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RESPONSIVENESS OF EXPORT GROWTH TO EXCHANGE RATE VOLATILITY IN NIGERIA: AN EMPIRICAL APPROACH

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ABSTRACT

Before and few years after Independence (1960), the Nigerian economy was largely sustained by export earnings from non – oil exports, particularly the primary agricultural commodities. From the late 1960's, the economy began to undergo fast structural changes, when the production and, export of oil became prominent, which made the Nigeria's exchange rate very strong and favourable in the early 1970s (oil boom era). This situation led to the abandonment of the agricultural sector and, consequent decline in the non – oil export revenue of the country, making her a single export commodity economy (i.e mono – cultural economy), the implication of which, is enormous, as manifested in 2016 when the country was plunge into recession. It is therefore, against the foregoing that, this study sought to determine the influence of exchange rate on the growth of exports in Nigeria from 1999 – 2016. The study adopted ex-post facto research design because, the data used were secondary data, extracted from the publications of CBN and NBS. The Hypothesis formulated states that, Exchange rate does

Introduction:

Exports are one of the oldest forms of economic transfer, and occur on a large scale between nations that have fewer restrictions on trade, such as, tariffs or subsidies. Export as a function of International trade, refers to selling goods and services produced in the home country to other markets abroad (Joshi, 2005).

It is pertinent to note that, Exports play very significant role in the acceleration of economic growth and development of a country. This is because, the ability to export goods and services helps an economy to grow by selling more overall goods and services. Export growth is basically influenced by some major factors, such as, the country's trade and exchange rate regime (i.e import tariffs,

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not have a positive and appreciable influence on the growth of exports in Nigeria. This was tested using the Ordinary Least Squares (OLS) multiple regression technique and, produced the result which indicates that, the null hypothesis is accepted. It was therefore, concluded that, exchange rate channel of monetary policy transmission, if cautiously applied, can significantly impact on the overall macroeconomic environment of the country, particularly, in the present era of globalization. The recommendation was that, the country's economy should be diversified and, also the high import taste of her people drastically reduced for the attainment of a robust external reserve and stable exchange rate environment.

Keywords: *Exchange Rate, Export commodity, Volatility. Recession, macroeconomic environment.*

Quotas and exchange rates); presence of an entrepreneural class, efficiency enhancing government policy; secure access to transport and marketing services (Kaynak and Kothavi, 1984; Belay, 2009).

Export and Import are twin variables that are closely related and play very significant role in determining the trade balance of a country. Consequently, the dynamics of the relationship between these two variables are of great importance to any economy and, have therefore, attracted the attention of researchers in determining the nature of their relationship. This is because, if a country experiences persistent trade deficits, the domestic interest rate will be very high and such a country will turn out to be a highly indebted country, which may affects the welfare of her people. So, the existence of a long – run equilibrium relationship between exports and imports is highly desirable for any economy. A robust exchange rate arising from a result- oriented monetary policy implementation can bring about the feat (Babatunde, 2014).

Exchange rate is one of the most important channels of monetary policy transmission that can impact significantly on the overall macroeconomic situation of a country, particularly, in the present era of rapidly developing global financial market and services. In countries where domestic monetary policies can not influence the world Interest rates, exchange rate becomes a major tool in adapting to changing external conditions (Twarowska and Kakol, 2014).

So, to minimize exchange rate volatility and stabilize the external environment, it has become necessary for countries, particularly those of emerging economies,

to clearly identify those factors that affect or influence exchange rate determination because, of its great practical importance. These factors are numerous and vary from country to country. They have both positive and negative effects on the domestic currency valuation. Such factors may include – Inflation rate, Interest rate, Capital Account balance, Speculator's role, Public debt, GDP growth, Employment data, Political stability and Economic performance (Pareshkumar, Narendra and Ashok, 2014).

Statement of the problem

The challenge posed by the mono – cultural nature of Nigerian economy since the exportation of oil began in the sixties (60s) is enormous. Before Independence in 1960 and few years after the Nigerian economy was largely sustained by export earnings from non – oil exports, especially the primary agricultural commodities. The economy began to undergo fast structural changes from the late 1960s when the production and export of oil became prominent, making the Nigeria's exchange rate very strong and favourable in the early 1970s (oil boom).

This era of oil boom led to the abandonment of the agricultural sector by both the larger population and the government. The consequence of which was the drastic decline in the non – oil export revenue of the country and, oil since then became Nigeria's single export commodity. The implication of the country's dependence on a single export commodity (mono – cultural economy) became evident with the collapse of the oil market (oil glut) in 1981 which brought about devastating consequences on the Nigerian economy, among which was high exchange rate. This situation got out of hand and led to the collapse of the Second Republic in 1983.

A similar scenario manifested recently (2016) when Nigerian economy was plunge into recession, engendered by shrinking GDP, high Interest rate, Inflation rate and exchange rate respectively. This was caused by the drastic decline in oil prices at the international market, coupled with the inability of the country to meet her supply allocation quota, due to the crisis in the oil producing region of the country.

As the entire macroeconomic environment becomes unstable, the key economic variables, such as, GDP and Forex begin to impact negatively on the economy. This is because, the Nigerian economy is an import dependent economy and a single export commodity driven one. It is against this backdrop that, the study

sought to determine the influence of exchange rate on the growth of Exports in Nigeria since the emergence of the fourth Republic in 1999.

Hypothesis

The following hypothesis was formulated for this study: -

H_0: Exchange rate does not have a positive and appreciable influence on the growth of Exports.

Review of Related Literature

(A) Conceptual framework

According to Investopedia (2015), an export is considered as a function of International trade whereby goods produced in one country are shipped or transported to another country for future sale or trade. The sale of such goods adds to the producing nation's gross output (GDP). Exports can be classified into two (2) major groups, namely: Mechandise exports and Service exports. The Mechandise exports are produced from three major sectors (Agriculture, mining and manufactures). Whereas, the Service exports include – Transportation, Tourism, Banking, Advertising, Construction, Retailing, Entertainment and Culture, Mass communication and Information Technology (Belay, 2009).

Exchange rate, on the other hand, is the price of one currency expressed in terms of another currency. It is usually expressed as the units of foreign currency needed to purchase one unit of domestic currency and vice – versa (Jochumzen 2010, CBN 2011). Exchange rate can be classified into two (2) types, viz: Nominal exchange rate and Real exchange rate. The Nominal exchange rate is the home- country currency price of a foreign currency. Changes in nominal exchange rate do not take account of changes in price level or inflation rate. While, Real exchange rate, is the rate at which two countries' goods trade against each other. Changes in it take account of changes in price level or inflation rate (CBN 2011, Reinert 2012, Twarowsk, Kakol 2014).

In the analysis of foreign exchange rate, the concept of 'Exchange rate Regime' is very important. It is a system of exchange rate determination, which is basically classified into two (2) types, namely: fixed or pegged exchange rate regime and flexible, floating or fluctuating exchange rate regime. Under the fixed exchange rate regime, all exchange transactions take

place at an exchange rate that is determined by the monetary authorities, as the rate is fixed by legislation. While, under the flexible exchange rate regime, the rates are determined by market forces (Demand and Supply) and, the monetary authorities do not intervene for the purpose of influencing the exchange rate (Jhingan, 2009). Most countries of the world today adopt the floating exchange rate regime in the management of their foreign exchange rate.

(B) Theoretical Review

Export as a function of International trade is a product of International theories, such as, the theory of comparative costs (David Ricardo); the factor endowment theory of International trade (Berlin Ohlin); the theory of Reciprocal Demand (John S. Mill) and, the theory of opportunity cost (Herberler G.). These theories explained the causes of International trade and its accruable benefits, thus, the emergence and existence of export and import transactions across the globe (Jhingan, 2009).

The fundamental statement of these theories, which is more or less the same, is that, 'when a country enters into trade with some other country, it will export those commodities in which its comparative production costs are less, and will import those commodities in which its comparative production costs are high'. This means that, each country will specialize in the production of those commodities in which it has greater comparative advantage or least comparative disadvantage and, thus, export those commodities in which its comparative advantage is the greatest and vice – versa (Jhingan, 2009).

Exports play very significant role in the overall growth of a country, as contained in some hypothesis, such as, export led – Growth hypothesis and product life cycle hypothesis. The advocates of these hypotheses argued that, exports can perform as an "engine of growth" because of some major advantages they offer. Thus, they include – first, that the Export sector generates positive externalities on non – export sectors through more efficient management styles and improved production techniques (Feder, 1983; Olayiwola and Okodua, 2013). Second, export expansion increases productivity by offering potential for scale economies (Helpman and Krugman, 1985, Krugman, 1997; Olayiwola and Okodua, 2013); Third, exports alleviate foreign exchange constraints and provide greater access to International markets (Olayiwola, 2000).

The theoretical review of foreign exchange rate determination, on the other hand, consists of two (2) components, viz: the traditional view and, the modern theoretical view. The traditional view considers International trade in goods as the primary determinant of exchange rate. The three popular theories that hold this view are, the mint parity, the purchasing power parity and the balance of payments theories of exchange rate determination (Lipsey, 1982; Jhingan, 2009). While, the modern theoretical view emphasizes financial assets, as the primary determinant of exchange rate. The models involved here are, the monetary approach model and, the portfolio – Balance approach mode; they all assume perfect capital mobility, that is, free movement of capital between nations (Stanley, 1973; Polly and Peter, 1980). So, it is the view of these models that, exchange rate is being determined by relative supplies of domestic and foreign bonds, as well as domestic and foreign money (Jacob, 1976; John, 1978).

(C) Empirical Review

Akhtar and Hilton (1984); Peree and Steinherr (1989); Caballero and Corbo (1989) and, Bini – Smaghi and Lorenzo (1991) using the Ordinary Least Square (OLS) techniques, all found significant but negative effect of exchange rate volatility on trade balance, in their studies of the effect of foreign exchange uncertainty on trade balance (exports) in some European and American countries. Feenstra and Kendall (1991) using the Generalized Auto – Regressive conditional Heteroskedasticity (GARCH) techniques also found negative effect of foreign exchange fluctuation on exports. Adopting the OLS technique too, Gotur (1985); Bailey and Tavlas (1988), Mann (1989) and Medhora (1990) all found little or no effect of exchange rate instability on trade.

However, Mckenzie (1998) adopted the Auto – Regressive Conditional Heteroskedasticity (ARCH) method and found positive effects of exchange rate instability on trade. Also Kasman and Kasman (2005) using the method of co – integration and Error Correction Method (ECM) found significant positive effect of instability in the exchange rate on export.

In their empirical investigation of the link between exchange rate volatility and trade in Nigeria, Afolabi and Akhanolu (2011) using GARCH techniques, found an inverse and statistically insignificant relationship between total trade and exchange rate volatility in Nigeria.

Isitua and N, Igue (2006) studied the effects of exchange rate volatility on US – Nigeria trade flows for the period 1985 to 2005, using GARCH modeling, co – integration, error correction apparatus and variance Decomposition on data. They found that, exchange rate volatility has a negative and significant effect on Nigeria's exports to the US. In line with theoretical expectation, US GDP exerts a positive effect on Nigeria's exports but, curiously, the effect is insignificant in the export function.

Umoru and Oseme (2013) studied the impact of exchange rate shocks on trade flows in Nigeria, using the Vector Error Correction (VEC) method. The result of the study indicated a cyclical feedback between the trade balance and the real exchange rate depreciation of Naira. However, the analysis finds no empirical evidence in favour of the short – run deterioration of the trade balance as implied by the J – curve hypothesis. Bonds (1985) in his empirical study on non – oil exporting developing countries, found that, real effective exchange rate, Gross National Product (GNP) in importing countries and, output in exporting countries (measured by deviations from trend) as well as long – term developments in both exporting and importing countries, play an important role in the determination of exports (Aliyu, 2007).

Methodology

The adopted research design for this study is the *ex – post facto*, as data used were drawn from secondary sources (secondary data), specifically from the CBN and NBS publications. While, Ordinary Least Square (OLS) regression analysis technique was used to analyse the data collected. To demonstrate the application of OLS method, a multiple regression model was developed with Exchange rate, Interest rate and OMO as independent variables and, Export as the Dependent Variable.

The model developed is in line with the formulated hypothesis which states that, Exchange rate does not have a positive and appreciable influence on the growth of Exports. Thus, the model:-

$Exp = 0 + 1Exr + 2Intr + 3OMO + \mu$……..

Where: Exp = Export

Exr = Exchange rate

Intr = Interest rate

OMO = Open Market Operation

0; 1; 2 and 3 = beta (parameters)

μ = Error term.

Data Presentation and Analysis

The data used for this study were extracted from secondary sources (CBN and NBS publications) and summarized using descriptive statistics. They were later subjected to some statistical treatment and then analysed using the Ordinary Least Squares (OLS) regression technique. Thus, a time series data set for an 18 year period (1999 - 2016) is presented below, indicating Exports (oil and non – oil) as dependent variable while, the independent variables are – Exchange rate; OMO (TBs) and Interest rate.

Table: - Data for the Dependent and Independent Variables.

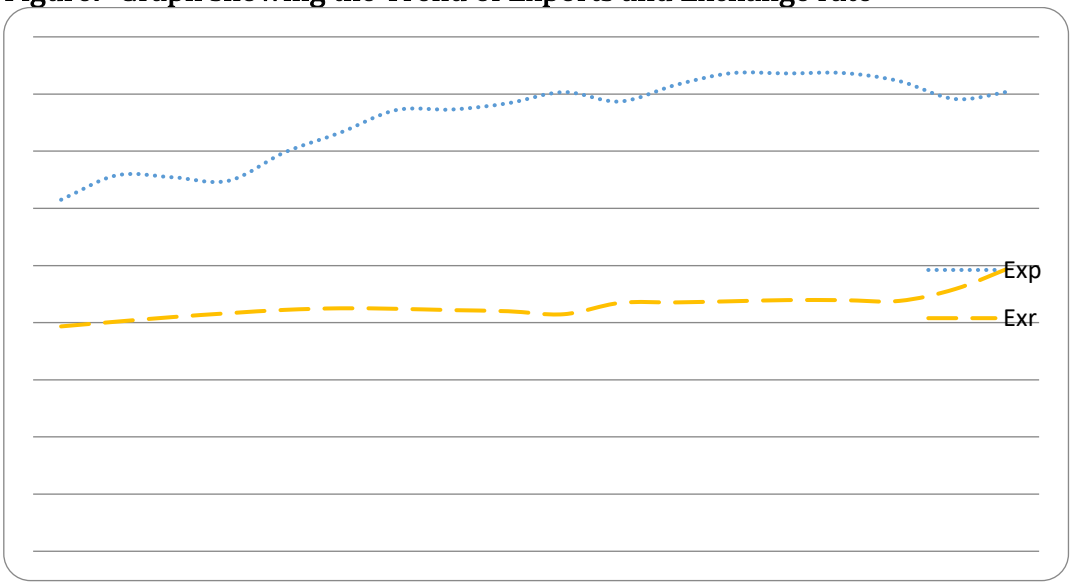
Year	Exports (Oil and Non-Oil)	Interest Rate	Open Market Operation (TBs)	Foreign Exchange Rate
	₦' Billion	%	₦' Billion	₦/US Dollar
1999	1,189.00	21.32	88.90	92.6934
2000	1,945.70	17.98	86.90	102.1052
2001	1,868.00	18.29	1,985.50	111.9433
2002	1,744.20	24.85	2,421.10	120.9702
2003	3,087.90	20.71	3,026.30	129.3565
2004	4,602.80	19.18	3,467.70	133.5004
2005	7,246.50	17.95	2,521.70	132.1470
2006	7,324.70	17.26	1,509.10	128.6516
2007	8,309.80	16.94	1,304.20	125.8331
2008	10,387.70	15.14	916.30	118.5669
2009	8,606.30	18.99	1,392.40	148.8802
2010	12,011.60	17.59	2,004.90	150.2980
2011	15,236.60	16.02	3,048.50	153.8616
2012	15,139.30	16.79	3,609.70	157.4994
2013	15,262.00	16.72	3,650.90	157.2600
2014	12,960.60	16.55	3,879.50	155.0000
2015	9,039.90	11	3,697.20	197.0000
2016	10,584.70	14	1,930.80	305.0000

Source: Central Bank of Nigeria and National Bureau of Statistics (various years)

Data Analysis

Exports (oil and non-oil) for the period under review stood at ₦1,189 billion in 1999 and increased by 38.89% to stand at ₦1,945.7 billion in 2000. It declined by 4.16% and further by 7.10% to stand at ₦1,868 billion and ₦1,744.2 billion in 2001 and 2002 respectively. The most significant rate of increase of 43.52% was recorded in 2003 with total export at ₦3,087.9 billion. Further increases stood at ₦4,602.8 billion (32.91%), ₦7,246.5 billion (36.48%), ₦7,324.7 billion (1.07%), ₦8,309.8 billion (11.85%), ₦10,387.7 billion (20%) was recorded in 2004, 2005, 2006, 2007 and 2008 respectively. A significant decline was recorded in 2009 with a reduction to ₦8,606.3 billion (20.7%). In 2010, total exports stood at ₦12,011.6 billion representing a 28.35% increase over that of the previous year and a further increase to ₦15,236.6 billion representing a 21.17% increase in 2011. A marginal decline over the 2011 figures which stood at ₦15,139.3 billion representing a 0.64% drop was recorded in 2012. The highest export in terms of value in the period under investigation which stood at ₦15,262 billion was recorded in 2013. It fell by 17.76% and further by 43.37% and stood at ₦12,960.6 billion and ₦9,039.9 billion in 2014 and 2015 respectively. In 2016, export stood at ₦10,584.7 billion representing a 14.59% growth.

Figure:- Graph showing the Trend of Exports and Exchange rate



The Figure above shows the graph of exports and exchange rate movement during the period under study. The necessity of the figure above is to show in a graphical form, the relationship between the variables in the second objective of the study. The graph reveals that the variables (exports and exchange rate) do not exhibit similar trends as there seem to be a mixture of both direct and inverse relationship across the years. The seeming random walk in the relationship

among the variables will be further subjected to empirical test in the next section in the test of hypothesis.

Table:-Descriptive Statistics for the two variables (Exports and Exchange rate)

Exp

	Percentiles	Smallest		
1%	1189	1189		
5%	1189	1744.2		
10%	1744.2	1868	Obs	18
25%	3087.9	1945.7	Sum of Wgt.	18
50%	8458.05		Mean	8141.517
		Largest	Std. Dev.	4891.864
75%	12011.6	12960.6		
90%	15236.6	15139.3	Variance	2.39e+07
95%	15262	15236.6	Skewness	.00011
99%	15262	15262	Kurtosis	1.758938

Exr

	Percentiles	Smallest		
1%	92.6934	92.6934		
5%	92.6934	102.1052		
10%	102.1052	111.9433	Obs	18
25%	120.9702	118.5669	Sum of Wgt.	18
50%	132.8237		Mean	145.587
		Largest	Std. Dev.	46.61963
75%	155	157.26		
90%	197	157.4994	Variance	2173.39
95%	305	197	Skewness	2.310606
99%	305	305	Kurtosis	8.791819

Source: Researcher's Computation using Stata Software (Version 13)
Note: Exp = Export (oil and non-oil); Exr = Exchange Rate

The table above shows the descriptive statistics used to analyze the responsiveness of Export growth to Exchange rate volatility in Nigeria for the period, 1999 – 2016.

The descriptive statistics shows the mean, standard deviation, variance, skewness and kurtosis of the distribution of export (oil and non-oil) and exchange rate. The table shows that the mean export (oil and non-oil) was ₦8,141.52 billion with a standard deviation of ₦4,891.86 billion. The distribution of export was positively skewed at 0.00011 with a kurtosis of 1.76. The table also shows the average exchange rate (Exr) stood at ₦145.59 with a standard

deviation of ₦46.62. The distribution of exchange rate was positively skewed at 2.31 (i.e. the distribution of exchange rate data tends towards the positive direction with much of the data being less than the mean). Kurtosis value of 8.71 which was used to measure the degree of steepness of the distribution of real exchange rate revealed that it was leptokurtic.

Test of Hypothesis

We re-state the hypothesis of the study as follows:

H_o: Exchange rate does not have a positive and appreciable influence on oil and non-oil exports.

H_a: Exchange rate has a positive and appreciable influence on oil and non-oil exports.

Decision Rule:

Decision Rule 1: Accept null hypothesis if P-value is greater than 0.05 and reject null hypothesis if P-value is less than 0.05.

Decision Rule 2: Accept alternative hypothesis if P- value is less than 0.05 and reject alternative hypothesis if p-value is greater than 0.05.

Result of the Regression Analysis

Table:- Result of Ordinary Least Square Regression Analysis of the Hypothesis.

Source	SS	df	MS		
Model	1.48049958	3	.493499861	Number of obs =	18
Residual	.788151788	14	.056296556	F(3, 14) =	8.77
Total	2.26865137	17	.133450081	Prob > F =	0.0016
				R-squared =	0.6526
				Adj R-squared =	0.5781
				Root MSE =	.23727

exp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
exr	.3180686	.7486084	0.42	0.677	-1.287537	1.923674
intr	-.0626896	.0248391	-2.52	0.024	-.1159642	-.009415
omo	.3051049	.1392889	2.19	0.046	.0063598	.60385
_cons	3.241005	1.732615	1.87	0.082	-.475084	6.957094

Source: Researcher's Computation using Stata Software (Version 13)

Note: exp = Export (oil and non-oil), intr = Interest Rate, exr = Exchange Rate and omo = Open Market Operation.

The regression result presented in the table above shows that the coefficient of the key variable of interest, exchange rate was positive. Exchange rate essentially had a positive and non-significant effect on export {$\alpha = 0.318$, $t = 0.42$, $p = 0.677 > 0.05$, $R^2 = 65.26\%$, Adjusted $R^2 = 57.81\%$}. This result implies that though exchange rate had a positive effect on both oil and non-oil exports, that effect was not statistically significant. R^2 also known as the coefficient of determination shows the goodness of fit of the model. It shows that the independent variables were only able to explain 65.26% variations in the dependent variable within the period under investigation. The other 34.74% variations in oil and non-oil exports were determined by other factors other than the independent variables. As also revealed in the table, interest rate had an inverse relationship (negative) effect on oil and non oil export. This means that as interest rate goes up, exporters find it difficult to procure loans necessary to support their export oriented businesses which in turn reduces the volume and value of exports. In summary, the result showed that interest rate had a negative and significant effect on oil and non-oil exports {$\alpha = -0.0627$, $t = -2.52$, $p = 0.024 < 0.05$, $R^2 = 65.26\%$, Adjusted $R^2 = 57.81\%$}. On the other hand, open market operation had a positive and significant effect on oil and non-oil exports {$\alpha = 0.305$, $t = 2.19$, $p = 0.046 < 0.05$, $R^2 = 65.26\%$, Adjusted $R^2 = 57.81\%$}.

Decision

As prescribed by the decision rule, the alternate hypothesis is rejected and the null hypothesis that exchange rate does not have a significant influence on oil and non-oil exports in Nigeria is upheld.

Implications of Result

The findings of this research indicates that exchange rate had a positive but non-significant effect on export (oil and non- oil). This result is consistent with the findings of Kasman and Kasman (2005) who applied Co-integration and Error Correction Model equally found a positive effect of exchange rate on exports.

Our findings is in line with the position of the classical economists who argue that devaluation of a domestic currency promotes exports of its products as other economies find the prices of their goods relatively cheaper, thereby enhancing

the demand for such products. However, this could be taken when a country's economy is export oriented and not import dependent as in the case of Nigeria where most of the goods are imported.

Conclusion and Recommendation

The exchange rate channel of monetary policy transmission if cautiously applied, in an effectively managed foreign exchange environment, can significantly impact on the overall macroeconomic environment of a country, particularly, in the present era of globalization. In countries where domestic monetary policies can not influence the world interest rates, exchange rate becomes a major tool in adapting to changing external conditions (Twarowska and Kakol, 2014).

Based on the finding of this study that, exchange rate had a positive but, non – significant effect on export growth, it is therefore recommended that, the country moves away from a single export commodity economy to a diversified one and, also reduce drastically the high import taste of her people. This will enable the country have a robust external reserve, strong domestic currency valuation and stable exchange rate or stable external environment.

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