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Impact of Environmental Factors on Foreign Exchange Fluctuations in Nigeria

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Abstract: The study tried to examine the effect of environmental forces on foreign exchange market in Nigeria. The PEST- Political variables such as change in government (CIG) and democratic rule (DMR); Economical variables such as interest rate spread (IRS) and inflation in consumer prices (ICP); Social variable like population growth (PGR); and Technological variables such as fuel exports in merchandise (FEM) and technology export (TEX) were used to evaluate the impact these environmental factors have on foreign exchange market (official exchange rate). This study employed a time series data with the time frame 1973-2015. A multiple regression model was developed and analyzed using the ordinary least square method (OLS) with the help of E-views, a statistical package. The result showed that in isolation, IRS, FEM and DMR significantly influenced dealing rates in the Nigerian foreign exchange market while ICP, CIG, PGR, and TEX did not show any significant influence on foreign exchange market in Nigeria. However, the overall result showed a significant positive relationship between the environmental forces and the foreign exchange market in Nigeria with a p -value of 0.000000. We therefore concluded that environmental factors have significant influence on the Nigerian Foreign Exchange market. Hence, we recommended that relevant stake holders should pay proper attention to those environmental factors with significant impact on our Foreign Exchange Market in Nigeria.

Keywords: Change in Government (CIG); Democratic Rule (DMR); Interest Rate Spread (IRS); Inflation in Consumer Prices (ICP); Population Growth (PGR); Fuel Exports in Merchandise (FEM) and Technology Export (TEX).

1. Introduction

The world is fast becoming a global market where individual nations link their economics directly or indirectly through trade and foreign exchange. The amount of foreign currencies in relation to local currency (foreign exchange) is substantial in the knowledge of globalisation (Scholte, 2008). Currency market is actually a global and decentralized financial market where currencies are transacted openly by individuals, businesses, government and others. It is the world's largest market by any standard. The medium of international exchange is highly uncertain and unpredictable which has various factors affecting movement of foreign exchange (Patel *et al.*, 2014).The Nigerian foreign exchange market has witnessed various changes which are determined by a number of antecedents. In the business market there is so much competition that companies sell outside their countries to increase sales. Increasing internationalization of business requires the use of different currencies.

Environmental factors are the irrepressible powers influencing the foreign trade market they are identifiable component in technological, economic, social and political, environment that influences the survival, operations, and development of any sectors (Gupta, 2013). The currency exchange market is an intricate and delicate market having a comprehension of the environmental factors influencing the volatility and participation. Prior to the establishment of the Central Bank of Nigeria (CBN) in1958 and the enactment of the Exchange Control Act of 1962, currency exchange was earned by the private segment and held in accounts abroad by commercial banks which went about as operators for exporters (Anajekwu and Usman, 2013).

Environmental factors cause fluctuation in the foreign exchange and has brought about an unstable financial sector which also has affected other operators within industry and commerce who are players in the international market. Environmental factor also known as PEST factor (Political, Economical, Social and Technological) may have a negative effect on international business transactions which will have a ripple effect on the economy as a

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whole. In this light, this study examined the effect of environmental factors on foreign exchange fluctuations in Nigeria.

1.1. Research Questions

This study seeks to answer this question: to what extent do these environmental factors affect foreign exchange market in Nigeria? The specific questions are:

1. What effect does Interest Rate Risk have on Official Exchange Rate in Nigeria?
2. Is there any relationship between Inflation in Consumer Prices and Official Exchange Rate?
3. What influence does a Fuel export have on Official Exchange Rate in Nigeria?
4. What is the relationship between Democratic rule and official Exchange Rate?
5. What impact does Change in Government have on Official Exchange Rate in Nigeria?
6. Is there any relationship between Population Growth and Official Exchange Rate?
7. Is there any relationship between technology export and Official exchange Rate in Nigeria?

The paper is structured with the second Section on literature review; Section 3 presents materials and methods, Section 4 presents Results and discussion, and finally Section 5 is on conclusion and recommendation.

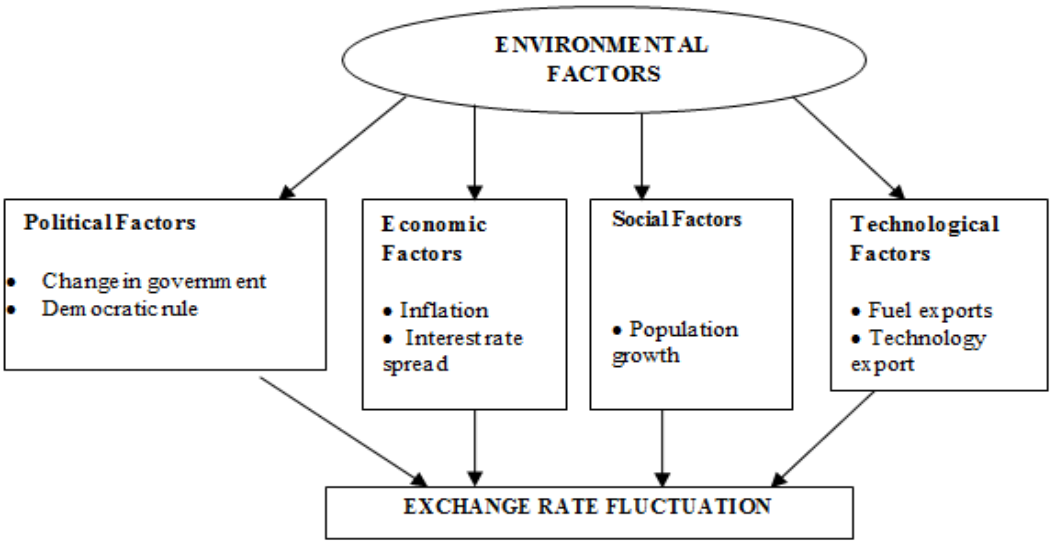
2. Literature Review

2.1. Conceptual Review

The foreign exchange is one that is affected by many elements known as the environmental factors. These elements can be divided into four categories that include economic, political, social and technological. Economic issues usually include things such as inflation, exchange rate and a country's growth and health in relation to their money. As a general rule, a country with a consistently lower inflation rate exhibits a rising currency value, as its purchasing power increases relative to other currencies (Van Bergen, 2010). Those countries with higher inflation typically see depreciation in their currency in relation to the currencies of their trading partners. Interest rates, inflation and exchange rates are all highly correlated. By manipulating interest rates, regulatory authorities exert influence over both inflation and exchange rates, and changing interest rates impact inflation and currency values. Higher interest rates offer lenders in an economy a higher return relative to other countries. Therefore, higher interest rates attract foreign capital and cause the exchange rate to rise.

Political factors like political stability, democratic rule, and change in government have a great influence on the foreign exchange market and the economy as a whole. Foreign investors inevitably seek out stable countries with strong economic performance in which to invest their capital. A country with such positive attributes will draw investment funds away from other countries perceived to have more political and economic risk. Political turmoil, for example, can cause a loss of confidence in a currency and a movement of capital to the currencies of more stable countries. Every country is different and every country has a unique mindset. These mindsets cast an impact on the businesses and the sales of their products and services; The social implications, the gender and connected demographics, the social lifestyles, the domestic structures affect not only the domestic market but the international market as a whole (Popa, 2012). Nigeria is a volatile country. It is about equally divided among Christians and Muslims, which makes it prone to religious strife. In addition, there are a number of rebel groups operating in Nigeria, especially in the delta of the river Niger. Political and social unrest in Nigeria is always likely and could have a huge impact on the country's exchange rate.

Technology has a great influence a country and its currency. Technology changes every minute and therefore companies need to stay connected along the way and integrate as and when needed. Also, these factors are analyzed to understand how the consumers react to technological trends and how they utilize them for their benefit. (Cadle *et al.*, 2010).



Researcher Conceptual Model 2017

2.2. Empirical Review

Rodriguez (2016) concentrated on the determinants of exchange rate administration decision between 1985 and 2010 for 20 Latin American nations utilizing an ordered board probit that considers economic, political and institutional components. The review showed fixed exchange rate administrations are connected with little and open economies with respect to trade and financial flows. The bigger the tradable segments are, the more outlandish it is that a legislature will peg its money. Additionally, the nature of political organizations, political quality and validity have an impact on how conversion scale administrations are set. Democracy and political stability are associated with flexible exchange rate regimes.

Amin and El-Sakka (2016) empirically determined the relationship between oil price fluctuations and movements in the dollar-pegged Gulf Cooperation Council (GCC) countries' exchange rates. findings indicate that the series are integrated of order one and evidence is found that oil prices and GDP per capita have a long run co-integration relationship with real exchange rates.

3. Materials and Methodology

The fluctuations of foreign exchange in Nigeria up to its present state is influenced by a number of factors such as the changing pattern of international trade, institutional changes in the economy and structural shifts in production. The study used secondary data to determine the influence of environmental factors. The secondary data was collected from already published data of Nigerian foreign trade pattern, Balance of Trade, tax and regulations guiding the Nigerian foreign exchange. Data from 1973 -2015 (43years) was used for analysis because Nigerian currency (Naira) started in 1973.

The data was analysed using multiple regressions to determine the relationship between the dependent and the independent variables. For the environmental factors used for analysis, political variables are change in government and Democratic rule. Economical variables are Interest rate spread and Inflation. Social variable used is the Population growth and technological variables are Fuel exports and technology export.

Hence, the accessed relationship that exists between the identified variables in the model specification is stated thus:

$$(OER)_t = \beta 0 + \beta 1(IRS) + \beta 2(ICP)_t + \beta 3(FEM)_t + \beta 4(DMR))_t + \beta 5(CIG)_t + \beta 6(PGR)_t + \beta 7(TEX)_t + \varepsilon \quad \ldots\ldots \quad (1)$$

Where,

OER = Official exchange rate (LCU per US$, period average)
IRS = Interest rate spread (lending rate minus deposit rate, %)
ICP = Inflation, consumer prices (annual %)
FEM = Fuel exports (% of merchandise exports)
DMR = Democratic rule binary variable which is unity if the country is on a democratic rule at time t,
CIG = change in government binary variable which is unity if there is a change in the country government at time t
PGR = Population growth (annual %)
TEX =technology export (ICT service, Communications, computer, etc. (% of service exports, BoP)
β = coefficients, and
ε_t represents the myriad of other influences on exchange rate, assumed to be well behaved.

4. Results and Discussion

Results of the regression analysis and associated estimated models are presented and evaluated below. The isolated effects, t-statistics and associated probabilities are summarized in the table 1 below.

Table-1. Specific Effects of Environmental Factors on Foreign Exchange Market

Index or Variable	Coefficient (β_i)	t-stat	P-value	Greater or Less Than 0.05 Significance Level	Significance
IRS	7.981338	2.571698	0.0145	Less	Yes
ICP	-0.447225	-1.206496	0.2357	Greater	No
FEM	-4.031844	-2.228681	0.0324	Less	Yes
DMR	74.78494	5.121572	0.0000	Less	Yes
CIG	-6.315553	-0.503467	0.6178	Greater	No
PGR	-52.67280	-1.177307	0.2470	Greater	No
TEX	0.016726	0.059909	0.9526	Greater	No

Source: EViews7 Regression Output (See Appendix I)

Estimated Model:

$$(OER)_t = 503.06 + 7.98(IRS) - 0.45(ICP)_t - 4.03(FEM)_t + 74.78\ (DMR))_t - 6.32(CIG)_t - 52.67(PGR)_t + 0.02\ (TEX)_t + \varepsilon$$

Table 1 above shows that the probability associated with the t-statistic of coefficient IRS is less than the specified 0.05 level of significance. That is, probability (p-value = 0.0145) < 0.05 with regression co-efficient B_1=

7.98. This indicates that the isolated effect of IRS is positive and significant. Consequently, it can be concluded that, in isolation, IRS in this study exert a positive significant impact on OER. This implies that a unit increase in IRS (Interest Rate Spread) causes an increase in OER (Official Exchange Rate).

The probability associated with the t-statistic of coefficient ICP is greater than the specified 0.05 level of significance. That is, probability (p-value = 0.2357) > 0.05 with regression co-efficient B_2= -0.45 This indicates that the isolated effect of ICP is negative and insignificant. Consequently, it can be concluded that, in isolation, ICP in this study exert an insignificant impact on OER. Thus implying that ICP (Inflation Consumer Prices) has a negative relationship with OER (Official Exchange Rate), meaning that an increase in ICP will result into a corresponding decrease in OER.

In the case of Fuel Exports as a percentage of Merchandise Exports (FEM), the probability associated with the t-statistic of coefficient FEM is less than the specified 0.05 level of significance. That is, probability (p-value = 0.0324) < 0.05 with regression co-efficient B_3= -4.03 This indicated that although the isolated effect of FEM is negative yet the impact on OER is significant. Therefore, in isolation, FEM in this study exert a negative significant impact on OER. This implies that a unit increase in FEM will result in decline of OER.

For Democratic Rule (DMR), the probability associated with the t-statistic of coefficient DMR is less than the specified 0.05 level of significance. That is, probability (p-value = 0.0000) < 0.05 with regression co-efficient B_4= 74.78 This indicated that the isolated effect of DMR is positive and significant to OER. Therefore, in isolation, DMR (Democratic Rule) in this study exerts a positive significant impact on OER (Official Exchange Rate). This implies that a unit increase in DMR will increase OER and vice versa.

For Change in Government (CIG) however, the probability associated with the t-statistic of coefficient CIG is greater than the specified 0.05 level of significance. That is, probability (p-value = 0.6178) > 0.05 with regression co-efficient B_5= -6.32. This indicated that the isolated effect of CIG is negative and insignificant to OER. Therefore, in isolation, the impact of CIG in this study is insignificant on OER. Thus, it can be concluded that as CIG increases, OER decreases.

The probability associated with the t-statistic of coefficient Population Growth (PGR) is greater than the specified 0.05 level of significance. That is, probability (p-value = 0.2470) > 0.05 with regression co-efficient B_6= -52.67. This indicated that the isolated effect of PGR is negative and insignificant to OER. Therefore, in isolation, the impact of PGR in this study is insignificant on OER. Thus implying that an increase in PGR, will result to a corresponding decrease in OER.

Lastly, the probability associated with the t-statistic of coefficient Technology Export (TEX) is greater than the specified 0.05 level of significance. That is, probability (p-value = 0.9526) > 0.05 with regression co-efficient B_7= 0.02. This indicated that the isolated effect of TEX is positive but insignificant to OER. Therefore, in isolation, TEX has no significant impact on OER, although a unit increases in TEX results in an increase in OER.

4.1. Overall Effect of Environmental Factors on Foreign Exchange Market in Nigeria

The F-statistics, associated probabilities and significance or otherwise of overall effects of environmental factors on foreign exchange market in Nigeria is as summarized in table 2 below.

Table-2. F-Statistic, P-Value, Level of Significance and Decision

F-Statistic	P-Value	Greater or Less than the 0.05 Level of Significance?	Decision on Overall Effect or Relevance
15.92999	0.000000	Less	Significant

Source: EView7 Regression Output (See Appendix I)

Recall that the main objective of the study is to establish the impact of environmental factors on foreign exchange market in Nigeria and that the study seeks to answer the research question on what extent do environmental factors impact on foreign exchange market in Nigeria.

Study Proposition: Environmental factors impact on foreign exchange market in Nigeria.

As shown in table 2 above, the probability associated with the respective F-statistics is less than the specified 0.05 level of significance. That is, probability (F-statistic = 0.0000) < 0.05. This implies that the components of environmental factors have significant impact on foreign exchange market in Nigeria. Therefore, it can be concluded, on the basis of this analysis, that environmental factors impact on foreign exchange market in Nigeria.

The degree of Environmental Factors Impact on Foreign Exchange Market in Nigeria using the coefficient of multiple determination (R-squared), adjusted coefficient of multiple determination (Adjusted R-squared) of environmental factors and foreign exchange market are discussed in Table 3 below.

Table-3. R-Squared, Adjusted R-Squared and Variations Explained

R-Squared	Adjusted R-Squared	Variation Explained*	Variation Unexplained
0.761108	0.713330	76.11%	23.89%

Source: EViews7 Regression Output (See Appendix I)

** R-Squared expressed as a percentage*

As shown in table 3, the degree of the environmental factors impact explains 76.11% of the variations in the Nigerian foreign exchange market. This shows a very strong positive correlation. Thus, providing empirical evidence that the extent to which foreign exchange market vary in Nigeria is explained mainly by environmental factors.

5. Conclusion and Recommendation

The Nigerian naira came into circulation in 1973 and since then it has experienced various fluctuations in the official exchange rate. Different factors are said to have varying impact on the exchange rate of a country therefore the study analysed the impact of environmental (PEST) factors on the Nigerian currency.

In conclusion, the analysis of the Environmental Factors effects on the Nigerian Foreign Exchange market show the followings: The political variables, such as Change In Government is not significant while Democratic Rule is significant; Economical variables such as Interest Rate Spread has a positive significant impact while Inflation is not significant; Social variable (Population growth) has no significant impact; Technological variables such as Fuel Exports is significant while Technology Export is not significant.

Judging from the above, it is recommended that relevant stake holders should pay proper attention to those environmental factors with significant impact on our Foreign Exchange Market. The Government should ensure we have a stable and continuous democratic government. Our policy issues should be taken seriously and those policies that will enhance stable Interest rate should be properly implemented. There should be collaboration with stakeholders in the industry to ensure that economic indices are continuously monitored so as to make sure that Inflation is kept at the barest minimum. In addition to these, activities in the petroleum industry have been shown to impact significantly on our foreign exchange market. Hence, the Government should be up-and-doing on this, by ensuring that the relevant organs are well equipped with adequate resources to reduce this impact.

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Appendix 1

Dependent Variable: OER
Method: Least Squares
Date: 10/18/16 Time: 23:06
Sample: 1973 2015
Included observations: 43

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IRS	7.981338	3.103529	2.571698	0.0145
ICP	-0.447225	0.370681	-1.206496	0.2357
FEM	-4.031844	1.809072	-2.228681	0.0324
DMR	74.78494	14.60195	5.121572	0.0000
CIG	-6.315553	12.54412	-0.503467	0.6178
PGR	-52.67280	44.74006	-1.177307	0.2470
TEX	0.016726	0.279199	0.059909	0.9526
C	503.0624	230.9967	2.177791	0.0362

R-squared	0.761108	Mean dependent var	58.23930
Adjusted R-squared	0.713330	S.D. dependent var	65.74906
S.E. of regression	35.20309	Akaike info criterion	10.12639
Sum squared resid	43374.00	Schwarz criterion	10.45405
Log likelihood	-209.7173	Hannan-Quinn criter.	10.24722
F-statistic	15.92999	Durbin-Watson stat	0.830910
Prob(F-statistic)	0.000000		