

The Impact of Port Congestion on The Nigerian Economy

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ABSTRACT

This research assessed the impact of port congestion on the Nigerian economy. It also examined critically, the factors affecting port performance and its impact on the Nigerian economy. Relevant literatures on port congestion and its effects on port productivity were reviewed. Secondary data were obtained from Central Bank Statistical Bulletin and Nigerian Ports Authority annual bulletin. Data for GDP, Imports, Exports and ports indicator of utilization and of service (Ship calls, Cargo throughput) for a period of 18 years (1995 - 2012) were analyzed using Multiple Regression with the aid of Statistical Package for Social Sciences (SPSS V.20.0), to determine the degree of significance of variables affecting port economic drivers. From the result of the analysis, it was deduced that imports, exports, cargo throughput and berth occupancy ratio correlate significantly and are statistically impacted by GDP variable. Nigerian economy is dependent on the export of Crude oil and Agricultural produce to earn foreign income, while our industries is dependent to a large extent, on the importation of materials needed for their consumption or production activities. Therefore, stagnation in port operations (ports congestion) will have dire economic consequences on the economic growth of the nation. Expanding gate operating hours will maximise the use of off-peak roadway capacity. Nigerian ports should start offering 24 hour/day gate operations to improve berth utilisation rate, reduced cargo dwell time, enhanced ship turnaround time. This will discourage the diversion of Nigeria bound cargo to ports of neighbouring countries, which implies improved revenue yield to the Nigerian economy. From the test of hypothesis, using the statistical student t-test, there is a strong, statistical, significant relationship between Gross Domestic Product and port performance economic drivers (imports, exports, ship calls and cargo throughput).

Keywords: Berth , congestion, GDP, port performance,.

1.0 Introduction

The Maritime sector is recognized as the catalyst for national development, as it houses most critical infrastructure and also a value creating hub for the national economy. The need to develop its potential into national economic strength is germane to achieve sustainable economic development. The maritime sector is of critical significance to the Nigerian economy. Nigeria as a nation is endowed with a vast coastline as well as navigable inland waterways and is strategically placed on the Atlantic coast of West Africa. Nigeria is the sixth largest producer of crude oil in the world and also has the most

prolific gas reserves in the world. The country is also rich other natural resources and agricultural produce. Most of these products are exported to international markets by sea where they are sold and foreign currency earned to ensure the country's developmental objectives. A virile and well organised maritime industry is therefore very important to facilitate Nigeria's international trade.

Ports congestion was noticed for the first time in Nigeria port in the early 1970's otherwise known as the era of cement armada (Ndikom, 2006). During this period, the average waiting time of ship desiring access to ports of West Africa

was well over 100 days. It was a very disturbing situation in Nigeria as ships were even reported to have waited for 10 months or an average of 240 days at our premier port of Apapa Lagos before gaining access for an allocated berth. Such situation has led to the bunching of vessels with significant threat to productivity and competitiveness of the port's system.

The ports are the gateway to the nation's economy. Port congestion and delay in freight handling has tremendously negated the operational performance of Nigeria's ports. These stagnation in port activities has made the Nigerian ports operationally inefficient which in turn has resulted to longer dwell time of cargo in the ports, poor ship turn-round time, block stacking of containers, higher demurrage on importers, higher operating cost of vessels by shipping companies, inadequate berth and space utilisation etc. The economic implications of these are, shippers now divert traffic (capital flight) to ports in Neighbouring countries; ports of Cotonou in Benin, Lome in Togo, Tema in Ghana, Abidjan in cote d'ivoire. These cargoes meant for Nigerian ports, always finds its way through smugglers into Nigerian borders. The effects of ports congestion to the Nigerian economy include; high handling cost of containers, increased prices of consumer goods, stampede on the operations of production companies, decrease in per capita income of employees. Thus, there would be attempt, in this study, to assess the impact of port congestion on the Nigerian economy using economic indices such as Gross Domestic Product (GDP) and port performance drivers such as; number of ship calls, cargo throughput (mmt), imports, export, berth occupancy rate and ship turnaround time.

1.2.1 Review of Related Literature

The Nigerian economy is driven by oil and gas exploration, production and sales. Other major contributors are international cargo trade, customs duties, direct taxes and others. In the Nigerian maritime sector, shipping is an indispensable component of the important drivers of the economy (Ugwu, 2006 in Ekpo, 2012).

Before the advent of port concession (1956-2005), the Nigerian port system suffered from numerous ills which

included the following: The turnaround time for ships was too long and usually calculated in weeks, sometimes months, depending on the cargo being loaded or discharged; Cargo-handling plants and equipment owned by the Nigeria Ports Authority (NPA) were few and mostly unserviceable leading to shipping companies hiring these machines from private sector sources after having paid NPA; Dwell time for goods in ports was prolonged due to poor port management as at such, overtime cargo filled the most active seaports leading to port congestion (Eniola, et al. 2014).

Shipping companies runs the risk of increasing operating cost on daily basis for every delay at the ports. Economic growth in an active port can stagnate or decline when arriving commercial vessels are delayed for the discharge of international cargo, fish, or other commodities. If the shipping companies continue to bring containers or other bulk cargoes on an unprofitable basis, they might discontinue their service of import/export from that port.

Nigerian manufacturers and retailers must factor these increased costs into their pricing, decreasing their global competitiveness and inflating costs for consumers. In many cases, high import costs and cargo delays imperil the very survival of Nigerian businesses and the livelihood of their employees. Delays and restrictions also rob the state of vital revenue through diverted trade and a diminished tax base. The losses in federal revenue resulting from the routing of inbound-trade via Cotonou could be as much as \$400 million per year (CUSTOMS Reforms, 2012).

Another problem is that Nigeria is severely limited in the size of vessels it can handle. It has no ports that can take Panamax vessels, that is, ships whose dimensions are the maximum able to fit through the Panama Canal.

In this, it contrasts with its neighbours Benin, which processes Panamax ships at Cotonou and Cameroon, which has Panamax ready deep-water ports at Kribi and Lolabé. As to "Post-Panamax" and "Super-Panamax" ports (able to handle ships respectively 18 and 22 container rows wide), no ECOWAS port at all qualifies, but they exist at Tangier in Morocco and at Cape Town, Port Elizabeth, and Durban in South Africa (others in Africa include Alexandria, Damietta, and Port Said in Egypt and Port Louis in Mauritius).

Table 1.2: Showing Time, Documents And Cost: Import Comparisons For Selected African Countries (2011)

COUNTRY	COST TO IMPORT (\$ PER 20- TEU)	TIME TO IMPORT (DAYS)	DOCUMENTS TO IMPORT
Benin	1400	32	7
Cameroon	1978	26	12
Ghana	1203	29	7
Liberia	1212	15	9
Nigeria	1440	39	9
Senegal	1940	14	5
South Africa	1807	35	9

Source: world Bank/ international Finance Corporation (2011) in CUSTOM’s Reforms (2012).

To resolve the problem of port congestion, port management may have to procure modern handling equipment and facilities to meet up with the demands of shipping and cargo volume at the port. The use of appropriate modern equipment can go a long way in resolving the problems arising from port congestion. This research had stated earlier that inadequate cargo handling equipment at all stages of cargo delivery at the port can lead to poor operational performance and, therefore, an efficiency port system.

1.3 Objectives and Research Methodology

The main objective of this research is to assess the effects of ports congestion on the Nigerian economy. The data for this study was sourced through the secondary means. Data were collect through several publications, NIMASA annual publications, textbooks, seminar papers, Nigerian ports authority annual bulletins etc

The objective of the study are:

1. To examine critically the relationship between import and Gross Domestic Product.
2. To identify the contribution of export to Gross domestic product
3. To understand the relationship between Ship Calls (grt) and Gross Domestic product.

4. To assess the extent Cargo throughput (mmt) contributes to Gross Domestic product

The multivariate regression analysis was used to model the relationship between the Gross Domestic product and the port performance drivers. Port congestion can be identified as a constraint on port performance which militates against the economic development of the nation. The multi-linear regression is used to obtain the coefficients associated with ports performance in the Nigerian maritime industry. The regression line which defines this relationship is expressed as:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + u \tag{1}$$

Where:

Y = GDP

B₀ = Constant

X₁ = Imports

X₂ = Export

X₃ = Ship traffic in GRT

X₄ = Volume of Cargo throughput (MMT)

U = Error term

B₀ is the baseline while B₁, B₂, B₃, and B₄ are coefficients of the regression parameters to be estimated. The values of the coefficients are obtained using the ordinary least square method.

The values will be gotten from the output of the Statistical Package for Social Scientist (SPSS V20).

3. DISSCUSION OF FINDING

Table 3. Showing the Relationship between the port economic drivers and GDP

Years	GDP	Import	Export	Ship Calls (Grt)	Cargo Throughput (Mmt)
1995	2907358.18	834297000	875895000	78,838,624	13,273,053
1996	4032300.34	775023000	1359580000	83,939,447	15,475,301
1997	4189249.77	1109740000	1321420000	92,843,341	16,582,805
1998	3989450.28	1076970000	948307000	97,892,193	19,325,718
1999	4679212.05	1320830000	1184840000	94,742,691	22,232,936
2000	6713574.84	1497750000	2524180000	123,037,909	28,932,880
2001	689,519,8.33	172,391,000,0	229,549,0000	130,013,586	35,940,692
2002	7795758.35	2320280000	2271570000	118211042	36,987,241
2003	9913518.19	3535520000	3733350000	132,388,233	39,765,945
2004	11411066.91	3525510000	5130720000	160,905,554	40,816,947
2005	14610811.45	4514830000	6857440000	145,495,860	44,952,078
2006	18564594.73	5188080000	8020350000	136474230	49,173,324
2007	20657317.67	5414630000	8562580000	178587798	57,473,350
2008	246,573,17.67	7232070000	10241900000	166131770	65,192,919
2009	24794238.66	7202780000	9265650000	175967300	66,908,322
2010	33984754.13	9241280000	11213700000	191116321	74,910,284
2011	37409860.61	9892644000	19440357000	183473027	55,234,777
2012	40544099.94	5624810000	22446320000	120,818,683	77092625

Source: CBN Statistical Bulletin and NPA Annual Report.

The following hypothesis were tested and by using a multivariate regression analysis. The results of correlation analysis revealed that there were very high significant correlations between all variables of this study, since the significant level was ($P < .05$). The framed hypotheses are:
 H_{01} : Imports into Nigeria is significantly related to the Gross Domestic Product of the Nigerian economy.

H_{02} : Exports are significantly related to Gross domestic Product.

H_{03} : ship calls is directly proportional to Gross domestic Product.

H_{04} : Cargo throughput is significantly related to Gross Domestic product

3.1 Multivariate Regression Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.996 ^a	.991	.987	1429623.70121	1.740

a. Predictors: (Constant), , SHPCAL, EXPT , CATHRUPT, IMP

b. Dependent Variable: GDP

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2559511230034904.000	6	426585205005817.300	208.719	.000 ^b
	Residual	22482063197807.957	11	2043823927073.451		
	Total	2581993293232712.000	17			

a. Dependent Variable: GDP

b. Predictors: (Constant), TURNRNDT, SHPCAL, EXPT, BEROCUPR, CATHRUPT, IMP

Source: Secondary data

From the results obtained in this work, several observation and interpretations can be made. The results obtained from the above model are discussed in as follows:

- 1) The coefficient of Import parameter (X_1), indicates a direct proportionate relationship with Gross Domestic product in the Nigerian economy.
- 2) The coefficient of Export (X_2) variable, indicates a direct proportionate relationship with GDP in the Nigerian economy.
- 3) The coefficient of Ship calls (X_3) variable, indicates an inverse proportionate relationship with GDP in the Nigerian economy.
- 4) The coefficient of Cargo throughput (X_4), variable, indicates a direct proportionate relationship with GDP in the Nigerian economy.
- 5) The R^2 value obtained for the model is high and aligns within the acceptable range, hence the model has a high goodness of fit and confirms that 99.1% variations of the dependent variable (GDP) is explained by the independent variables.

- 6) The value of the F- ratio (ANOVA- approach) tested on the model shows that the regression parameters are not all equal to zero. Since the calculated F-value (208.719) is greater than the tabulated F- value (2.70), implies that all parameters are not equal to zero, thus the model is significant.
- 7) The t-values for each independent variable explain their individual contributions on the dependent variable.
 - a) The calculated t- value obtained for $IMP(X_1)$ parameter is (3.812) and is greater than the tabulated t (1.74). This therefore implies that Imports are statistically and significantly impacted by the GDP variations.
 - b) The calculated t- value obtained for the $EXPT(X_2)$ parameter is (7.003) and which is greater than the t tabulated value (1.74). This implies that, the Export (X_2) parameter has a direct proportionate relationship with the dependent variable and is statistically significant.

- c) The calculated t- value obtained for SHPCAL(X_3) parameter is (1.689) and is less than the tabulated t (1.74). This therefore implies that Ship calls are not statistically and significantly impacted by the GDP variations.
- d) The calculated t- value obtained for CATHRUPT(X_4) parameter is (3.528) and is greater than the tabulated t (1.74). This therefore implies that Cargo throughput is statistically and significantly impacted by the GDP variations.

The regression statistics as showed above (**Table 3.1**) shows a strong correlation existing between GDP and the identified ports economic drivers. The *R*-value stood at 99.6% and the coefficient of determination also gave a value of 99.1%. This implies that the ports economic drivers X_1 - X_4 are accountable for the impacts of port congestion on the Nigerian economy.

Looking at table 3.1 also shows the Beta values of the ports economic drivers relative to the Gross Domestic product. The negative contributors to the GDP values are variables X_3 , and X_4 . Each of these factors has negative Beta coefficients.

Considering the variables that have positive Beta values for the selection of the critical factors, we present X_1 whose Beta value is 0.002. This is followed by variable X_2 with Beta value 0.001, X_4 with Beta value of 0.158 and X_5 with Beta value of 15423.356.

From these Beta values, the factor with the highest Beta coefficient becomes the most critical factor relative to port congestion problems. Consequently, variable X_5 whose Beta value stood at 15423.356 is the most critical factor. The next influential factors to the ports economic drivers values in ascending order are $X_2 = 0.001$, $X_1 = 0.002$, $X_4 = 0.158$.

$$GDP(Y) = B_0 + B_1(IMPR) + B_2(EXPT) - B_3(SHPCAL) + B_4(CATHRUT) + u \quad (2)$$

$$GDP(Y) = 3819759.299 + 0.002(IMPR) + 0.001(EXPT) - 0.053(SHPCAL) + 0.158(CATHRUT) + u \quad (3)$$

The significance of the above model is tested by way of the F-test using the Analysis of variance (ANOVA) approach. The interpretation of the regression line is that, there is a direct proportionate effect on the independent variable such that the value of Gross Domestic Product generated within the Nigerian

economy will increase by; 0.002 for every unit increase in Import, 0.001 for every increase in Export, increase by 0.053 for a unit decrease of ship call at Nigerian ports, increase by 0.158 for every a unit increase in cargo throughput, increase by 15423.356 for every unit increase in Berth occupancy rate and increase by 231849.629 for a unit decrease in Ship turnaround time. The regression intercept have a negative value which shows an indirect proportionate effect on the dependent variable.

Conclusion

In conclusion, port congestion is a major constraint on port productivity and performance, aside oil exploration, the maritime industry is a heavy foreign exchange earner. However, the demand for port services is a derived demand, in that even the oil companies and other service and manufacturing industries are dependent upon the port sector for the exportation or importation of their goods, due to the economics of scale offered by shipping. From the literature reviewed, it is evident that a lot of factors negate the efficient performance of Nigerian ports. This has led to cargo diversion or capital flight to the ports of neighbouring countries, thereby diminishing the economic base of Nigeria. Statistics has it that Nigeria loses about \$400 million per annum from goods en-route Nigeria but was diverted to other ports of neighbouring countries. In the light of the fore going, this research found out that, Imports, Exports, ship call and Cargo throughput have direct proportionate relationship with GDP. Thus, the government must muster enough political will to make Nigerian ports more efficient, so that the problem of cargo diversion and arbitrary charges by the private terminal operators will be a thing of the past.

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