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Evaluation of Trend of Foreign Exchange Reserve and Shipping Industry Trade Performance in Nigeria

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Abstract: This study focused on the evaluation of the trend of foreign exchange (FX) reserve and the performance of shipping industry trade by examining the export and import trades within the periods 2011 to 2022. The objectives were to determine the correlation between trend values of FX with export and import shipping trades in Nigeria. Provisional data on foreign exchange reserve, export, and import trades from World Bank, CBN, and Trend Economy were analyzed using Spearman's rank correlation coefficient analysis, and it was observed that foreign exchange positively influences export and import shipping trades; however, the study infers that the impacts were not significant at 0.05 (2-tailed) significance level. It concludes that the positive correlations between the data variables inform that decrease in FX influences decrease in export and import trade which also return economic growth, development, and reduced people's standards of living in Nigeria. However, the reserve becomes the case. The study recommends immediate policy adjustment to hold and maintain strong foreign exchange which could boost country's reserve for better performance of the shipping industry and other sectors of the economy.

Keywords: foreign exchange, shipping industry performance, Nigeria

Introduction

Foreign exchange reserves named also as External Reserve, International Reserves, or Foreign Reserves are assets held by a monetary authority to support liabilities and influence monetary policy within a country [1]. Foreign exchange reserves consist of various forms of assets, including foreign banknotes, deposits, bonds, treasury bills, and other government securities in foreign currencies [2]. According to the International Monetary Fund (IMF), these reserves are defined as official public sector foreign assets that are readily accessible and controlled by monetary authorities. They are used to directly finance payment imbalances, regulate the magnitude of such imbalances through interventions in exchange markets to influence currency exchange rates, and serve other purposes.

The security of the substantial reserve of foreign assets is paramount for governments, and it is attended as a safeguard against unforeseen currency devaluations on the global stage [3]. These reserves play a pivotal role in the stability of exchange rates, in the support of the competitiveness of exports, in protection of the liquidity in times of crisis, and in the development of the investor trust [4].

Over time, foreign reserves have played a crucial role in the improvement of the international creditworthiness of many countries and make easier access to external debt [5]. Confidence from the international community in countries with sufficient foreign reserves is influenced by the soundness of their economic policies and investment climate [6]. In addition, nations rely on foreign reserves to settle external debts, provide capital for various sectors of the economy, and capitalize on diverse economic opportunities such as the shipping industry [7]. These reserves are essential components of fiscal policy, serving to mitigate against economic shocks and complement monetary policy efforts aimed at achieving price and financial stability. It is imperative that foreign exchange reserves be invested in safe and liquid assets to ensure their effectiveness.

According to the theory of monetary policy which form the basis for this study emphases that change in monetary supply is the key driver of any nation's economic activity [8]. This theory imposes that the central bank is the machinery in control of monetary policy of the Nation and can exert much influence over the economic growth rate by manipulating the amount held in foreign reserve in currency or liquid assets circulating the Nation's economy [9–11].

The theory implies that if a nation has a huge reserve which increases supply of money, the economic activity will increase; however, the reverse is the case where the country has less control of the foreign reserve in currency or liquid assets circulating its economy [8, 12].

Monetary policies are responses to handle such situations; in most times, it reflects on export and import revenues, transfers, and capital flows of developing nations such as African countries [13, 14]. The present drop in Nigeria's FX reserves seems to devaluate naira and decline in Nigeria's oil prices [2]. The shipping industry appears to

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be particularly sensitive to fluctuations in the terms of trade, significantly impact on the balance between exports and imports, as well as local manufacturing activities in Nigeria. Hence, this study examines the influence of Nigeria's foreign exchange reserve on shipping industry operations in the recent time, where the study objectives include:

- To determine the correlation between the trend of Nigeria's foreign exchange reserve and export revenues of the maritime industry.
- To determine the correlation between the trend of Nigeria's foreign exchange reserve and import revenue of the maritime industry.

However, the following hypotheses were formulated to succeed in the study objectives:

H1: The correlation between the trend of Nigeria's foreign exchange reserve and export revenues of Nigeria's shipping industry is not statistically significant
H2: The correlation between the trend of Nigeria's foreign exchange reserve and import revenues of Nigeria's shipping industry is not statistically significant

The significance of this study would enable policymakers and government agencies to realize the importance and efficacy of keeping valuable foreign reserves which would enhance various aspect of the economic activities especially the shipping industry development for a developing economy like Nigeria. These reserves are utilized for direct financial support and to manage balance of payments in the international market.

The regulation of payment imbalances in trade is facilitated by the assets held in foreign exchange reserves, which helps maintain the stability of the country's currency exchange rate. The devaluation of the Naira, caused by low external reserves and high debt rates, impacts various aspects of the economy [13]. The currency devaluation on a global scale occurs when a nation's currency declines relative to major world currencies [15].

This study is organized as follows: Section 2 provides a literature review on foreign exchange and the shipping industry. Section 3 describes the methodology. Section 4 examines the results, and Section 5 presents the conclusion and policy recommendations.

2. Literature Review

Studies in the recent time shows that Nigeria has witnessed very low foreign exchange reserves which has detrimental effects on Naira devaluation in the global market economy [16, 17], and for the past thirty years, the depreciation of the Nigerian Naira against the U.S. dollar and other foreign currencies has raised concerns among citizens, the government, and the economy. This devaluation has led to comparisons between the Naira and currencies of other West African nations like Ghana, Togo, and Cameroon, where the Naira's value was higher, but now has declined significantly. The influence of the U.S. dollar on global currencies stems from the economic power of the United States and its historical ties to many nations, including those that were formerly colonized by America.

The Nigeria's foreign exchange rate market has remained broke and difference between USD and NGN widens, and the improvement in interbank FX liquidity in Nigeria has not met expectations, partly due to the re-introduction of de facto controls on local trades and loose monetary policy conditions. Moreover, the forex market, serving as the global exchange platform for national currencies manipulated to set daily exchange rates against the dollar, departing from the ideal market condition where exchange rates are determined by demand and supply forces. It also notes that the CBN being the apex bank has made enough efforts in intervention to clear up backlog unmet FX demand, a condition that caused a ripple effect on devaluation of the currency against dollar rate in the international market. This is a situation that has jeopardized the economy of Nigeria. Tables 1 and 2 below unfold the truth of US dollar exchange rate to naira in the past years and first quarter of 2024.

Table 1
Annual monthly average of naira exchange rate to USA dollar from 2010 to 2023

Year	Currency ($ to #)	Exchange rate
2010	$1	N 154.8
2011	$1	N 165.1
2012	$1	N 161.5
2013	$1	N 162.9
2014	$1	N 199
2015	$1	N 300
1016	$1	N 320
2017	$1	N 305.8
2018	$1	N 306.1
2019	$1	N 362.59
2020	$1	N 382.75
2021	$1	411
2022	$1	448
2023	$1	460.703
Monday 1 April 2024	$1	1421

It is obvious that the value of naira to US dollar depreciates annually and unbearable in the recent time, with adverse effects on the Nation's market economy, balance of trade, foreign reserves, and the shipping industry. The situation of naira in first quarter of 2024 is quite enormous. In 2024, the rate of naira to dollar depreciated and the whole economic system was in a mess. The value of oil dropped and cost of imported items escalated which had rippled effect in the economy. The local industries could no more produce adequately for market consumption due to high cost of production. Nigeria being a developing country depends so much on the foreign markets and has most of its household commodities and daily consumptions based on imported goods, and even the local industries depend on the import markets for raw materials and semi-finished products for its industry.

As a matter of fact, this study also examined resource-based theory, in which the contribution of Edith Penrose in 1959 is relevant especially on sustainable competitive advantage [18]. Resource-based theory can be explored to explain a country that builds "strategic resources" and has competitive advantages in market place to control, maintain, and sustain its economy.

Table 2
Monthly average of naira exchange rate to USA dollar late 2023 and 1st quarter of 2024

Months	USD rate	Exchange rate to Naira
October 2023	$1	#786.5
November 2023	$1	#789.9
December 2023	$1	#897.6
January 2024	$1	#951.9
February 2024	$1	#1597
March 2024	$1	#1421
Monday 1 April 2024	$1	#1421

According to the theory, a resource is strategic when it is valuable, rare, difficult to imitate, and non-substitutable [19]. Competences involve the development of specialist expertise and strategies to overcome foreseen challenges. By implication, a country that held valuable assets in foreign exchange and have good monetary policy or reserve management policy would stand in a better position to compete in the global market and sustain its economy. In conclusion, this theory explores how reserve management policy impacts the performance of the shipping industry, especially in developing countries such as Nigeria.

Reserve management policy refers to the strategies and guidelines implemented by central banks or financial institutions to oversee their foreign exchange reserves. The main goals of reserve management policy include preserving the sufficient reserves to support the country's currency in the foreign exchange market and protect it against the external financial shocks. Moreover, these policies aim to ensure that there are enough reserves available to meet the country's external obligations and to mitigate the impact of economic downturns. Traditionally, central banks worldwide have held reserves to maintain the convertibility of their domestic currency at a fixed exchange rate. Over time, this system has evolved into adjustable pegged exchange rates and, more recently, into more flexible exchange rate arrangements.

Shipping industry is key sector in the Nigerian economy. The performance of the industry so much lies on many factors which reserve management policy and foreign exchange rate play vital roles in import and export of commodities to sustain Nigeria's economic system. According to UNCTAD (2017), global maritime trade growth is closely tied to changes in real GDP, with a 1% change in real GDP corresponding to a 1.1% change in maritime trade volume. This relationship underscores the direct impact of global economic trends on the demand for maritime transport services, which are essential for the international movement of goods.

Mwasinago et al. [20] focused on the case of Kenya, and the influence of foreign exchange rates on the maritime sector's performance in driving economic growth was investigated. The research utilized panel data analysis and employed Simple Regression Analysis and Dynamic Stochastic General Equilibrium modeling with Generalized Method of Moments techniques. The findings emphasized the significant role of foreign exchange rates in shaping the maritime sector's performance, particularly in the context of economic growth promotion.

Specifically, the study revealed that fluctuations in foreign exchange rates have a direct impact on the maritime sector's performance. This insight underscores the importance of considering currency dynamics when assessing the maritime industry's contribution to economic development and trade facilitation.

The findings indicated a strong and positive relationship between foreign exchange rates and maritime performance, highlighting the significant role of currency dynamics in driving economic growth. The study's conclusion emphasizes the considerable impact of foreign exchange rates on the maritime sector in Kenya, underscoring its critical role as a key determinant of economic development.

Akatsuka and Leggate [21] examined how exchange rate risk affects the performance of lead shipping firms in Japan and Norway, two significant maritime nations. In the shipping industry, the complexity intensifies because freight rates are linked to the US dollar, requiring conversion into multiple currencies. The Yen's surge against the US dollar pushes Japanese firms to seek protection through natural hedging against exchange rate swings. Conversely, Norway, experiencing less drastic Krone fluctuations versus the US dollar, opts to maintain exposure, allowing for some speculative activities. These cases underscore the significant power of exchange rate risk on corporate performance, as evidenced by market behavior.

Alquist et al. [22] investigated the relationship between foreign reserve management and the U.S. money market. They developed a model to analyze how U.S. money market spreads react to decisions made by foreign central banks regarding exchange rate management, influenced by changes in their net export position. Data from 70 respondents in the US monetary market were collected and subjected to regression analysis to assess the impact of foreign reserve management on the US money market. The analysis revealed that fluctuations in central banks' demand for dollar liquidity due to oil price volatility are associated with higher spreads in local money markets. Specifically, a one-standard-deviation increase in the demand for dollar liquidity by a central bank in an oil-exporting nation leads to a two to six basis point increase in spreads and an average of $3 billion in Treasury sales.

Adama et al. [23] conducted a study to analyze the impact of external reserves on Nigeria's economic growth. Using data from the Central Bank of Nigeria's annual reports and statements from 1986 to 2020, they employed both descriptive analysis and the autoregressive distributed lag (ARDL) model. Their findings showed fluctuations in economic growth rate and external reserves, with reserves exhibiting greater variability. The study concluded that economic growth positively responds to changes in external reserves by 0.22%, inflation rate by 0.08%, and a one-period lag of GDP by 0.21%, while negatively responding to changes in the exchange rate by 0.10% in the short run. Recommendations are to create a conducive environment for increased productivity to boost foreign reserves, to avoid exchange rate misalignment, and to control inflation within a single digit.

Many studies have been reviewed such as refs [24–26] and other authors such as Hadi et al. [27]; Dash and Narayanan [28], all suggest that Foreign Exchange Reserve Management plays drastically role in the shipping industry of maritime nations. However, this study has identified area in recent time which no attention has been given to determine the correlation in the trend of Nigeria's foreign exchange reserve and shipping industry revenue on export and import. Therefore, this study explores the necessary data to evaluate empirically the relationship between Nigeria's foreign exchange reserve and export and import revenue in Nigeria's shipping industry in 2011 to 2022 which no study has covered in context and time.

3. Methodology

This study adopted expository research method which is based purely on existing data information. It involves reading widely on the concepts, comparing and contrasting, analyzing and synthesizing all points of view, and developing new insights and normally leads to systematic secondary data collection methodology, where many publications, Google Scholar, and Internet were sourced. World Bank and Central Bank of Nigeria's monthly and annual reports were very relevant. The provisional data/information given on Table 3 below were used for analysis. This study is a correlational study, and the analytical tool employed was Spearman's ranking correlation analysis between two variables to determine the significant relationships existing between the variables in the study. Spearman's rank correlation analysis test the correlation and significance of data variables when they are interval or ratio, linearity related, or bivariatey distributed. In this study, data sets met these assumptions, making the test appropriate for analysing the relationship between variables. Spearman's rank correlation coefficient, denoted as r, gauges how one variable changes concerning another in a monotonic relationship, where

Table 3
Spearman's ranking correlation coefficient foreign_reserve and export_trade

Correlations				
			Export trade	Foreign reserve
Spearman's rho	Export trade	Correlation Coefficient	1.000	0.378
		Sig. (2-tailed)	.	0.226
		N	12	12
	Foreign reserve	Correlation Coefficient	0.378	1.000
		Sig. (2-tailed)	0.226	.
		N	12	12

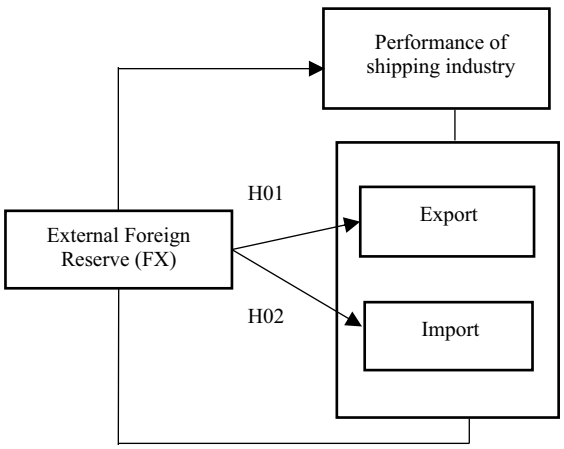
$-1 \leq r \leq 1$. A positive r signifies that both variables increase simultaneously, while a negative r implies that one decreases as the other increases. A r of 1 or -1 signifies a perfect monotonic relationship, where ranks are either fully aligned or exact opposites, respectively. An r of 0 suggests no association. The nearer r is to -1 or 1, the stronger the association, while closer to 0 implies a weaker connection. The model for the study is articulated as follows:

$$r_p = \frac{1 - 6\sum idi}{n(n^2 - 1)}$$

where r_p = the Spearman rank correlation coefficient; n = the number of data points; di = the difference in rank of the ith elements.

Figure 1 represents the conceptual framework of the different hypotheses of the study.

Figure 1
Conceptual framework of the relationship between foreign exchange reserve and performance of Nigeria's shipping industry



4. Results and Discussions

Figure 2 is the line graph representing the provisional data on Nigeria's export, import, and foreign exchange reserve in billion USD for the periods 2011 to 2022 according to [29] and [30].

Figure 3 represents the trend line or the behavior of export trade from 2012 to 2022. This shows a negative slope implying that there is a decrease in the export shipping trade in Nigeria. Export trades are domestically produced goods and services which were shipped abroad in the international market. The country recorded the highest export of goods and services worth 146.3670187 billion USD in 2012, and thereafter, there has never been any other greater year for the past twelve years 2012 to 2022.

Similarly, Figure 4 shows the trend line of imported commodities to Nigeria from 2012 to 2022 which has not shown any improvement over the years. The series of fluctuations on the imported commodities is based on the fact that Nigeria's economy depends heavily on imported goods but been affected by dollar to naira exchange rate which hampers trade.

Figure 5 also demonstrates the trend line of Nigeria's foreign reserve from 2012 to 2022, which shows that there has not been any improvement on Nigeria's foreign exchange reserve over the years. Foreign reserves are assets held by monetary authorities and readily available for direct financing of payment imbalances. These reserves are controlled by the authorities and can be used to regulate the magnitude of such imbalances by the intervention in exchange markets to influence currency exchange rates or for other purposes. This implies that Nigeria has not held or improved on its foreign exchange reserve of more than 44.97 billion USD in 2011 for the past twelve years.

4.1. Hypotheses testing

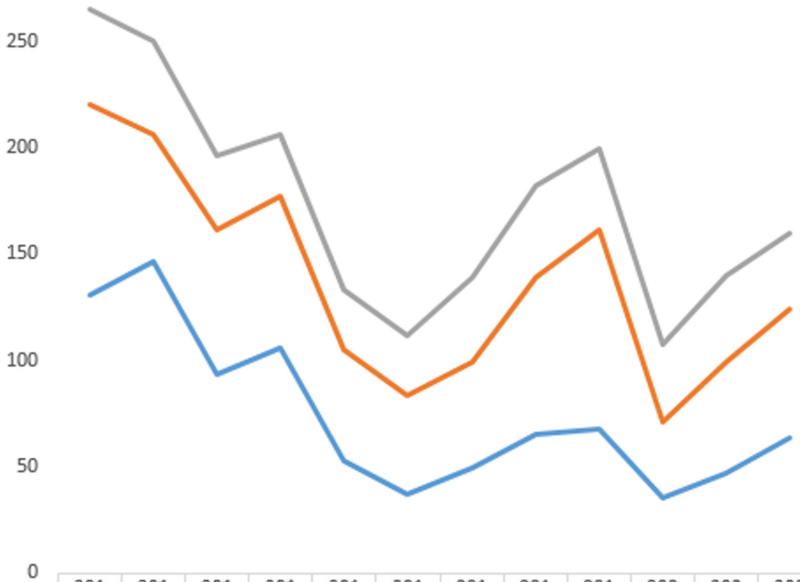
H1: The correlation of the trend between Nigeria's foreign exchange reserve and export revenues of Nigeria's shipping industry is not statistically significant

Table 3 below displays the results of Spearman's ranking correlation coefficient analysis of Nigeria's foreign exchange reserve (FX) and export revenues of shipping industry. The table shows a correlation coefficient of 0.378 which implies that $-1 \leq r \leq 1$; hence, this infers that the value of r is positive, and there is a direct relationship between the variables. The result shows a significance of $0.226 > 0.05$. The study informs that there is a positive relationship between FX and export trade which is not statistically significant at 95% level (2-tailed). Therefore, we accept the research hypothesis saying that the correlation of the trend between Nigeria's foreign exchange reserve and export revenues of Nigeria's shipping industry is not statistically significant.

H2: The correlation between the trend of Nigeria's foreign exchange reserve and import revenues of Nigeria's shipping industry is not statistically significant

Table 4 below displays the results of Spearman's ranking correlation coefficient analysis of Nigeria's foreign exchange reserve (FX) and import revenues of shipping industry. The table shows a correlation coefficient of 0.342 which indicates that $-1 \leq r \leq 1$; hence, this informs that the r value is positive, and there is a relationship between the variables. The result shows a significance of $0.342 > 0.05$. The study informs that there is a positive relationship between FX and import trade which is not statistically significant at 95% level (2-tailed). Therefore, we accept the research hypothesis that the correlation between the trend of Nigeria's foreign exchange reserve and import revenues of Nigeria's shipping industry is not statistically significant.

Figure 2
Provisional data on Nigeria's export, import, and foreign exchange reserve in billion USD (2011–2022)



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Foreign Reserve USD Billion	44,97	43,68	35,07	29,01	28,01	28,02	40,5	42,84	38,34	36,73	40,48	35,56
import USD Billion	89,78	60,25	67,61	71,49	52,59	46,55	49,51	73,85	93,97	35,59	52,19	60,67
export USD Billion	131	146,4	93,88	105,9	52,59	37,3	49,49	65,36	67,48	35,09	47,34	63,42

Figure 3
Trend line of export trade 2012–2022

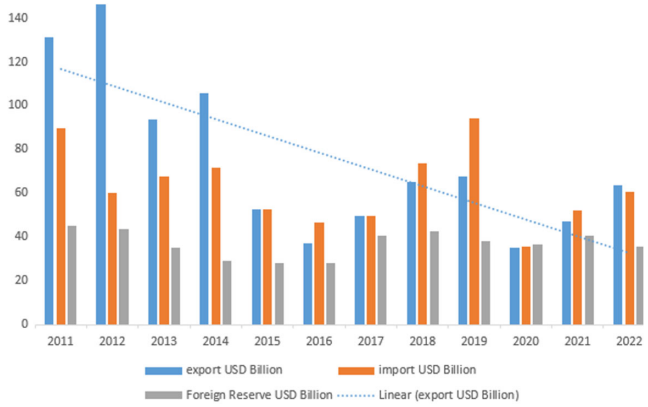
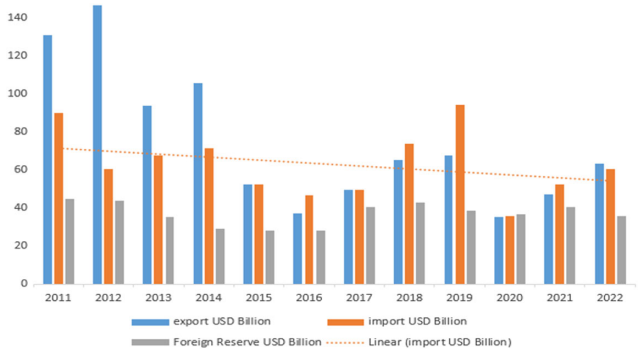


Figure 4
Trend line of import trade 2012–2022



4.2. Discussion of findings

The study shows the trend lines of foreign reserve and export shipping trade informs that there is no growth, implying that over the periods of twelve years (2011–2022) there has not been any form of increase in foreign reserve and export trade in Nigeria. This has strong implication on retarding economic growth and development of Nigeria. The study finds that there is a positive connection on the trend of foreign exchange reserve and export trade in Nigeria's shipping industry which is not statistically significant at 0.05 level of significance (2-tailed). The positive association of the variables is an indication that foreign exchange reserve has huge impact on export trade in Nigeria industry. This implies that increase in foreign reserve will stimulate growth in export shipping, and also decrease in foreign reserve will decrease export activities. The study infers that the impact is not significant at 95% (2-tailed) significant level. The implication is that foreign reserve has not contributed immensely to the growth and development of export shipping trade in Nigeria economy. High rate of dollar to naira exchange has effects on export of goods and services. The Nigeria export goods such as crude oil has loss monetary value in the international market due to exchange rate and payment imbalance.

On the other hand, the study indicates that the correlation between foreign reserve and import trade is positively associated and the association is not statistically significant at 95% (2-tailed) significant level. The implication is that foreign reserve has influence over import trade and determines the rate and extent of trading in Nigeria; however, the study infers that this impact is not significant enough to instigate increase in import trade. This

Figure 5
Trend line of Nigeria's foreign reserve 2012–2022

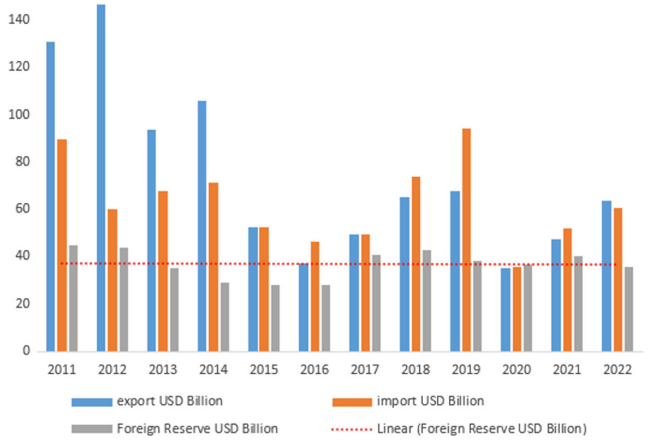


Table 4
Spearman's ranking correlation coefficient foreign_reserve and import_trade

Correlations				
			Foreign reserve	Import trade
Spearman's rho	Foreign reserve	Correlation Coefficient	1.000	0.301
		Sig. (2-tailed)	.	0.342
		N	12	12
	Import trade	Correlation Coefficient	0.301	1.000
		Sig. (2-tailed)	0.342	.
		N	12	12

was shown on the trend line which confirms a negative slope on the trend line of import shipping activity and negative growth on international reserve. The impact is real on the fact that decrease in foreign exchange reserve negatively affects shipping trade and national economic growth and development of Nigeria.

The findings of this study agree to a large extent with many previous researches on this discourse, such as the works of ref [31] which examined the impact of external trade on Nigeria's foreign exchange reserves, noting fluctuations in reserves alongside increased import and export trade. It used data from 1980 to 2015 and applied co-integration and vector error correction model analysis. The findings indicated a significant influence of foreign trade on Nigeria's reserves, consistent with this study's findings. Causality test results showed that oil imports, non-oil imports, oil exports, non-oil exports, and exchange rates affected reserves. Specifically, oil exports, non-oil imports, and exchange rates were significant at a 5 percent level. The study suggested diversifying Nigeria's export base and reducing unnecessary imports to enhance foreign reserves.

Similarly, the studies of [32] investigated the relationship between exchange rates and total exports in Nigeria from 1981 to 2019 using ordinary least squares. They found a positive and significant short-term relationship between exchange rates and total exports, as well as positive relationships between oil refining, trade openness, and total exports. The study recommended that authorities manage exchange rate dynamics to avoid destabilizing other macroeconomic variables.

Nnamaka et al. [32] examined the impact of foreign trade on external reserves in Nigeria using time series data from 1980 to 2019. They employed ADF unit root tests, co-integration analysis, and vector error correction models. Results showed stationarity over the time series at order one and a long-run equilibrium relationship among the variables. The vector error correction model indicated a significant negative impact of oil imports, non-oil imports, and exchange rates on external reserves, while oil and non-oil exports had a positive impact. The study recommended that the Central Bank of Nigeria stabilize the local currency value to mitigate external shocks caused by exchange rate volatility.

5. Conclusion and Policy Recommendations

The outcomes of this study obviously spelt out that FX has constructive effect on the performance of shipping industry in Nigeria. The Nigeria's foreign exchange reserve plays vital roles in boosting the industry as well as diminishing or reducing the rate of trading activities of import and export in the shipping industry and Nigeria's economy at large. These findings indicate that Nigeria's foreign exchange reserve significantly influences the export and import activities of its shipping industry, highlighting the importance of maintaining high foreign reserves for economic stability and growth. Showing that the impact on shipping trade was not statistically significant informs Nigeria has not hold enough foreign reserve that could boost the trade, and the positive relationship suggests potential implications for policy decisions to boost international reserve, control exchange rate, and payment imbalance.

Overall, the study underscores the critical role of FX management in shaping the performance of Nigeria's shipping industry and its broader economy. It recommends the adoption of effective exchange rate policies to bolster foreign reserves, thereby sustaining and enhancing economic growth and the performance of the shipping sector. Given that ports and shipping industries serve as vital drivers of economic development in a developing nation like Nigeria, prioritizing sound FX management is essential for long-term prosperity and resilience.

Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

The data that support this work are available upon reasonable request to the corresponding author.

Author Contribution Statement

Chinyeaka Nwokodi Nwoloziri: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization, Supervision. **Tamunosa Felix Pieterson:**

Conceptualization, Methodology, Software, Formal analysis, Writing – original draft, Visualization, Project administration. **Tochi Clement Nwachukwu:** Conceptualization, Methodology, Software, Formal analysis, Writing – original draft, Visualization, Project administration. **Arbia Hlali:** Conceptualization, Validation, Writing – original draft, Writing – review & editing, Visualization, Supervision.

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