

Exchange Rate Volatility and the Nigerian Industrial Sector Performance

Aidi, Hakeem O.^{1*}, Saidu, Iya Abbas² and Suleiman, Hussein, I.³

¹Department of Economics, University of Nigeria Nsukka, Enugu State, Nigeria

²Department of Economics, College of Continuing Education, Adamawa State Polytechnic, Yola, Adamawa State, Nigeria.

³Department of Economics, University of Nigeria Nsukka, Enugu State, Nigeria

***Corresponding author**

Aidi Hakeem O

Article History

Received: 18.09.2018

Accepted: 30.09.2018

Published: 30.10.2018



Abstract: Exchange rate is an important macroeconomic variable that economic planners, policymakers as well as governments all over the world monitor very closely. This may be because volatility in exchange rate is capable of putting an entire nation in an acute state of disequilibrium. In Nigeria, economists and other stakeholders have continued to make relevant efforts to restore normalcy/stability to the nation's exchange rate that has been subjected to severe rate of volatility in recent years. The Nigerian industrial sector remains a potentially viable alternative amidst the incessant widespread calls for diversification of the Nigerian economy. As such, it is not against conventional wisdom to say that since industrialisation may involve importation (of raw materials), exportation (of finished goods) or both; one may not be wrong to expect a link with exchange rate. Therefore, this study investigated the relationship between exchange rate volatility and industrial sector performance in Nigeria using quarterly time series data spanning from 1980Q1 to 2016Q4. The researchers relied on the use of OLS multiple regression technique for analysis while exchange rate volatility was generated using Exponential Generalised Autoregressive Conditional Heteroskedasticity (EGARCH). The result showed that exchange rate volatility is inversely related to industrial sector performance (using industrial sector contribution to GDP as a proxy) in Nigeria. Furthermore, trade openness was observed to have a negative sign (though statistically insignificant) while exchange rate and interest were also found to be strong and significant positive drivers of industrial sector performance in Nigeria. Following the findings, the Nigeria government and other stakeholders are advised to hasten efforts to arrest the perennial fluctuations in exchange rate in the country in order to stimulate expansion of productivity in industrial sector.

Keywords: Exchange Rate, Exchange rate volatility and Industrial sector performance.

INTRODUCTION

Exchange rate is an important macroeconomic indicator which shows the degree of competitiveness of the currency of any country. Ajakaiye [1] noted that it is an economic indicator that plays crucial roles in any economy because it directly influence domestic price level, profitability of trade, allocation of resource, investment decision and so on. As such, all economies (developed and developing) ensure policies are put in place to properly monitor and control the movement of exchange rate. Exchange rate volatility is the degree of rapidness of a change in a country's currency in term of others [2]. This study seeks to establish the relationship between exchange rate volatility and the Nigerian industrial sector performance; this is an important study coming at a time when the calls for diversification (of Nigerian economy) are deafening. It is essential to note that all industries require inputs; most of these inputs in the developing countries (especially Nigeria) are being imported. Therefore, variations in exchange rate are expected to affect cost of inputs and overall level of output in the long-run.

Having established the possible link between exchange rate volatility and industrial sector performance, it is important to briefly highlight the trends of both exchange rate volatility and the Nigerian industrial sector. This will help ensure clearer understanding of this study. Empirical evidence revealed that the performance, growth and capacity utilization level of the Nigerian industrial sector have not been encouraging. Data from the Central Bank of Nigeria [3] showed that the total industrial sector contribution to real gross domestic product (GDP) fell from 43 percent in 1981 to 41 percent in 1991; it fell further to 37 percent, 22 percent and 18 percent in 2001, 2011 and 2016 (2nd quarter) respectively. Obadan [4] explained that chief among factors responsible for the continuous fall is inadequate access to raw materials and spare parts caused by highly volatile rate of exchange. Obadan [4] explained further that the

Copyright @ 2017: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution and reproduction in any medium for non commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

inadequacy of vital industrial inputs negatively affects industrial capacity utilization which fell from 70 percent in 1981 to about 25 percent in 1986.

The introduction of the structural adjustment programme (SAP) in 1986 was to revamp the industrial sector through restructuring process geared at reducing import dependence and promotion of manufacturing activities to meet domestic need as well for export purpose. A major feature of the SAP is to increase cost of imported inputs through the correction of naira's over-valuation thus increasing incentives for the utilization of local inputs [4]. Following the introduction of SAP, there was slight improvement in industrial activities within Nigeria with capacity utilization (in the manufacturing sub-sector) growing up to 32 percent (on the average) between 1987-1989. However, the improvement in the industrial sector could not be sustained largely because unlike raw materials that can be sourced from within, most industrial machineries and spare parts are still being imported. In summary, the Nigerian economy faced the full scale consequences of import reduction policies (in the absence of local technological or engineering plants) including cost implications of importing machines and parts from abroad, disruption of industrial activities (several production outfits were put of operation) because of technological or engineering related issues.

On exchange rate volatility, during the fixed exchange rate regime, the naira exchange rate relative to the dollar fluctuated progressively between the first quarter of 1970 and the third quarter of 1986. The exchange rate which persisted at \$1.00 to ₦0.7143 in the first quarter of 1970 to second quarter of 1971 appreciated to ₦0.6579 in the third quarter of 1971 and remained at that until the first quarter of 1974. It appreciated to an average of ₦0.6159 at the end of 1975. It however depreciated to ₦0.6265 and ₦0.6466 in 1976 and 1977 respectively. Thereafter, it appreciated to ₦0.6060 in 1978 all through 1980 to ₦0.5464 before a persistent depreciation to ₦2.0206 in 1986 [5].

The magnitudes of fluctuations were different during the fixed and flexible regimes. While the rates depreciated massively under the flexible regime, they were relatively less volatile in the fixed regime. While foreign exchange was more rationally priced during the flexible regime, its genuine or frivolous demand however was still excessive, leading to persistent depreciation. For example, the naira exchange rate, which stood at \$1.00 to ₦1.3248 in the third quarters of 1986 depreciated to ₦3.6114 in the fourth quarter of the same year by a whopping ₦2.2866. The depreciation of the naira continued consistently, with low margins up to the fourth quarter of 1988 when the naira exchange rate reached \$1.00 to ₦5.0920. The exchange rate further depreciated massively in the first quarter of 1989 to ₦7.2292 [5] as a result of the merger of the autonomous and official foreign exchange markets, which gave birth to the Inter-bank Foreign Exchange Market (IFEM).

To further remove exchange rate instability, the CBN again had to modify the Inter-bank procedures in December 1990 when the Dutch Auction System (DAS) was re-introduced, while in August 1991, the bank introduced the model weighted average system of exchange rate determination. The move behind these ideas was still to reduce the wide fluctuations in the exchange rate system. In spite of all the efforts made to stabilize the naira exchange rate, the fluctuation in the rate continued in 1992. As a result of this instability, the CBN had to adopt a completely deregulated system of trading in March 1992, with the view of meeting all requests for foreign exchange by the users. In an attempt to meet this main objective, exchange rate depreciated from \$1 to ₦18.4740 during the second quarter of 1992 to ₦19.4964 in the fourth quarter of the same year.

In 1993, exchange rate stabilized at ₦21.8861 in the third quarter and remained the same throughout the period until in 1994 when it was finally pegged. The policy stance of pegging the rate during the period was mainly to further instill sanity into the foreign exchange market, and to encourage increased activities in the productive sectors of the economy. In order to stem the negative performance of the naira in the foreign exchange market, the Autonomous Foreign Exchange Market (AFEM) was introduced.

The naira exchange rate which stood at \$1.00 to ₦21.8861 in the third quarter of 1993 was also retained in 1995 and even beyond, following fair performance in maintaining stability for the naira. It depreciated from ₦92.6934 in 1999 to ₦133.5004 in 2004. It stood at ₦120.9702, ₦129.3565 and ₦133.5004 in 2002, 2003 and 2004 respectively. It appreciated to ₦132.1470 in 2005, ₦128.6516 in 2006, ₦125.8331 in 2007 and ₦118.5669 in 2008. Between 2009 and 2014, there was a further depreciation in exchange rate from ₦148.9017 to ₦158.5526 respectively while at the moment the exchange rate to dollar is in excess of ₦350.

In short, the high level of instability of Nigerian exchange rate may be responsible for the below optimal performance of the Nigerian industrial sector since most of the industrial inputs are imported at high cost (due to the exchange rate depreciation). With high production cost, not many investors will be encouraged to invest thus leading to unavoidable fall in the total output of the industrial sector. Furthermore, as output falls; many workers will be laid off to cut cost thereby compounding the unresolved huge unemployment rate problem in Nigeria. Sequel to the identified problems and failure of policies employed to address the problems, this study seeks to ascertain the relationship between exchange rate volatility and the Nigerian industrial sector performance using quarterly data from 1980Q1 to 2016Q4.

REVIEW OF LITERATURE

The number of studies that focused on investigating the relationship between exchange rate volatility and industrial sector performance (especially at the national level) are at the moment relatively very few. It is important to note that these few available studies (particularly in Nigeria) lack unanimity in both their findings and conclusions. In this study, review of related literature (which focused on Nigeria) was done in what follows:

Nwokoro [6] examined the impact of foreign exchange and interest rate variations on the Nigeria's manufacturing output using annual time series data ranging from 1983 to 2014. Incorporating manufacturing output as the dependent variable and interest rate, capacity utilization, government expenditure on manufacturing sector and investment in industrial production as independent variables; the researcher employed ordinary least squares model for the purpose of data analyzing. The result revealed that foreign exchange and interest rate have statistically significant negative relationship with the dependent variable (manufacturing output). The scholar thus called for review current exchange rate policy to check the continuous depreciation of the Naira.

In another Nigeria- based research, Okoye, Nwakoby and Modebe [7] investigated the impact of interest rate liberation on the performance of Nigeria industrial sector using time-series data from 1983 to 2013. Relying on Vector Error Correction Mechanism (VECM) analysis, the researchers observed that interest rate has no statistical significant impact on industrial sector output growth (dependent) while lending rate and financial depth have significant positive relationship with the dependent variable of the study.

Ugwu [16] studied the relationship between foreign exchange dynamics and manufacturing firms' performance in Nigeria using annual data spanning from 1986 to 2016. Using ordinary least squares method (multiple regression techniques), the results showed strong statistically significant relationship between exchange rate fluctuations and manufacturing firms' profitability during the period considered. The researcher called for diversification of the Nigerian economy to fast-track sustainable development in Nigeria.

In another important study, Owoeye and Ogunmakin [8] in an attempt to ascertain the impact of exchange rate volatility on banks performance in Nigeria using annual times series data from 1970 to 2005. The researchers used two different variables (capital deposit ratio and loan loss to total advance) as proxies for bank performance while government expenditure, interest rate, real gross domestic product and exchange rate (core variable) were incorporated as independent variables. The results of the multiple regression models revealed the absence of significant relationship between exchange rate volatility and capital deposit ratio but loan loss to total advance has a statistical significant relationship with the dependent variable of the study.

Lawal [9] measured the economic association between exchange rate fluctuation and manufacturing sector output in Nigeria between 1986 and 2014. The researcher listed manufacturing output as the dependent variable while exchange rate, consumer price index and government capital expenditure were among the listed independent variables. Using multiple regression model (ARDL), the researcher observed both shortrun and longrun positive relationship between exchange rate and manufacturing output though not statistically significant. The study recommended government interference through introduction of policies capable of promoting exports.

Opaluwa, Umeh and Ameh [10] reviewed the effects of exchange rate fluctuations on the Nigerian manufacturing sector using annual data spanning from 1986 to 2005 (20 years). The scholars incorporated manufacturing gross domestic product as the dependent whereas manufacturing employment rate, exchange rate and manufacturing foreign private investment were listed as the independent variables. The result of the ordinary least squares showed a statistically significant inverse relationship between exchange rate manufacturing sector's output. The study emphasised the need to strengthen the agricultural sector so as to provide inputs for the manufacturing sector and reduce importation of expense inputs.

Simon-Oke and Aribisala [11] examined the relationship between exchange rate deregulation and industrial sector performance in Nigeria using annual secondary data from 1975 to 2005. The researchers employed co-integration and chow breakpoint techniques for data analysis; the results showed that a statistically significant longrun relationship existed between the dependent variable (industrial sector performance) and exchange rate deregulation. The researchers further estimated error correction model to determine the shortrun dynamics between the variables. The scholars suggested the review of exchange rate policy in the country in order to accelerate sustainable industrial growth.

Ehinomen and Oladipo [12] investigated the impact of exchange rate management on the growth of manufacturing sector in Nigeria using annual data from 1986 to 2010. Employing ordinary least squares model, the

results revealed that exchange rate appreciation has strong statistical relationship with manufacturing gross domestic product (dependent variable); so also inflation was also found to be positively related to manufacturing gross domestic product. The scholars concluded that government should pursue exchange rate appreciation policies so as to help reduce production cost in the country.

Enekwe, Ordu and Nwoha [13] studied the effects of exchange rate fluctuation on the manufacturing sector in Nigeria using annual data that spread from 1985 to 2010. The selected dependent variable for the study is manufacturing gross domestic product while exchange rate, manufacturing foreign private investment and manufacturing employment rate were incorporated as independent variables. Using multiple regression model, the researchers found that all the independent variables have statistically significant positive relationship with the dependent variable. The study recommended stimulation of manufacturing sector in order to improve the economy.

Sequel to the review of literature, it is essential to state that:

- There is lack of consensus among scholars who have delved into establishing the relationship between exchange rate, exchange rate volatility and industrial sector performance worldwide.
- Researches that focused on the relationship between exchange rate volatility and industrial sector performance are relatively too few (especially at national level which is the scope of this study). For example, the work of Simon-Oke & Aribisala [11] focused on exchange rate deregulation instead of exchange rate volatility; Owoeye & Ogunmakin [8] looked at exchange rate volatility and bank profitability (instead of industrial sector performance) while Okoye *et al.*, [7] considered interest rate liberation and industrial sector performance.
- To the best knowledge of the researchers, only Simon-Oke and Aribisala [11] examined the relationship between exchange rate deregulation and the Nigerian industrial sector performance. The research work chose exchange rate deregulation (not exchange rate volatility) as the core variable.
- This study will rely on Exponential Generalized Autoregressive Conditional Heteroscedasticity (Egarch) for the generation of exchange rate volatility due to its numerous advantages over ARCH, GARCH etc popular in literature. This study is expected to fill the mentioned vacuums in literature.

Data and Research Methodology/Model

Data

This study seeks to establish the relationship between exchange volatility and the Nigerian industrial sector performance using quarterly time series data ranging from 1980Q1 to 2016Q4. The core variable is exchange rate volatility (generated using Egarch) whereas exchange rate, interest rate and trade openness are included as control variables. Data for all the variables were obtained from the Central Bank of Nigeria (CBN) statistical bulletin [3] and World Development Indicators [14].

Research Methodology/Model

To capture the objective of this study (i.e. to establish the relationship between exchange rate volatility and the Nigerian industrial sector performance), the mathematical relationship between the dependent and independent variables is expressed as follows:

$$INDPER = f(EXRVOL, EXCRAT, INTRAT, TRADOP) \dots \dots \dots 1$$

Where,

- INDPER is Nigerian Industrial Performance (using industrial sector contribution to GDP as a proxy)
- EXRVOL is Exchange Rate volatility (generated using EGARCH)
- EXCRAT is Exchange Rate
- INTRAT is Interest Rate and
- TRADOP is Trade Openness (measure as import plus export divided by RGDP)

The econometric form of Equation 1 is specified as follows:

$$INDPER_T = \alpha_0 + \alpha_1 EXRVOL_T + \alpha_2 EXCRAT_T + \alpha_3 INTRAT_T + \alpha_4 TRADOP_T + \mu_t \dots \dots 2$$

Where,

- α_0 is the constant term
- α_1 to α_4 are the coefficients of the independent variables and
- μ_t is the error/stochastic term while all other variables remain as earlier defined. Following the recommendation of Gujarati & Porter [15], all variables not in percentage in Equation 2 are logged. Thus, Equation 2 is re-specified as:

$$LGINDPER_T = \alpha_0 + \alpha_1 LGEXRVOL_T + \alpha_2 LGEXCRAT_T + \alpha_3 INTRAT_T + \alpha_4 LGTRADOP_T + \mu_t \dots \dots 3$$

Equation 3 is therefore estimated using Ordinary Least Squares (OLS) regression technique to capture the aforementioned objective of the study.

RESULTS AND INTERPRETATION

Stationarity Test

To avoid spurious result, it is essential to conduct stationarity test on all the incorporated variables. This will enable the researchers ascertain whether the mean value and variance of these variables do not vary over time. To this end, the researchers relied on Augmented Dickey-Fuller (ADF) technique. Therefore, the null hypothesis is stated as follows:

$$H_0: \delta = 0 \text{ or } \rho = 1 \text{ (i.e. the variables are non-stationary)}$$

Decision Rule

At the more conventional 5% level of significance, the null hypothesis will be rejected if the ADF statistics is negative and greater than the Mackinnon critical value (i.e. if the ADF statistics is more negative than the Mackinnon critical value at 5% level of significance).

Table-1: Stationarity Test Result for Variables in Equation 3

Variable	Mackinnon Critical Value at Level	ADF Statistics at Level	Mackinnon Critical Value after 1 st difference	ADF Statistics after first difference	Order of Intergration
LGINDGDP	-3.440681	-2.741953	-3.440894	-12.17754	I(1)
EXRVOL	-3.440894	-12.95038	-	-	I(0)
LGEXCRAT	-3.440681	-1.125240	-3.440894	-12.95040	I(1)
INTRAT	-3.440681	-2.067124	-3.440894	-12.05083	I(1)
LGTRADOP	-3.440681	-1.878757	-3.441552	-8.073092	I(1)

Source: Author’s computation (using eviews)

The above Table showed that EXRVOL (exchange rate volatility) is stationary at level while others, such as LGINDGDP, LGEXCRAT, INTRAT and LGTRADOP were found to be stationary after first differencing at 5 percent level of significance.

Test of Cointegration

Following the results of the stationarity test, the fact that the dependent variable (LGINDGDP) and three other independent variables (LGEXCRAT, INTRAT and LGTRADOP) are integrated of order 1 raises suspicion of possible co-integration among the variables. Co-integration test was therefore conducted to ascertain whether or not the variables are co-integrated. The following table shows the result of the co-integration test using Johansen Co-integration techniques which is most suitable in this circumstance (i.e. when there are more than one independent variables in the equation having same order of integration as the dependent variable) according to Gujarati & Porter [15].

Table-2: Summary of Johansen Cointegration Test Result for Equation 3

Model	Number of Cointegrating Equation(s)	Trace Statistics	Critical Value at 5%	P-Value
Equation 3	None*	98.78994	69.81889	0.0234
	At Most 2	13.98187	29.79707	0.8416
	At Most 4	0.526687	3.841466	0.4680

Source: Author’s computation (using Eviews)

DECISION RULE

The null hypothesis is to be rejected when the P-value is less than 5 percent (i.e. reject H₀: if P-value < 0.05). From Table-2, for “None”, the H₀: “There is no co-integrating equation” will be rejected since the P-value of 0.0234 is less than 0.05. For at most 2, the H₀: there is at most two co-integrating equations” cannot be rejected (i.e. there is co-integration) since the P-value of 0.8416 is greater than 0.05. The same treatment applies to the hypothesis that there is “at most four co-integrating equations” since the P-value of 0.4680 is greater than 0.05 (i.e. there is co-integration).

The presence of co-integration confirms the existence of a longrun relationship between the dependent and the independent variables. It also necessitates the need to estimate error correction model (ECM) to reveal the short-run adjustment of the co-integrated variables towards their equilibrium values. The ECM is a short-run model that explains how the long-run error of a model is corrected in the short-run. Gujarati & Porter [15] explained that ECM provides the

medium for the reconciliation of the short-run behaviour of an economic variable with its long-run behaviour. The result of the ECM revealed a negative and statistically significant coefficient (-0.340706). This simply implies that about 34 percent of the short-run disequilibrium between the dependent variable and independent variables will be taken care of within the space of one quarter.

Regression Result and Interpretation

Following the explanation of Gujarati and Porter [15], since the co-integration test result established the existence of long-run relationship between the dependent and independent variables of this study, the estimation of our model (equation 3) will not produce a spurious but a consistent and reliable result. Presented below is the result of the regression:

Table-3: Regression Result for Equation 3

Variable	Coefficient	Std Error	t-Stat at 5%	Prob.
Constant	8.770428	0.050803	172.6376	0.0000
Exrvol	-0.128659	0.048205	-2.668984	0.0085
Lgexcrat	0.144951	0.004711	30.76653	0.0000
Intrat	-0.010024	0.002134	-4.696939	0.0000
Lgradop	-0.055627	0.029019	-1.916937	0.0573
R-Squared	0.887708			
Adjusted R-Squared	0.884544			
Durbin-Watson Stat.	2.265962			
F-Stat.	280.6390			
Prob (F-Statistics)	0.000000			

Dependent Variable: Lgindgdp

Source: Author's computation (using Eviews)

It is important to note that the decision as to the significance or otherwise of any variable listed in the model depends on the use of the 2-t rule of thumb as well as the corresponding probability value (P-value) of the variable. The above table contains the regression result capturing the objective of this study. It shows that the core variable (exchange rate volatility) is statistically significant.

Constant

The coefficient of the constant or intercept term (8.770428) is positive and statistically significant with a P-value of 0.0000. The intercept is expected to help predict the value of the dependent variable (LGINDGDP) when all other independent variables are assumed to be zero.

Exchange Rate Volatility (EXRVOL)

The coefficient of exchange rate volatility (-0.128659) is negative and statistically significant, with a t-statistic of -2.668984 and a P-value of 0.0085 which is less than 0.05. This implies that as exchange rate volatility goes up, industrial performance declines. That is, a one percent increase in exchange rate volatility will on the average reduce the performance of the industrial sector by approximately 0.13 percent holding all other variables fixed.

Exchange Rate (LGEXCRAT)

The coefficient of this variable is positive (i.e. 0.144951) and statistically significant (looking at the t-statistic of 30.76653 and its corresponding P-value of 0.0000 which is less than 0.05). This implies that a one percent increase in LGEXCRAT will enhance the performance of the Nigerian industrial sector by approximately 0.15 (percent on the average) holding all other variables constant.

Interest Rate (INTRAT)

Interest rate was found to be statistically significant and inversely related to the dependent variable (LGINDGDP). The coefficient, t-statistic and P-value are -0.010024, -4.696939 and 0.0000 respectively. This implies that a percentage increase in INTRAT is expected to reduce LGINDGDP by about 0.01 percent, holding other variables constant.

Trade Openness (LGTRADOP)

The negative sign of the coefficient of trade openness (LGTRADOP) revealed an inverse relationship with the Nigerian industrial sector performance (LGINDGDP) but since the t-statistics and P-value of -1.916937 and 0.0573 show that the variable is statistically insignificant such conclusion cannot be reached.

Coefficient of Determination (or R-Squared)

This explains the proportion of the variability in the dependent (LGINDGDP) variable that is explained by the core and control variables. The result above revealed that R^2 is 0.887708. It simply implies that the incorporated independent variables explained about 89 percent of the variations in the dependent variable in the model. The R^2 -adjusted take into consideration the sample size.

F-Statistics (F-test)

This test enables us to determine whether or not the entire regression model result is statistically significant. The decision rule is to reject the null hypothesis (that the regression model is not statistically significant) if Prob (F-stat) is less than 5 percent. From the above table, the value of the F-stat is 280.6390 while Prob (F-stat) is 0.0000 (i.e. less than 0.05). Therefore, it is rational to reject the null hypothesis and conclude that the regression model is statistically significant.

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

Summary of Findings

This study examined the impact of exchange rate volatility on the Nigerian industrial sector performance using quarterly data from 1980Q1 to 2016Q4. In this study, the Nigerian industrial sector performance (using industrial contribution to GDP as a proxy) was listed as the dependent variable while exchange rate volatility (generated using EGARCH), exchange rate, interest rate and trade openness were incorporated as independent variables. The researchers observed a statistically significant negative relationship between the core variable (exchange rate volatility) and the dependent variable (industrial sector performance) of this study. The negative sign carried by the coefficient of exchange rate volatility implies that volatility in exchange rate has negative consequences on the Nigerian industrial sector. Note that exchange rate and interest rate were also found to be statistically significant in the model; while exchange rate has positive impact on the dependent variable (LGINDGDP), interest has a negative impact.

In addition, trade openness was found to be inversely related to the dependent variable however the t-statistics and p-value show that the variable is not statistically significant. All the independent variables except trade openness follow a priori expectation; trade openness came out with a rather strange negative sign contrary to theoretical expectation. Although this variable is not significant (considering the t-statistics and P-value), carrying a negative sign can be best explained to mean that the Nigerian economy is not making gains from openness of her economy to foreign investors.

Finally, since exchange rate volatility is a strong negative driver of Nigerian industrial sector performance (dependent variable), the researchers are optimistic policies can be put in place to manipulate and control the variable in such a way that frequent instability experienced in exchange rate can be minimized.

CONCLUSION

The results of the study showed that the previous policies rolled out to address the persistent variations in exchange rate have not been very effective. In this study, the researchers made effort to test the relationship between exchange rate volatility and the Nigerian industrial sector performance using high frequency data. Following the findings, it suffices to conclude that expansion of productivity in the Nigerian industrial sector is indeed impossible if the instability in exchange rate is not quickly checked. In short, among what can be deduced from these findings are: that the highly volatile exchange rate will not give room for optimal performance of the industrial sector; that the Nigerian interest rate is too high and it is discouraging both domestic and foreign investment in the industrial sector; also policies that can stimulate appreciation of exchange rate can also trigger more productivity in the industrial sector.

RECOMMENDATION

Following the findings of this study, the researchers recommend that:

- The incessant fluctuations in exchange rate should be addressed using more modern and effective policies. The government should also consider exchange rate depreciation policy since it is expected to assist in expanding output and boosting more exports of goods and services.
- Government and other stakeholders should adopt policies that can encourage exchange rate appreciation in order to boost productive activities in the industrial sector.
- Potential investors in the industrial sector should be encouraged by providing more soft and low interest loans. This will attract both foreign and local investors who might not be ready to invest at high interest rate.

REFERENCES

1. Ajakaiye, O. (2001). Impact of Exchange Rate Depreciation on Sectorial Prices, *NISER Monograph Series*, (1986–2000).
2. Ngwudiobu, I. M., Emecheta, C., & Aidi, H. O. (2016). Persistence of terms of trade shocks and real exchange rate volatility in Nigeria. *International Journal of Advances in Social Science and Humanities*, 4(2), 40-51.
3. Bashir, Y. (2016). Effects of treasury single account on public finance management in Nigeria. *Research Journal of Finance and Accounting*, 7(6).
4. Obadan, M. I. (1994). Critical factors in the naira exchange rate depreciation and capital flight in Nigeria. *NCEMA policy analysis series*, 7(2).
5. Abiola, I., & Olausi, A. S. (2014). The impact of credit risk management on the commercial banks performance in Nigeria. *International Journal of Management and Sustainability*, 3(5), 295.
6. Nwokoro, A., N. (2017). Foreign exchange and interest rates and manufacturing output in Nigeria. *International Journal of Business & Law Research*, 5(1), 30-38.
7. Okoye, L. U., Nwakoby, C. I., & Modebe, N. J. (2015). Interest rate reform and real sector performance: Evidence from Nigeria. *African Banking and Finance Review*, 2(1), 97-114.
8. Owoye, T., & Ogunmakin, A. (2013). Exchange rate volatility and bank performance in Nigeria. *Asian Economic and Financial Review*, 3(2):178-185.
9. Lawal, E., O. (2016). Effect of exchange rate fluctuations on manufacturing sector output in Nigeria. *Journal of Research in Business and Management*, 4(10), 32-39.
10. Opaluwa, D., Umeh, J., C., & Ameh, A., A. (2010). The effect of exchange rate fluctuations on the Nigerian manufacturing sector. *African Journal of Business Management*, 4(14), 2994-2998.
11. Simon-Oke, O., & Aribisala, S. E. (2010). Exchange rate deregulation and industrial performance: An assessment (1975-2006). *An International Multi-disciplinary Journal*, 4(2), 236-251.
12. Ehinomen, C., & Oladapo, T. I. (2012). Exchange rate management and the manufacturing sector performance in the Nigerian economy. *Journal of Humanities and Social Science*, 5(5), 1-12.
13. Enekwe, C. I., Ordu, M. M., & Nwoha, C. (2013). Effect of exchange rate fluctuations on manufacturing sector in Nigeria. *European Journal of Business and Management*, 5(22). 10-26.
14. Castañeda, A., Doan, D., Newhouse, D., Nguyen, M. C., Uematsu, H., & Azevedo, J. P. (2016). *Who are the Poor in the Developing World?*. The World Bank.
15. Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics* (5th Ed), New York: McGraw-Hill.
16. Ugwu, O. (2017). Foreign Exchange Rate Dynamics and Manufacturing Firms' Performance In Nigeria. *International Journal of Humanities and Social Science Invention*, 6(9), 9-14.