Enhancing the Performance of the Maritime Sector in Nigeria: Effect of Macroeconomic Variables

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Abstract

Several studies have emphasized the potential of the maritime sector in enhancing Nigeria's economic growth. Identifying how macroeconomic policy can be used to boost the performance of the maritime sector, however, has not received adequate attention in the literature. This paper examines the effect of macroeconomic variables on the performance of the maritime sector in Nigeria. Data for the paper was collected from the statistical Bulletin of the Central Bank of Nigeria (CBN) from 1981 to 2016 and analysed using OLS model with HAC Newey-West method of estimating the coefficient covariance. The result shows that exchange rate and foreign reserve have negative effect on the performance of the maritime sector. Although not statistically significant, the results suggest that exchange rate policy and fluctuation in the nation's foreign reserve, has consequences for the performance of the maritime sector in Nigeria. Federal government capital expenditure was also found to have a positive effect on the performance of the maritime sector. Whereas it implies that increasing capital expenditure to the maritime sector would have a significant effect on the performance on its growth, statistical evidence shows that this might not be the case. More so, the regression result also shows that oil sector have continued to have a positive effect on the performance of the maritime sector in Nigeria. Nevertheless, the significance of this variable at 10% critical value shows that the relationship is weak hence, the need to diversify the economic activities in the maritime sector into non-oil sector as well. Examination of the regression model to identify the observations that had influence on the performance of the growth of the maritime sector identified the following period as having influence on the

performance of the Nigerian maritime sector: 1993-1994, 1999-2000, 2005, 2009-2011, and 2013, and 2015-2016. These periods are associated with periods of high inflation in Nigeria, exchange rate devaluation, regime switch from military to democratic rule, debt burden issues, the 2008 global financial crisis and the 2016 economic recession period in Nigeria. As such, the economic implication is that despite the effect of rising inflation, fiscal adjustment and economic recession in Nigeria, the maritime sector was able to sustain its growth. It is therefore important for the nation to implement policies that will continue to support the growth of the maritime sector as the sector has the potential to serve as shock absorber in times of declining government revenue and economic crunch in Nigeria. In conclusion, the use of the HAC Newey-West covariance method to estimate the OLS model proved that it yields more robust estimates than when estimated using the Huber-White and ordinary covariance method.

1.0   Introduction

Several studies (such as Oyesiku, Onakoya & Folawewo, 2013; Igberi & Ogunniyi, 2013; Uma, Ogbonna & Hyacinth, 2014) have emphasized the potential of the maritime sector in enhancing Nigeria's economic growth. Identifying how macroeconomic policy can be used to boost the performance of the maritime sector, however, has not received adequate attention in the literature. The maritime sector is an integral aspect of transportation that provides services to all aspect of the whole aggregate economy activities. It comprises four major areas namely marine transport, shipbuilding, capacity building, and maritime insurance business - the latest aspect of maritime business. Maritime industry can also be categorized into transport of goods by sea, which is made up of containerized and non-containerized, transport of persons by sea, which is made up of ferries and cruise ships, service and offshore support vessels, which is made up of ship laying or repairing, undersea cables or pipelines; prospecting for

oil; conducting oceanographic research; diving assistance; undertaking undersea work; service offshore wind farms, oil and gas platforms (Andrew, 2016).It also consists of passenger and freight transport, ferry transport, marine towing, ship chartering, marine cargo handling, harbor and ports operations, marine salvages, piloting services, and marine shipping agencies (Sen, 2004). As a backbone of the global trade and the global economy, it contributed 90 per cent to world trade, reflecting on the GDP group outlook and around over 500, 000 merchants' ships trading internationally, over 1.5 million seafarers in over 150 nations (IMO report, 2016).

In Africa, maritime sector is recognized as critical to many African economies particularly the Gulf of Guinean (GoG). For instance, according to Hassan Bello (2016), the executive secretary of Nigerian Shipper's Council (NSC), the transport sector contributes about 10% of Nigeria's GDP. Also, 76 per cent of shipping businesses conducted in West Africa place in Nigeria and statistics from the Nigerian Ports Authority (NPA) on ship calls to Nigeria revealed that between 2009 and 2012, Nigeria's tonnage has grown from 82 million tons to over 150 million with an estimated freight payment rising from $4.1 billion to above $7.5 billion annually, but participation of Nigerians was zero. The four years import freight payment estimated at $22.53 billion was all paid to foreign ship owners with no benefit to the Nigerian economy. Some other shocking statistics indicate that Nigeria exports about 900 million barrels of crude oil annually, but foreign vessels earn the freight of about $2.25 billion a year carrying the country's crude with no freight earning benefit to Nigeria (FinIntell, 2013).

Nigeria was estimated to have a population of over 183 million with 28.58 million persons in the Nigerian labour force in the fourth quarter of 2016 and 81.18 million labour force population (working ages who were willing, able and actively looking for work) in the third quarter of 2016, a huge economic potential for the nation, corporate organizations,

merchandise in international seaborne trade, Small and Medium Scale Enterprises (SMEs), entrepreneurs etc. According to Ekpo (2012), maritime industry includes all enterprises engaged in the business of designing, constructing, manufacturing, acquiring, operating, supplying, repairing and/or maintaining vessels, or component parts, thereof: of managing and/or operating shipping lines, stevedoring and customs brokerage services, shipyard, dry dock, marine railways, marine repair shops, shipping and freight forwarding services and similar enterprises. Recently, the Minister of Finance, Mrs. Kemi Adeosun praised the regulatory agency, Nigerian Maritime Administration and Safety Agency (NIMASA), invariably Nigerian Maritime Industry for its contribution to the revenue performance of the nation in year, 2017. This is a reflection of huge economic potential the industry holds to the growth and wellbeing of the Nigerian economy.

Though, Nigerian economy is mono-economic in nature; heavily relied on oil trade. And also the seaborne trades, which account for about 90 percent of finished goods or raw materials imported or exported in/out of the country. According to International Maritime Organization (IMO), the Nigerian Maritime Industry was estimated to exceed $153billion in March, 2016, corresponding to about 30% of the country Nigerian Gross Domestic Product (GDP). Despite these promising trend, weak public investment in the sector, government policy that are not geared to creating enabling investment environment, would have significant effect on the performance of the Nigerian maritime sector. This paper examines the effect of macroeconomic variables on the performance of the maritime sector in Nigeria.

2.0   Overview of the Maritime Industry in Nigeria

Historical fact shows that Nigeria's maritime sector is oldest established sector in the country having its origins in the early eighteenth century where massive trade activities took place

under the colonial master (Maritime Stakeholders Forum, 2015). The several of phases, both in economic boom and challenges, are in the hands of military junta and civilian administration. The industry has contributed significantly to the revenue performance of the federal government of Nigeria, investment, employment generation (both directly and indirectly) and stimulation of various forms of small and medium scale businesses along the coastal line and interlinked.

According to Agbakoba (2015) maritime sector is estimated to be capable of generating N7trillion annually and 40,000,000 jobs. The industry is estimated from $25billion to $2trillion market size with annual contribution of 36 percent to 40 percent, second to Oil and Gas sector. The maritime sector is expanding and the growth expectation is highly promising following the development of (a) Export Processing Zone (EPZ), development of new and modern port/terminal infrastructure, (b) Enactment of essential maritime industry support Laws such as The Coastal and Inland Shipping (Cabotage) Act and Local Content Development Act etc. (c) Port trade from and to dominant economic regions of the world and (d) The expansionary trends at macro-level of the economy from industrial activities in manufacturing, oil and gas, telecommunications and power generation.

To Nigerian macro-economy: Statistics show that since the federal government embarked on ports concession to solve the problem of protracted inefficiency, corruption, mismanagement, and huge debts that characterized the Nigerian ports (Oghojafor, Kuye & Alaneme, 2012), the number of indigenous and other private investors has increased from twenty (20) that were granted to operate out of ninety-four (94) prequalified concessionaires, operating seaport and terminals in the country. Consequentially generating increase in number of employment in the industry and increased revenue contribution to the country federal account. However, the multi-dimensional, benefit of functional maritime industry lies in the capacity to remedy the

growing unemployment rate through chains of small business and entrepreneurship businesses, inflow of investment, and other related economic factors of production.

To the Financial Sector: Maritime industry is arguably one of the capital intensive sectors of an economy. This implies that there huge volume of money transaction that involves in there transaction business activities. However, according to Ekpo (2012), Nigeria trades about 180 million tons of sea borne cargo per annum, an annual freight that worth $6.8 billion or N1,088 billion. This shows the enormous financial transaction that took place in the banking sector from one maritime service organization to another and other corporate bodies. However, this provides opportunities for commercial banks and regulatory body, CBN to increase their profit margin through bank service charge. While other opportunities include helping in commodity price stability, balance of payment deficit and trades.

To the Agricultural Industry: Maritime industry has greater opportunities and roles in the functionality of subsistent and commercial farming businesses. It has huge role to play in the development and import and export of agricultural products harvest by farmers, products distribution by agrobusinesses. For instance, according to Nigerian Bureau of Statistics (NBS), total exports for the period under review stood at N3,005.9 billion, while total imports stood at N2,286.5 billion. The total value of Nigerian's merchandise trade at the end of First Quarter (Q1), 2017 was N5,292.4 billion. This represented a slight increase of 0.1% relative to the value of N5,286.6 billion recorded in the preceding quarter. The marginal rise in export, coupled with a slight decrease in import brought the country's trade balance to N719.4 billion during the period, up from N671.3 billion. Out of which 4.35% were from agriculture. This implies that this achievement can be improved upon through lowering maritime transport cost aside of the roles it played indirectly and directly for the agricultural sector of the Nigerian economy.

To the Transportation Industry: Since maritime transport deals with both local and international trade, it helps to stimulate the development of intermodal transportation system within the country and ease of cargoes and heavy goods through inland waterways and also helps in the development of transport infrastructure, this is because maritime transport investment and growth along economic development in a complex processes and industrialization of a nation. Other economic opportunities maritime transport has its integral part of the transport system in the country are the development of dry bulk shipping, tanker shipping, Coastal passenger/Cruise services, Liner/Container etc. that have contributed to the Nigeria's GDP.

To Pollution and other Maritime threats control and management: The maritime industry serves like a life wire to the country economy. However, one of the benefits of the development of maritime industry is to help in the development of broad knowledge and understanding of associated threats to maritime security, thereby increasing the shipping and ports activities, revenue generation of states along and around the coastal area, implementation of cabotage reform, piracy law, technology transfer, illegal unreported and unregulated fishing and other form of pollution in the sea.

To Ship Finance and Maritime Insurance: According to Ekpo (2012), vessels financing is still evolving in the Nigerian financial market, largely on account of its peculiar nature. Most operators rely on equity financing, which is hardly sufficient. The operators need well-structured and developed ship finance service capable of providing composite funding options to meet the growing demand for financial solutions in the sector. This provides the opportunities for stakeholders, government and regulatory bodies in the sector to reform and rethink the Cabotage Vessels Financing Fund (CVFF) to stimulate indigenous shipping activities.

Port Development: The increase in the number of volume of cargoes (both in and out) and other factors shows the strategic role played by port in the country. It was through this that the idea of sea and river ports development, construction of terminals and jetties, river dredging, construction of Inland Container Depots (ICDs) and Cargos Consolidation Centres (CCC) string up in the country. Consequentially, this has had ripples effect in all the chains of the economy along the businesses in there zones. This corroborated the findings of port reform measure taken in Nigeria, investigating the relationship between privatization and the relative efficiency within the container port industry (Estache, 2004; Tongzon & Heng, 2005; & Okeudo, 2013).

2.1 Challenges in the Nigerian Maritime Industry

Nigerian Ports System Problem: This is a problem that has lingered from pre-concession into this current period of port concession. It often sometimes paralyzes economic activities in the ports. It is a problem of static and malfunctioning of port system in the country and excessive of government interferences and intervention, inadequate infrastructure of ports facilities and proliferation of government agencies. Though harmonized Act regulating the ports agencies of the government exist, there is still need to have a unified agency present in the ports that will designate criminal activities to all constitutional bestowed agencies on the appropriate agency in the country. The recent Nigerian Ports Authority (NPA) and Intel Plc. dispute is a case among ports challenge in Nigeria. Also, the lack of intermodal transport system connecting the ports has contributed to the ports congestion and road lockage in Apapa and Port Harcourt etc. resulting to delay in cargoes discharge, fines, and thieves.

Manpower and Capacity Building Problem: Currently, the capacities of Nigerian seafarers are still closely related to the 19th century routine. This includes inadequate well-trained and

professional seafarers, dockworkers, inspection personnel, government agents present in ports, maritime labour specialist in handling modern day cargo handling and delivery equipment. This consequently often lead to improper management of inspection, clearing, and port management and some lead to death or industrial unrest.

Corruption Problem: There is this school of thought that argued that even if theoretical privatization or port concession contributes to improved efficiency of the performance (both financially and non-financially). Its negative effect on the distribution of wealth and ports poor management arising from corruption makes it destructive factor responsible for moribund state of affairs in Nigerian economy and consequentially, maritime industry state. As institutionalized cankerworm, it has created serious setback for the growth and development of indigenous ship-owners, country's infrastructure, and maritime development as a whole, the economy and other sphere of Nigeria life.

Problem Bureaucracy: Snail bureaucratic process involved in the assessment and confirmation of document(s) in the maritime sector has led to serious loses revenue to the pocket of individual and jesters rather state and/or revenue of the shipping companies. According to Eme & Eden (2007), the problems arising from state bureaucracy were thematic and are three: structural administrative attitude and behavoiur, political and economic influences. However, this has adversely affected the process of documentation and verification/conformation a complex process and thus a serious threat to the development of Nigerian Maritime Industry.

Maritime Security Problem: Piracy, armed robbery at sea, drug trafficking, smuggling, maritime terrorism, cyber threat, IUU, oil bunkering, pollution etc. are other problems of maritime industry in Nigeria. It was estimated that Nigeria loses about N9billion revenue annually to illegal fishing and smuggling (Association of Indigenous of Seafood Stakeholder,

2017)[1]. Also, Speaker of the Houses Representative, Hon. Yakubu Dogara, disclosed during the in a public hearing of Maritime Operation Coordinating Board Act 2017 that Nigeria loses about N7 trillion annually to insecurity and revenue linkages in her waterways. Invariably, this is a huge economical lost to both the country and maritime industry as whole.

Problem of Modern Technology: Maritime business is associated with the use of highly expensive and sophisticated modern technologies. Available equipment in the Nigerian ports show that Nigeria is lagging behind in the application of the maritime shipping codes and others technologies. For instance, in Nigeria maritime threats are still been largely detected by relatively simple technology compared to what is obtainable in India Ocean and other developing countries in Asia that have experienced serious decline in the sea problem. Currently, cargoes inspection is still being carried out by 100 percent physical inspection making it cumbersome for cargoes discharge, underutilization of limited port space among others.

2.2   Empirical Literature

Studies that examined the effect of the transport sector on the Nigerian economy have employed the Ordinary Least Square (OLS) to achieve their objectives. Recent innovation in OLS estimation with regards to what should be done when any of the assumptions of stationary, normality and autocorrelation are violated, are however, not taken into account in these studies. There are three methods to estimate the coefficient variance in empirical studies employing the use of OLS: the ordinary covariance method, the Huber-White covariance method and the Heteroscedasticity and Autocorrelation Consistent Covariance (HAC)

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[1] https://guardian.ng/news/how-nigeria-loses-n9bn-annually-to-illegal-fish-importation/

Newey-West covariance method. According to a secondary material on sandwich estimators[2], the variance-covariance matrix in linear least squares regression model are specified as:

$$V(\hat{\beta}) = E(\hat{\beta} - \beta)(\hat{\beta} - \beta)' = (X'X)^{-1} X'\Omega X (X'X)^{-1} \qquad (2.1)$$

Where $\Omega = E(\in \in')$ \hfill (2.2)

If the error terms, $\in$, are homoscedastic and uncorrelated so $E(\in \in') = \sigma^2 I$, the covariance matrix simplifies to:

$$V(\hat{\beta}) = (X'X)^{-1} \sigma^2 (X'X)(X'X)^{-1} = \sigma^2 (X'X)^{-1} \qquad (2.3)$$

By default, most time series software's estimates the coefficient covariance matrix with the assumption that: $V(\hat{\beta}) = (X'X)^{-1} \sigma^2 (X'X)(X'X)^{-1} = \sigma^2 (X'X)^{-1}$, such that

$$\hat{\Omega} = \left[\frac{\sum_{t=1}^{T} \hat{\in}_t^2}{T-k} \right] I = s^2 I, \qquad (2.4)$$

and

$$\hat{V}(\hat{\beta}) = (X'X)^{-1}(X's^2 I X)(X'X)^{-1} = s^2 (X'X)^{-1} \qquad (2.5)$$

Where s^2 the standard degree-of-freedom is corrected estimator of the residual variance. According to Zeileis (2004), sandwich estimators can be used to obtain robust estimators of the coefficient variance $V(\hat{\beta})$ by relaxing the assumptions of heteroscedasticity and no autocorrelation. Three classes of robust variance estimators that are estimated using this considerations are: Heteroscedasticity Consistent (HC) Covariance estimators; Cluster Robust (CR) variance estimators, when there is correlation between observations in different groups or clusters; and HAC estimators when heteroscedasticity *and* serial correlation are present.

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[2] http://www.eviews.com/help/helpintro.html#page/content/Regress2-Robust_Standard_Errors.html

Although the HAC approach yields a more robust estimate, all three approaches alter the estimates of the coefficient standard errors of an equation but not the point estimates themselves. Following Zeiles (2004), this paper employs OLS model with the HAC method of estimating the covariance.

Until the kind of innovation demonstrated in Zeiles (2004), several studies have estimated OLS regression without paying attention to the method used in estimating the coefficient covariance hence, leading to wrong inferences. When applied to the studies that examine the impact of the maritime sector on economic growth, the result is more worrisome. For instance, Uma *et al* (2014) examined the effect of the transport sector (road transport, rail transport, air transport and water way) on the Nigerian economy using time series data from 1981-2009. The result from the ordinary least square model employed revealed that only road transport had a significant impact on the real GDP. Although the joint effect of the variables on the economy was statistical significant based on the F-statistic, it was not stated which method of covariance was used for the coefficient as such, the finding that only road transport was significant leaves room for further investigation. Using Nigeria as a case study, Oyesiku *et al* (2013) investigated the impact of public sector investment in transport on economic growth from 1977 to 2009. The empirical model for the study was developed from the endogenous growth framework in which transport investment entered into the production function as input, while the Ordinary Least Squares (OLS) estimation technique was used for the estimation. The findings showed that transportation played an insignificant role in the determination of economic growth in Nigeria. Like the case of Uma et al (2014), it is not clear which covariance method was used for the estimation of the coefficient covariance in Oyesiku *et al* (2013).

Igberi and Ogunniyi (2013) used ordinary least square and seemingly unrelated regression to estimate the effect of the Nigerian maritime sector on the growth of the Nigerian economy.

The result shows that the maritime transport sector has a negative relationship, though not significant on the economic growth. The study concludes that for the Nigerian maritime transport to have a positive and significant impact on economic growth and industrialization in Nigeria, government should formulate policies that would encourage genuine foreign and private participations in the maritime sector of the economy. This recommendation however, did not stem from the regression model as the effect of specific government policies such as the effect of increased public investment through capital expenditure, and other variants of fiscal or monetary policies on the maritime sector, were outside the scope of the study. This omission was also found in Oyesiku et al (2013) who called for the total overhauling of the transport sector through government policies without saying what policies should be considered.

3.0   Research Method

Following Oyesiku et al (2013), Igberi & Ogunniyi (2013), Uma et al (2014), this paper employs ordinary least square regression for the estimation of the empirical model. Using Zeiles (2004), however, the HAC Newey-West covariance method was used to estimate the coefficient covariance. Data for the paper was collected from the statistical Bulletin of the Central Bank of Nigeria (CBN) from 1981 to 2016. The data was collected for the following variables: Gross Domestic Product for the maritime sector, Oil sector trade, non-oil sector trade, federal government capital expenditure to economic services and implicit price deflator for the maritime sector. The other variables for which data were collected were foreign reserve and exchange rate (relative to the US dollar).

The variables were tested for stationarity using the Augmented Dickey Fuller (ADF) unit root test. It was found that all the variables were I(I) except for the maritime sector GDP which

was I(II). This shows that the performance of the maritime sector is susceptible to sudden up and down swings hence, effective macroeconomic policies such public investment, exchange rate policy and inflation, would play a significant role in enhancing the performance of the maritime sector in Nigeria.

Table 3.1: Measurement of Variable and their Associated Level of Stationarity using ADF Test

Variables	Abbreviation	Measurement of variable	Level of Stationarity
Maritime sector GDP	GDP_{MSt}	Percentage (%)	I(II)
Oil Sector Trade	OST_t	Naira Billion	I(I)
Non-Oil Trade	$NOST_t$	Naira Billion	I(I)
FGN capital Expenditure	$FGCAP_t$	Naira Billion	I(I)
Implicit Price Deflator (Maritime sector)	IPD_t	Naira Billion	I(I)
Foreign Reserve	FR_t	US$ Billion	I(I)
Exchange Rate	ER_t	Relative to the US$	I(I)

Source: Author

Note: I(I) = Stationary at first difference: I(I); I(II) = Stationary at second difference

The regression model is specified thus:

$$y = \alpha + \beta X + \mu \tag{3.1}$$

where $y = GDP_{MSt}$ and X is a vector of the independent variables. The OLS model is specified in stochastic form as follows:

$$GDP_{MSt} = \alpha_0 + \alpha_1 OST_t + \alpha_2 NOST_t + \alpha_3 FGCAP_t + \alpha_4 IPD_t + \alpha_5 FR_t + \alpha_6 ER_t + \mu \tag{3.2}$$

Where μ is the disturbance term.

The OLS model is estimated using the HAC Newey-West covariance coefficient. The CUSUM of squares test will also be used to test for structural stability while the influence covratio is used to measure the impact of each observation on the variances (and standard errors) of the regression coefficients and their covariance's. A major advantage of the influence statistics is to identify dates within the observation that have significant effect on the model. These dates will then be captured using dummy variables on 0 and 1 in order to estimate the effect of these structural dates on the performance of the maritime sector.

The OLS model with the Dummy variable to be estimated is presented thus:

$$GDP_{MSt} = \alpha_0 + \alpha_1 Dummy + \alpha_2 OST_t + \alpha_3 NOST_t + \alpha_4 FGCAP_t + \alpha_5 IPD_t + \alpha_6 FR_t + \alpha_7 ER_t + \mu \qquad (3.3)$$

The estimations are carried out using Eviews 9 software. The next section discusses the empirical result.

4.0 Result and Discussion

A standard requirement of regression model is that the variables should be stationary. Using the ADF unit root test, it was found that all the variables were I(I) while the GDP for the marine sector was I(II). Post estimation result also shows that the assumption of no autocorrelation is also violated, hence justifying the need for estimating the OLS model with HAC Newey-West covariance method. The Jacque-Bera statistics also shows that the probability value is greater than 0.05 suggesting that the residuals are not normally distributed. These evidence implies that that the standard regression assumption of stationary variables does not apply to the model. To correct for this estimation, the HAC Newey-West covariance method is applied instead of the ordinary covariance method.

Table 4.1: Estimated Regression Result (Equation 3.2)

Variables	Coefficient (with HAC Newey-West Covariance Method)	Coefficient (with Huber-White Covariance Method)	Coefficient (with ordinary Covariance Method)
Exchange Rate	-0.0000345 (0.975)	-0.0000345 (0.978)	-0.0000345 (0.9882)
FGN capital Expenditure	0.000194 (0.4772)	0.000194 (0.453)	0.000194 (0.6466)
Foreign Reserve	-0.00834 (0.2999)	-0.00834 (0.2231)	-0.00834 (0.2386)
Inflation (IPD)	0.01265 (0.0095)	0.01265 (0.0025)	0.01265 (0.0186)
Non-Oil Trade	-0.0000913 (0.007)	-0.0000913 (0.0162)	-0.0000913 (0.1083)
Oil sector Trade	0.0000405 (0.09680	0.0000405 (0.1182)	0.0000405 (0.2392)
Autonomous component (Constant)	-0.0629 (0.0146)	-0.0629 (0.1561)	-0.0629 (0.1959)
Adjusted R-square	21.43%	21.43%	21.43%
F-statistics	2.50039 (0.0469)	2.50039 (0.0469)	2.50039 (0.0469)
DW Stat	2.95	2.95	2.95

Source: Authors Estimation. Figures in parenthesis ( ) are p-values

Exchange Rate, Foreign Reserve, Public Investment and the Maritime Sector

The result shows that exchange rate and foreign reserve have negative effect on the performance of the maritime sector. Although not statistically significant, the results suggest that exchange rate policy and fluctuation in the nation's foreign reserve, has consequences for the performance of the maritime sector in Nigeria. On the other hand, federal government capital expenditure has a positive effect on the performance of the maritime sector. Whereas

it implies that increasing capital expenditure in the maritime sector would have a significant effect on the performance on the maritime sector, statistical evidence shows that this has not be the case. This is a pointer to the need to address the spate of infrastructural deficit militating against the effective operation of the Nigerian maritime sector. The poor state of infrastructure in Nigeria vis-à-vis other selected countries is buttressed by the 2014 World Economic Forum (WEF) data on enabling trade index. It shows that Nigeria's infrastructure index is much lower than those of other countries like Singapore, Qatar, South Africa and Ghana, and the country ranks 110 among 138 countries. While Nigeria has a rating of 2.9, countries like Ghana, South Africa and Singapore ranked 3.2, 4.2 and 6.1 respectively.

Implicit Price Deflator, Inflation and the Maritime Sector

The variables that had significant effect on the performance of the maritime sector from the regression model are: implicit price deflator in the maritime sector, non-oil trade and oil sector trade. The results shows that the IPD deflator (a proxy for inflation in the model) is positively related with the performance of the maritime sector. This implies that inflation increases the cost and revenue performance of the maritime sector. As a result, achieving single digit inflation would have a significant effect in improve the real growth of the maritime sector. The positive relationship of the implicit price deflator also implies that investing in the maritime sector will be associated with inflated cost just as procurement is expected to expensive than usual. This also has a tendency of bringing about corruption in the maritime sector. These issues further emphasizes the importance of achieving low single digit inflation on the performance of the maritime sector in Nigeria.
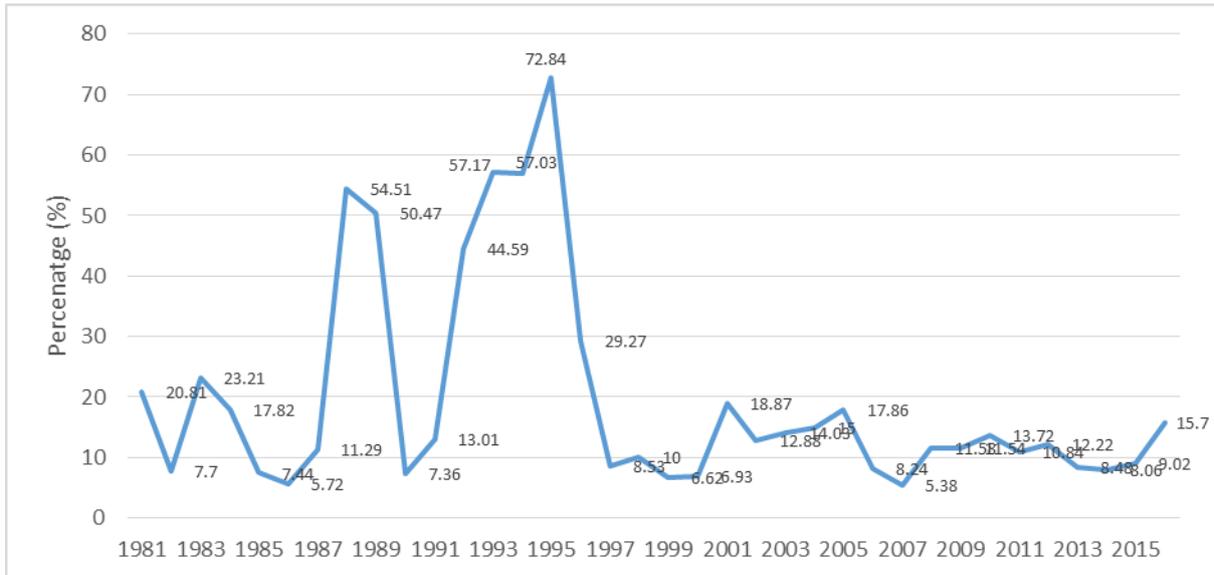
Figure 4.1: Structural Break Test
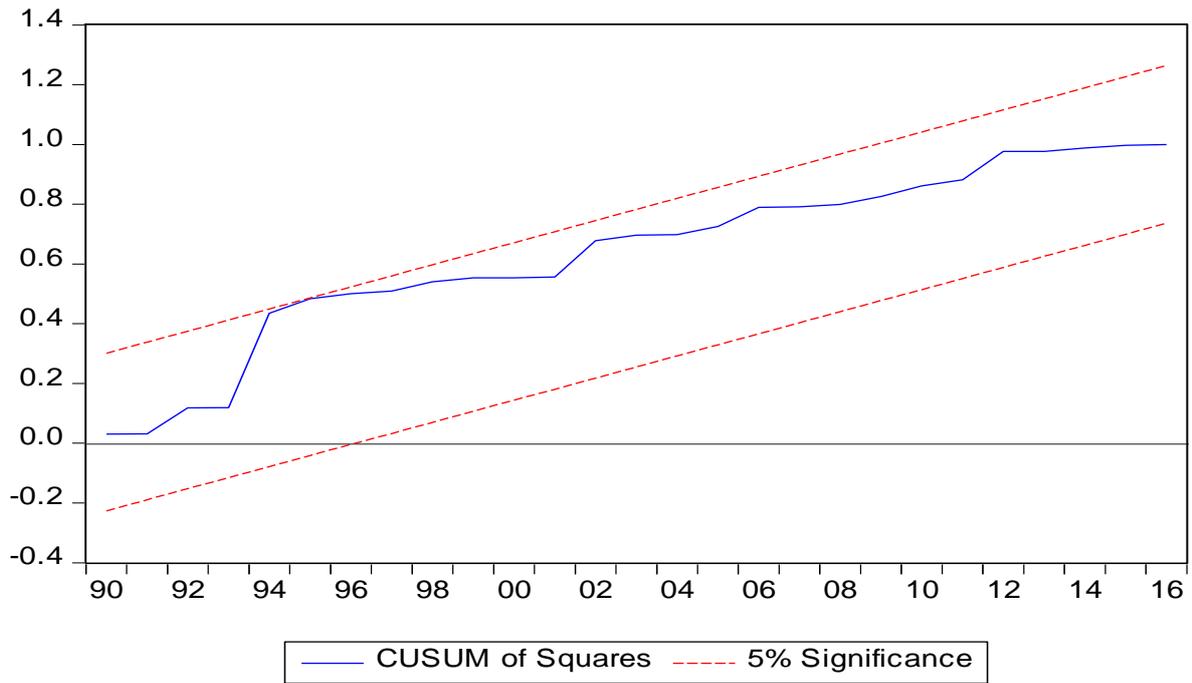
Source: Authors Estimation

An examination of the structural break test using the CUSUM of squares test shows that 1993 to 1995 represents a period where the model was unstable (see Figure 4.1). An examination of the data on inflation within this period shows that these were times where inflation was highest in the country in 1993, inflation was 57.17%, 57.03% in 1994 and 72.84% in 1995.

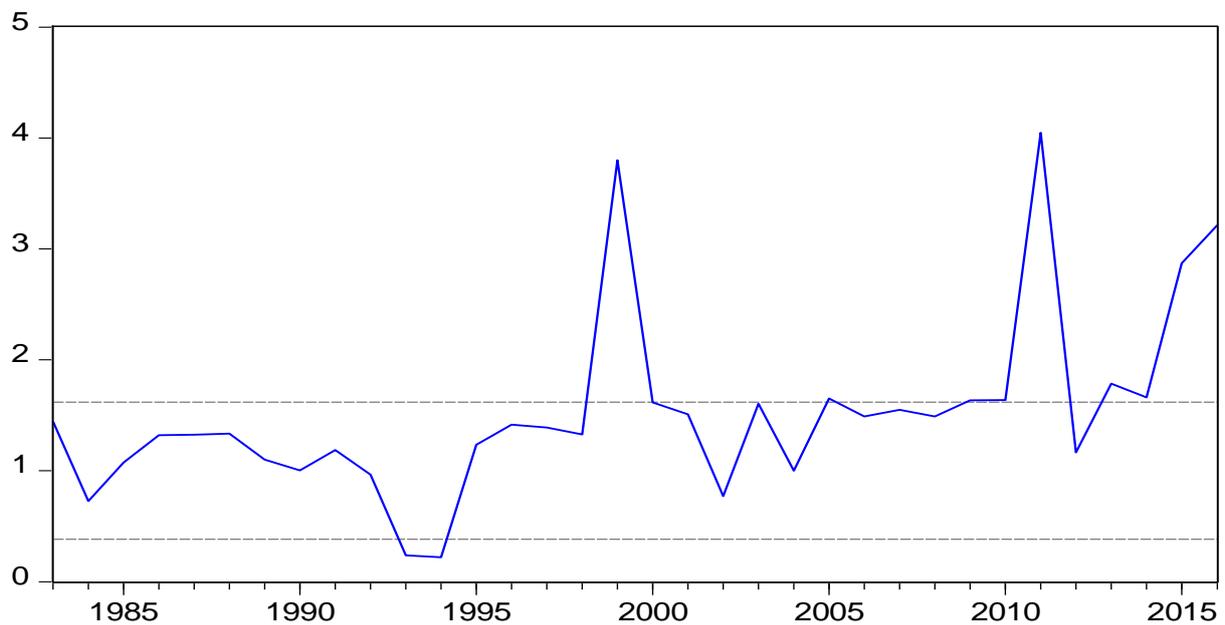Figure 4.2: Trend of Inflation in Nigeria: 1981 - 2016

Oil and Non-Oil Sector Trade and the Maritime Sector

The regression result also shows that oil sector have continued to have a positive effect on the performance of the maritime sector in Nigeria. Nevertheless, the significance of this variable at 10% critical value shows that the relationship is weak hence, the need to diversify the economic activities in the maritime sector into non-oil sector as well.   Unlike its oil counterpart, non-oil sector trade has a negative effect on the performance of the maritime sector in Nigeria. This result, which is statistically significant at 5% critical value, implies that despite the volume of non-oil trade that is carried out through the maritime sector, the country has not been able to harness the benefits that should be derived through non-oil activities in the maritime sector. Reform to examine the activities of the Nigerian customs and taxes levied on non-oil goods that are transported via the sea would be relevant in reversing the trend. More so, the rising insecurity in the maritime sector would also need to be addressed as it increase the risk of transporting goods through the maritime sector. The use of the HAC Newey-West covariance method to estimate the coefficient as presented in Table 4.1 also show that the method yielded better estimates than when estimated using the Huber-White and ordinary covariance method.

Identification of Structural Breaks Using Influence Statistics and the Effect on the Maritime Sector

An examination of the regression model to identify the observations that had influence on the performance of the growth of the maritime sector identified the following period as having significant effect on the performance of the Nigerian maritime sector: 1993-1994, 1999-2000, 2005, 2009-2011, and 2013, and 2015-2016. These periods are associated with periods of high inflation in Nigeria, exchange rate devaluation, regime switch from military to democratic rule, debt burden issues, the 2008 global financial crisis and the 2016 economic recession period in Nigeria.

Fig 4.3: Identification of Structural Breaks Using Influence Statistics

Using categorical variable: 0 for these periods, and 1 if otherwise; the regression model was re-estimated. It was found that the dummy variable for the break dates had a positive but insignificant effect on the performance of the maritime sector. The economic implication is

that despite the effect of rising inflation, fiscal adjustment and economic recession in Nigeria, the maritime sector was able to sustain its growth. It is therefore important for the nation to implement policies that will continue to support the growth of the maritime sector as the sector has the potential to serve as shock absorber in times of declining government revenue and economic crunch in Nigeria.

5.0   Summary and Conclusion

The maritime sector is an integral aspect of transportation that provides services to all aspect of the whole aggregate economy activities. While several studies have emphasized the potential of the maritime sector in enhancing Nigeria's economic growth, identifying the set of policies that can be used to boost the performance of the maritime sector has, however, not received adequate attention in the literature. Though, the Nigerian economy is mono-economic in nature, its seaborne trade account for about 90 percent of import and export activities in/out of the country. Identifying the factors constraining the performance of maritime sector and how various policy instrument can be used to address such challenges is therefore critical for the sustainable growth of the sector. This paper examines the effect of macroeconomic variables on the performance of the maritime sector in Nigeria. Following Zeiles (2004), the paper employs OLS model with HAC Newey-West method of estimating the coefficient covariance.

Data for the paper was collected from the statistical Bulletin of the Central Bank of Nigeria (CBN) from 1981 to 2016. The data were collected for the following variables: Gross Domestic Product for the maritime sector, Oil sector trade, non-oil sector trade, federal government capital expenditure to economic services and implicit price deflator for the maritime sector. The other variables for which data were collected were foreign reserve and exchange rate (relative to the US dollar). The variables were tested for stationarity using the Augmented Dickey Fuller (ADF) unit root test. It was found that all the variables were I(I)

except for the maritime sector GDP which was I(II). This shows that the performance of the maritime sector is susceptible to sudden up and down swings hence, effective macroeconomic policies such as public investment, exchange rate policy and inflation, would play a significant role in enhancing the performance of the maritime sector in Nigeria. The result shows that:

- Exchange rate and foreign reserve have negative effect on the performance of the maritime sector. Although not statistically significant, the results suggest that exchange rate policy and fluctuation in the nation's foreign reserve, has consequences for the performance of the maritime sector in Nigeria. On the other hand, federal government capital expenditure has a positive effect on the performance of the maritime sector. Whereas it implies that increasing capital expenditure in the maritime sector would have a significant effect on the performance on the maritime sector, statistical evidence shows that this might not been the case. This is a pointer to the need to address the spate of infrastructural deficit militating against the effective operation of the Nigerian maritime sector.

- The effect of the implicit price deflator, non-oil trade and oil sector trade on the maritime sector, were statistically significant. The results shows that the implicit price deflator is positively related with the performance of the maritime sector. As a result, achieving single digit inflation would have a significant effect in improving the real growth of the maritime sector.

- An examination of the structural break test using the CUSUM of squares test shows that 1993 to 1995 represents a period where the model was unstable (see Figure 4.1). An examination of the data on inflation within this period shows that these were times where inflation was highest in the country in 1993, inflation was 57.17%, 57.03% in 1994 and 72.84% in 1995.

- The regression result also shows that oil sector have continued to have a positive effect on the performance of the maritime sector in Nigeria. Nevertheless, the significance of this variable at 10% critical value shows that the relationship is weak hence, the need to diversify the economic activities in the maritime sector into non-oil sector as well. Unlike its oil counterpart, non-oil sector trade has a negative effect on the performance of the maritime sector in Nigeria. This result, which is statistically significant at 5% critical value, implies that despite the volume of non-oil trade that is carried out through the maritime sector, the country has not been able to harness the benefits that should be derived through non-oil activities in the maritime sector. Reform to examine the activities of the Nigerian customs and taxes levied on non-oil goods that are transported via the sea would be relevant in reversing the trend. More so, the rising insecurity in the maritime sector would also need to be addressed as it increase the risk of transporting goods through the maritime sector. The use of the HAC Newey-West covariance method to estimate the OLS model yielded more robust estimates than when estimated using the Huber-White and ordinary covariance method.

- Furthermore, an examination of the regression model to identify the observations that had influence on the performance of the growth of the maritime sector identified the following period as having significant effect on the performance of the Nigerian maritime sector: 1993-1994, 1999-2000, 2005, 2009-2011, and 2013, and 2015-2016. These periods are associated with periods of high inflation in Nigeria, exchange rate devaluation, regime switch from military to democratic rule, debt burden issues, the 2008 global financial crisis and the 2016 economic recession period in Nigeria.

- Lastly, using categorical variable: 0 for these periods, and 1 if otherwise; the regression model was re-estimated. It was found that the dummy variable for the

break dates had a positive but insignificant effect on the performance of the maritime sector. The economic implication is that despite the effect of rising inflation, fiscal adjustment and economic recession in Nigeria, the maritime sector was able to sustain its growth. It is therefore important for the nation to implement policies that will continue to support the growth of the maritime sector as the sector has the potential to serve as shock absorber in times of declining government revenue and economic crunch in Nigeria.

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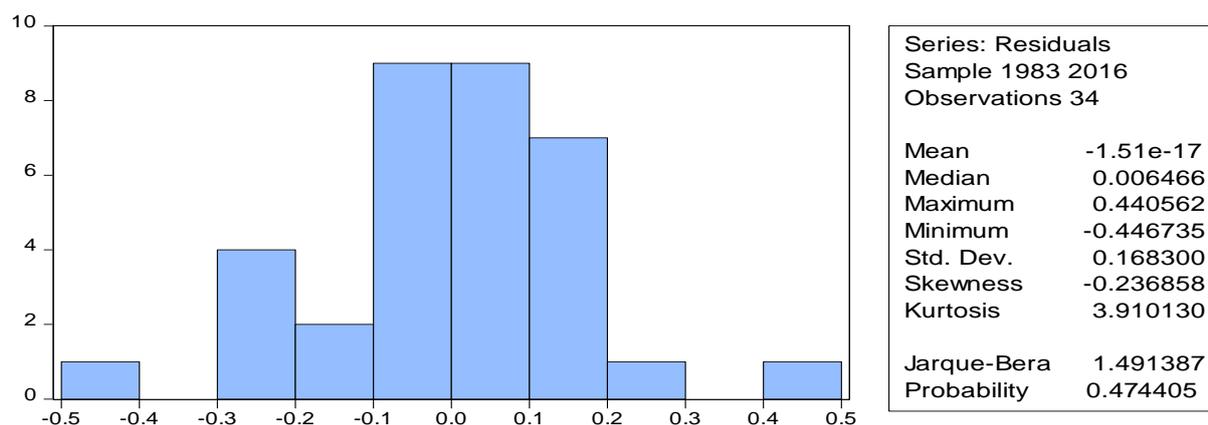
APPENDICES

A.1: Eviews Output for Estimated Equation 3.2

Dependent Variable: D(D(GDPMS))
Method: Least Squares
Date: 03/03/18   Time: 16:13
Sample (adjusted): 1983 2016
Included observations: 34 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.062889	0.024108	-2.608666	0.0146
D(ER)	-3.45E-05	0.001091	-0.031646	0.9750
D(FGCAP)	0.000194	0.000269	0.720771	0.4772
D(FR)	-0.008340	0.007891	-1.056911	0.2999
D(IPD)	0.012648	0.004531	2.791587	0.0095
D(NOST)	-9.13E-05	3.13E-05	-2.919184	0.0070
D(OST)	4.05E-05	2.35E-05	1.720212	0.0968

R-squared	0.357179	Mean dependent var	0.019687
Adjusted R-squared	0.214330	S.D. dependent var	0.209913
S.E. of regression	0.186063	Akaike info criterion	-0.344221
Sum squared resid	0.934726	Schwarz criterion	-0.029970
Log likelihood	12.85176	Hannan-Quinn criter.	-0.237053
F-statistic	2.500397	Durbin-Watson stat	2.952726
Prob(F-statistic)	0.046975	Wald F-statistic	10.36234
Prob(Wald F-statistic)	0.000006		

A.2: Normality Test Result

Series: Residuals	
Sample 1983 2016	
Observations 34	
Mean	-1.51e-17
Median	0.006466
Maximum	0.440562
Minimum	-0.446735
Std. Dev.	0.168300
Skewness	-0.236858
Kurtosis	3.910130
Jarque-Bera	1.491387
Probability	0.474405

A.3: Eviews Output for Estimated Equation 3.3

Dependent Variable: D(D(GDPMS))
Method: Least Squares
Date: 03/03/18   Time: 18:08
Sample (adjusted): 1983 2016
Included observations: 34 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.079728	0.083767	-0.951784	0.3500
DUMMY	0.018379	0.084425	0.217698	0.8294
D(ER)	0.000313	0.001830	0.171080	0.8655
D(FGCAP)	0.000176	0.000279	0.632046	0.5329
D(FR)	-0.008283	0.007789	-1.063473	0.2973
D(IPD)	0.012909	0.005009	2.577046	0.0160
D(NOST)	-9.51E-05	3.31E-05	-2.875217	0.0080
D(OST)	4.30E-05	2.97E-05	1.445002	0.1604

R-squared	0.358145	Mean dependent var		0.019687
Adjusted R-squared	0.185338	S.D. dependent var		0.209913
S.E. of regression	0.189465	Akaike info criterion		-0.286901
Sum squared resid	0.933322	Schwarz criterion		0.072243
Log likelihood	12.87731	Hannan-Quinn criter.		-0.164422
F-statistic	2.072512	Durbin-Watson stat		2.952443
Prob(F-statistic)	0.083399	Wald F-statistic		8.794714
Prob(Wald F-statistic)	0.000016			

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