect the economic growth of Nigeria.

Hence, this study will consider; 1. Introduction, 2. Data and Methods, 3. Results, 4. Discussions, 5. Conclusion.

1.2 Literature Review

1.2.1 Evolution of Ports Authorities

Shipping businesses in most countries are usually coordinated and regulated by their respective ports authorities. These Ports authorities could be described as organizations responsible for the management, development and regulation of port activities. These institutions perform variety of functions, with different terms of business operations and governance structure [10-15]. Ports authorities perform three basic functions ranging from, i) Landlord function; ii) Regulator function; iii) Operator function [16]. The landlord function entails such activities as competition between port structures. The regulator function involves activities relating to the creation and implementation of benchmark standards for activities in the port while the operation function entails the provision of operational port services [9,11,13,17-20].

1.2.2 Ports Development and Administration in Nigeria

The evolution of ports reforms in Nigeria dates back to the year 1906 [1]. At independence in 1960, the need for indigenization of port industry became very obvious. Ports were formerly addressed marine before its metamorphosis to Nigeria Ports Authority in 1954. The enactment of the NPA Act in 1954 was the first bold step

adopting an integrated national approach to ports administration in Nigeria. It [21,22] identified eight major and other ancillary ports and jetties across the coastal areas in Nigeria. These ports include Lagos Port Complex; Apapa; Tin Island Port, Port Harcourt (old), Federal Ocean Terminal, Onne; Warri Port, Calabar Port, Koko Port and container Terminal Port, Lagos [23].

1.2.3 Profile of Revenue Generation of Nigeria Ports Authorities (2010 – 2019)

In an attempt to diversify the Nigerian revenue which was over 70% oil controlled, the federal government of Nigeria took certain steps to enhance the revenue generated from the maritime sector by changing the management and technology employed at the Nigerian ports authority [24,25]. It is [21] opined that in order to achieve the lofty ambition and target of huge revenue that will complement proceeds from oil sales, certain measures must be effected such as deployment of cutting edge technology and assist to ensure that all revenue leakages are blocked.

Consequent upon the revenue narration in the foregoing, the Nigerian Ports` sources of revenue generation could be categorized into two types namely, internally generated revenue (traffic revenue, harbor revenue and administrative revenue) and income from other sources (dividend on equity participation, rental port development levy, annual license fees and rents and rates from Cabotage activities).

1.2.4 Revenue Performance of Port Authorities

Port revenues are earned mainly from berth occupancy and cargo handling fees and it was noted that Port financial Performance apart from the traditional financial statements, may be determined by relating Ports income generation operating surpluses and expenditures to total GRT/NRT of shipping and the total tonnage of cargo handled at the port [26]. The useful measure of financial performance is the rate of return on turnover which is determined by dividing operating surplus by operating income.

1.2.5 Economic Growth Measurement - Gross Domestic Product (GDP) of Nigeria

Nigeria is one of the key regional players in West Africa with a population of approximately 202 million accounting for over half of the region's population size and one of the largest population of youths in the world [25].

1.2.6 Gross Registered Tonnage

This refers to record of internal volume (internal capacity) of ships or water going vessels used as a means for categorizing commercial vessels.

1.2.7 Total Tonnage of Cargo Handled (Throughput)

Tonnage of cargo handled, otherwise called Port Throughput, and measures the amount of cargo or number of vessels the port authority handles overtime.

1.3 Theoretical Review

This paper is anchored on the modified neoclassical growth theory referred to as the endogenous growth theory. It could be termed as an economic ideology which operates within a closed system from other parts of the world. On the other hand, the modified neoclassical growth model assumes that economic growth is stimulated by both endogenous factors (government policies) and exogenous forces (technology, expert advices, capital, and amount of unskilled labor) [26].

1.4 Empirical Review

The study of the analysis of the impact of port operations in Nigeria using least square regression statistical techniques and concluded that gross registered tonnage of the vessel has significantly contributed to the Nigerian gross domestic product (GDP) [26]. In the study carried out by [27] on the Analysis of relationships between Ports activities and other sector of the economy using simple regression estimation techniques, it discovered that port activities resulted in an increase in fiscal revenue and accelerated economic growth. Using panel data regression, a research on Transportation Infrastructure and Economic Growth in China discovered that transportation networks have a positive effect on per capital growth rate across all sectors of the Chinese economy [28,29]. This position was further supported by [30].

However, inefficient port system was highlighted by [31] and corroborated by [32] which revealed that in Korea, the port cities of Busan and Icheon failed to get out of poor state of economic performances.

2. Data and Methods

The research design employed in this study is the ex-post factor approach, which entails the use of the output of already concluded events in assessing the performance of the Ports authorities under study. Secondary data were used and obtained from the Nigeria Ports Authority and the National Bureau of Statistics.

2.1 Sample Study and Model Specification

The sample adopted for this study is the Nigeria Ports Authorities with over 17 seaports in Nigeria and the relevant variables to measure the effect of the authorities' financial performance on the economic growth and development of Nigeria include the sectoral Gross Domestic Product (GDP), income generation operating surpluses and expenditures to total GRT/NRT of shipping and the total tonnage of cargo handled at the port.

Using the [32] performance metrics, other relevant variable will include; Income (expenditure) per GRT which translates to Total Revenue (expenditure) divided by Total GRT (or NRT) of shipping; Operating surplus per ton of cargo handled is measured by Operating surplus divided by Total tonnage of cargo handled (throughput) while the Rate of return on turnover is measured by Operating surplus divided by Operating income.

Hence, using above theoretical analysis:

$$GDP = f(TRGRT, OSTP, OSOI), [\%] \quad (1)$$

$$GDP = a_0 + a_1TRGRT + a_2OSTP + a_3OSOR + U_t, [\%] \quad (2)$$

$$TRGDP = a_0 + a_1TRGRT + a_2OSTP + a_3OSOR + U_t, [\%] \quad (3)$$

where: *GDP* is Gross Domestic Product contribution [%]; *TRGDP* is Total Port Revenue to Gross Domestic Product [%]; *TRGRT* is Total Revenue to total gross registered tonnage [%]; *OSTP* is Operating surplus (Ports) to total tonnage of cargo handled (Throughput) [%]; *OSOR* is Operating Surplus to Operating Revenue of the ports authorities [%]; $a_0 - a_3$ are Parameters [-]; U_t is Error term.

2.2 Apriori Expectation

From studies, we expect a positive correlation between the contributions to GDP and the relevant financial parameters [26,32].

3. Results

Table 1 and 2, shows TRGDP, Revenue contribution to GDP of 29.73% in 2010. The revenue parameters show that the economic recession that hit the country between 2017 and 2018 also affected the maritime sector adversely. The revenue of the ports authority to the nation's GDP stood at an average of between 32% to 45% between 2010 to 2016, before the sharp growth to 70.69% in 2017 and then drop to 62.18% by 2019. The rise in this index (Total revenue to GDP indicates that the recession strongly affected the key economic drivers such as oil prices, while the maritime sector helped to cushion this adverse effect during the period).

Table 1 NPA performance data 1. Source: [33,34]

Year	Amt.Realize d (TR) (‘Million)	Amt.Expe. (TE) (‘Million)	Amt. Remitted (OS) (‘Million)	GDP Contrib. (‘Million)	GRT (‘Million)	Throughput (‘Million)
2010	101,050	95,030	6,020.0	339,848	106.6896	76.744727
2011	115,020	105,140	9,880.0	374,099	122.6147	83.461697
2012	136,010	125,200	10,810.0	405,441	129.5069	77.104738
2013	157,310	144,140	13,170.0	514,966	138.6722	78.281634
2014	172,800	154,770	18,030.0	568,499	156.0714	84.951927
2015	177,200	158,770	18,430.0	481,066	144.6152	77.387638
2016	182,420	158,550	23,870.0	404,650	139.4065	70.819092
2017	265,600	255,290	10,310.0	375,745	137.4802	71.903266
2018	270,560	245,910	24,650.0	398,186	128.6718	73.175127
2019	277,680	248.9600	28,720.0	446,543	131.8975	74.698136

Table 2 performance data 2. Source: authors

YEAR	OSTP	TRGRT	OSOR	TRGDP
2010	78.442	947.140	0.05957	0.29734
2011	118.378	938.060	0.08590	0.30746
2012	140.199	1050.214	0.07948	0.33546
2013	168.239	1134.402	0.08372	0.30548
2014	212.238	1107.186	0.10434	0.30396
2015	238.152	1225.321	0.10401	0.36835
2016	337.056	1308.547	0.13085	0.45081
2017	143.387	1931.915	0.03882	0.70686
2018	336.863	2102.714	0.09111	0.67948
2019	384.481	2105.271	0.10343	0.62184

3.1 Stationarity Tests

The test for stationarity requires that the variables in the series model must be stationery at a given level and p-value must be significant at that level. Stationerity is attained where the test statistics is most negative and greater than the critical value of the chosen level of significance.

Table 3 Stationarity table. Source: authors

Variable	ADF t-statistics	Critical value @5%	P-value	Level of integration
TRGDP	-3.3665	-2.0063	0.0050	I(2)
TRGRT	-3.6094	-2.0063	0.0034	I(2)
OSTP	-3.8539	-2.0212	0.0030	I(2)
OSOR	-2.9196	-2.0440	0.0130	I(2)

From the table 3, all the variables were found to be stationery at order two (2). At the second difference as reported, the ADF Statistics for the respective variables were more negative than the critical values at 5% significance level.

3.2 Heteroskedasticity Tests

If the variance of the errors is not constant, we test for the presence of heteroskedasticity with the intention of treating same if found. The treatment method used is the ARCH test (Autoregressive conditionally Heteroskedastic). The Null hypothesis states that there is no Heteroskedasticity if the p-value is greater than the level of significance [35].

Table 4 Heteroskedasticity table. Source: authors

Heteroskedasticity Test: ARCH			
F-statistic	0.156761	Prob. F(1,4)	0.7124
Obs*R-squared	0.226273	Prob. Chi-Square(1)	0.6343

In the case of table 4, we accept the Null hypothesis that there is no evidence of heteroskedasticity since p-value is greater than 5% of the significance level.

3.3 Regression Tests

Hence, from table 5, TRGRT(1) at led 1, it has a t-statistic value of 4.9744 and a p-value of 0.0156 was found to have a positive effect on Total Revenue to Gross Domestic Product and this effect is statistically significant at 5% level since its p-value is well below 0.05. Therefore, we reject null hypothesis to accept the alternative. Similarly, Operating surplus to total revenue, OSOR showed a t-statistic value of -6.7531 and a p-value of 0.0066 is negative, but it has a statistically significant effect on total revenue to gross domestic product since its p-value is below 5%. However, the OSTP(-1) at lag 1, has a t-statistic value of 0.8559 and p-value of 0.4549 and this effect is positive and statistically not significant at the 5% level.

Table 5 Regression table. Source: authors

Dependent Variable: TRGDP				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.191756	0.042043	4.560948	0.0198
TRGRT (1)	0.000248	4.9805	4.974443	0.0156
OSTP (-1)	0.000216	0.000253	0.855946	0.4549
OSOR	-2.053840	0.304135	-6.753058	0.0066
R-squared	0.990857	Mean dependent var		0.396911
Adjusted R-squared	0.981713	S.D. dependent var		0.146382
F-statistic	108.3680	Durbin-Watson stat		1.924644
Prob (F-statistic)	0.001480			

3.4 Co-integration Tests

The Engle-Granger Co-integration tests was carried out on the model and the result is shown in table 6:

Table 6 Engle-granger co integration. Source: authors

Co-integration Test - Engle-Granger		
Specification: TRGDP TRGRT(1) OSTP(-1) OSOR C		
Co-integrating equation deterministics: C		
Null hypothesis: Series are not cointegrated		
	Value	Prob.*
Engle-Granger tau-statistic	-2.621741	0.6639
Engle-Granger z-statistic	-6.334353	0.4058

The result of the Engle-Granger co-integration tests in table 6 shows that there is no co-integration between the dependent variable, TRGDP and the independent variables – TRGRT, OSTP and OSOR at the 0.05 level of significance as both the Engle-Granger tau-statistic and Engle-Granger z-statistic showed insignificant effect of the independent variables on the dependent variable (TRGDP) of 0.6639 and 0.4058, respectively.

4. Discussion

The table 5, TRGRT(1) at led 1, has a t-statistic value of 4.9744 and a p-value of 0.0156, it was found to have a positive effect on Total Revenue to Gross Domestic Product and this effect is statistically significant at 5% level since its p-value is well below 0.05. Therefore, we reject null hypothesis to accept the alternative. Similarly, Operating surplus to total revenue, OSOR showed a t-statistic value of -6.7531 and a p-value of 0.0066 is negative, but has statistically significant effect on total revenue to gross domestic product since its p-value is below 5%.

However, the OSTP (-1) at lag 1, has a t-statistic value of 0.8559 and p-value of 0.4549 and this effect is positive and statistically not significant at the 5% level. The implication of this result is that a 1% increase in TRGRT (Total Revenue to total gross registered tonnage) will result to a 0.00248% increase in TRGDP and the coefficient of the future level of TRGRT variable has a positive sign and is positive at the 5% significance level. This supports the view that the future level of Total Revenue to Gross Registered Tonnage (TRGRT) in Nigeria positively affects economic growth measured by total revenue to Gross Domestic Product (TRGDP) in the short-run.

The result evidently shows that both total revenue to total registered tonnage and operating surplus to operating/total revenue have significant effect on economic growth measured by total revenue to gross domestic product of Nigeria in the short-run, the formal having positive effect while the latter carried a negative effect; hence, policy makers should pay close attention to factors that affect these variables in managing the NPA and the Nigeria maritime sector. It was found, however, that operating revenue surplus to throughput (i.e. total tonnage of cargo handled) had no significant effect on TRGDP for the NPA.

While the result of the effect of TRGRT and OSOR on TRGDP corroborates with the findings of [36,37]; the result of OSTP, however, did not agree with the findings in [26] as it showed a statistically insignificant effect on TRGDP (Total Revenue to Gross Domestic Product). Also, the research revealed no co-integration between TRGRT, OSTP and OSOR on economic growth (TRGDP). This is very revealing, as it implies that the result of recent port reforms by the NPA have not been effective in addressing a sustainable incremental long-term revenue capacity of the agency. Another plausible explanation could be that the reform needed more time for review.

5. Conclusion

This paper studied the effect of Port Revenue Performance on Economic Growth; The Nigerian Ports Authority Experience (2010-2019). The study discovered that revenue performance and economic growth have positive and significant relationship when revenue is assessed using revenue generated to gross registered tonnage and gross domestic product. We also observed a similar effect of operating surplus to total revenue, which was negative but significant. But for the total revenue to throughput, we observed that there was no significant relationship. Hence, we conclude that Port Revenue measured by revenue generated by the ports and registered gross tonnage have positive and significant effect on economic growth while the total revenue to the throughput have insignificant effect.

Based on the outcome of this research, we recommend as follows:

1. Policy makers are admonished to formulate appropriate and implementable regulatory framework that will address infrastructural deficits at the ports and stimulate port utilization by established major foreign vessel companies. This expectedly will result to increased registration fees, annual license fee for cabotage vessel financing fund and port charges as more major vessels will call on the ports regularly.
2. The government is advised to embark on dredging and expansion of our existing inland waterways to attract more vessels to the ports and generate increased cargo handling and other related fees such as harbor revenue, administrative revenue and traffic revenue.

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