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Effect of Exchange Rate Depreciation on Trade Balance in Nigeria

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***Abstract*:** *This study examined the effect of exchange rate depreciation on trade balance in Nigeria (1986-2014). The econometric analytic tools used are: Co integration Test, vector error correction model, Wald test, Granger Causality Test with the following results (i) the trace statistics of the Johansen co integrating equation shows that there exist a long run equilibrium relationship between exchange rate depreciation and trade balance in Nigeria. (ii) the vector error correction term met the required conditions, however exchange rate depreciation has no significant effect on trade balance in Nigeria, (iii) the causal relationship between BOT and EXR indicated that exchange rate granger cause balance of trade. The study concludes that depreciation cannot improve the trade balance in the Nigerian economy in the short run as depreciation can only benefit countries that are originally export based before the depreciation of a currency. Economies that are import dependent like Nigeria can hardly benefit from the depreciation of its currency. Based on the findings, the study makes the following recommendations; to retain the continuous long run relationship among BOT and other explanatory variables (EXR, FDI), effort should be made through the use of appropriate policy instruments to diversify sources of foreign exchange in the country to sustain such positive relationship in the long run. Since, it was seen that any increase in the depreciation of Naira with respect to dollar will bring about a fall in the balance of trade; Government should discourage further depreciation of the naira as this is unfavourable to the economy. Result from this study shows that a rise in foreign direct investment (FDI) will promote trade in the economy, hence Government should encourage foreign direct investment by improving on local security, revitalizing our power sector and other social services that can attract foreign investment.*

Keywords: *Balance of trade, exchange rate, depreciation, marshal learner condition, J curve hypothesis, causality*

I. Introduction

Foreign exchange is very crucial to an economy because its rate shows the degree of the economic might of any given nation. Hence its management is not left to chances but to the most skilled professionals and technocrats who are usually assembled at the apex monetary institution (the Central Bank). The level of foreign exchange of a given nation shows the pattern of its economic development (Loto 2011).

Exchange rate is defined by Jhingan, (1997) as the rate at which one currency is exchanged for another. From this definition, Jhingan regards exchange rate as a price of one Currency in terms of another Currency. Thus the exchange rate between the naira and the dollar refers to the amount of naira required to purchase a dollar. According to Obaseki (1993) the exchange rate of a particular Currency measures the worth of a domestic economy in terms of another. The exchange rate measures the external value of a Currency. It provides a direct relationship between the domestic and foreign prices of goods and services.

Foreign currency is required for making payments to other countries for goods, services, interest payments on loans for investment. Thus Nigeria's demand for US dollars, British sterling, French francs and Japanese Yen is largely derived from Nigeria's demand for American, British, French and Japanese goods respectively. Nigeria's supply of these currencies is earned by its exports to those countries. Under the flexible exchange system, the exchange rate is determined by the interplay of the forces of demand and supply, increase in imports leading to increase in demand for the foreign currency of the exporting country while an increase in exports leads to increase in the supply of that foreign currency.

A rise in the general level of internal prices will stimulate demand for imports which now become relatively cheaper. This will increase demand of foreign currency without there being an increase in its supply and so there will be a tendency for the home currency to depreciate. If prices in all countries are rising the effects on the exchange rates will cancel out. The extent to which a country must pay attention to the value of its currency in terms of others will determine the extent of its freedom of action with regard to its internal monetary policy. A country with a large volume of internal transactions will probably be more interested in the internal value of its currency than one which is more nearly self-supporting.

A fixed exchange rate regime entails the pegging of the exchange rate of the domestic currency to either a unit of gold, a reference currency or a basket of currencies, with the primary objective of ensuring a low

rate of inflation. They include amongst others, the reduction of transaction cost in trade, increased macroeconomic discipline, possibility of increased credibility due to stability in the exchange rate and increased response to domestic nominal shocks. A major drawback of the fixed/pegged regimes, however, is that it implies the loss of monetary policy discretion (or monetary policy independence). The floating exchange rate regime, on the other hand, implies that the forces of demand and supply will determine the exchange rate. This regime assumes the absence of any visible hand in the foreign exchange market and that the exchange rate adjusts automatically to clear any deficit or surplus in the market. Consequently, changes in the demand and supply of foreign exchange can alter exchange rates but not the country's international reserves. In this arrangement, the exchange rate serves as a "buffer" for external shocks, thus allowing the monetary authorities full discretion in the conduct of monetary policy.

The objective of this study is to determine the effect of exchange rate depreciation on trade balance in Nigeria.

The Nigeria trade balances and exchange rate from 1986 to 2014 at the interval of 10 years are as follows: (1986) N2, 937.00, (1995) N 195,533.7, (2005) N4, 445,678.5 and (2014) 6039.34

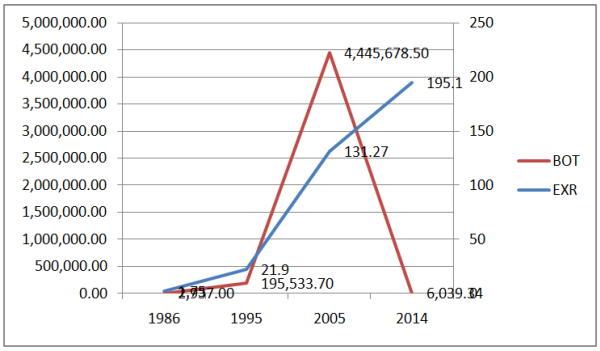

Figure 1. The Trend of Balance of trade and exchange rate in Nigeria

Table 1: Trade balance and exchange rate values (10 years interval)

YEAR	EXCHANGE RATE	TRADE BALANCE
1986	1.75	2,937.00
1995	21.9	195,533.7
2005	131.27	4,445,678.5
2014	195.1	6,039.34

From the foregoing, it is clear that the trend of exchange rate depreciation and trade balance in Nigeria did not consistently follow appriori expectation which opines that a nominal devaluation improves the trade balance. This conjecture is rooted in a static and partial equilibrium approach to the balance of payments that has come to be known as the elasticity approach (Bickerdike, 1920; Robinson, 1947; Metzler, 1948). For instance, in 1986, the exchange rate was N1.75 to a US dollar against a trade balance of N2, 937.00. In 1995, with a higher exchange rate of N21.9, to a US dollar the trade balance increased to N 195,533.7. This confirms the trend does not follow the apprioria expectation. In an interval of 2005 and 2014, the exchange rate depreciated from 131.27 to 195.1 against trade balance of N4, 445,678.5 and N 6,039.34. Looking at the interval analysis, trade balance tends to grow as naira currency depreciated but by 2014 exchange rate of 195.1 against N6,039.34 trade balance decrease was noticed, which depicts a fall in export as a result of a rise in domestic currency and does not follow the appriori expectation. This obvious contradiction justifies continuous empirical investigation on the actual effect of exchange rate depreciation on Nigeria trade balance. It is in a bid to stall such adverse economic implication that this study intends to investigate the effect of exchange rate depreciation on trade balance in Nigeria from 1986 – 2014.

II. Theoretical Review

There have been several theories in the economic literature that examine the effect of exchange rate depreciation on the trade balance. The prominent theories considered in this study include: the elasticity approach, monetary approach and absorption approach. The elasticity approach was propounded by Robinson (1947) and Metzler (1948) and popularized by Kreuger (1983), it posits that transactions under contract completed during the period of exchange rate depreciation may affect the trade balance negatively in the short

run but over time export and import quantities adjust which give rise to elasticities of exports and imports to increase and quantities to adjust.

As a result of this, the foreign price of the devaluing country's export is reduced and increase the price of imported goods which directly reduces the demand for imports at the long run the trade balance improves. This theory clearly states that the effect of exchange rate depreciation is dependent on the elasticity of exports and imports. This approach, commonly known as the BRM model which is gotten from the proponents (Bickerdike, 1920; Robinson, 1947; Metzler, 1948), has been recognized in the literature as providing a sufficient condition (the BRM condition) for a trade balance improvement when there is an exchange rate depreciation. The hypothesis that exchange rate depreciation can improve the trade balance has been rooted in a particular solution of the BRM condition, known as the Marshall-Lerner condition (Marshall, 1923; Lerner, 1944). This condition states that for a positive effect of exchange rate depreciation on the trade balance, and implicitly for a stable exchange market, the absolute values of the sum of the demand elasticities for exports and imports must exceed unity.

Past data for developed and developing countries have shown that exchange rate depreciation may cause a negative effect on the trade balance in the short run but an improvement in the long run; that is, the trade balance followed a time path which looked like the letter "J" as shown below;

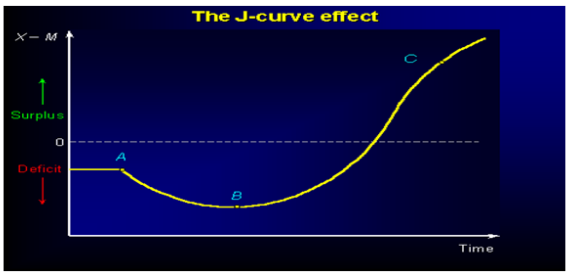

Figure 2: J curve Analysis

The main explanation for this J-curve has been that, while exchange rates adjust instantaneously, there is lag in the time consumers and producers take to adjust to changes in relative prices (Junz and Rhomberg, 1973; Magee, 1973; Meade, 1988). In terms of elasticities, domestically, there is large export supply elasticity and low short-run import demand elasticity. Williamson (1983) criticized the elasticity theory arguing that higher import prices that are caused by exchange rate depreciation could stimulate increase in the domestic prices of non traded goods. This leads to a rise in inflation and potentially reduces the advantages of exchange rate depreciation as manifested in the increase in trade balance. Laffer (1977) opined that the elasticity approach is not likely to hold in real life situation also Himarious (1989) shares similar view; that the effectiveness of exchange rate depreciation on real exchange rate and its effect on trade balance is of core importance.

Some of the initial criticisms of the elasticity approach are: (a) the import demand and export supply functions, defining the structural model, depend only on the nominal prices (measured in domestic currency units) rather than on relative prices and appropriate scale variables such as real income, real expenditures, real money balances, or productive capacity; (b) there are markets or goods not accounted for explicitly. For example, a trade deficit implies that goods are paid for with an asset (e.g., money) or income that has not been explicitly included in the analysis Alexander (1952). (c) it relies overly on a partial approach for analyzing a problem that should use a general equilibrium framework.

The Monetary Approach: the main view of this approach is that balance of trade is a monetary phenomenon (Frenkel and Johnson 1977). Any excess demand for goods, services and assets, could lead to a deficit in the balance of payments; reflects an excess supply of or demand for the stock of money. Accordingly, the balance of payments behavior should be analyzed from the point of view of money supply and demand. The monetarist view is based on the argument that exchange rate variation reduces the real value of cash balances and changes in relative price of traded and non-traded goods, and causes the trade balance to improve (mills 1979). However, higher import prices after changes in exchange rate may contribute to higher overall domestic prices of non-traded good and then impact negatively on the trade balance.

Upadhaya and Dhakal (2004) opined that exchange rate variation decreases the real supply of money which gives rise to the excess demand for money, the effect of this is hoarding and an increase in trade balance. From the point of view of the monetarist, the role of relative prices in the analysis of exchange rate variation is not important in explaining the effect of changes in exchange rate on trade balance.

Major incentives in the form of conducive environment for domestic production, especially effective infrastructure that could lead to significant improvement in competitiveness are required. Although several ad

hoc measures were taken to stem the deteriorating tide of the Nigerian economy from the late 1970s to early 1980s, it was until 1986 that a comprehensive economic adjustment programme was put in place to restructure the economy. Exchange rate reform was a major component of this economic reform agenda that was further intensified under the Nigerian Economic Empowerment and Development Strategy (NEEDS). The goal of exchange rate reform is to systematically attain an appropriate value for the Nigerian currency that would serve as a major incentive for exports but disincentive for increased imports. How effective has this reform been? Has exchange rate reforms been able to stimulate exports, especially non-oil exports? What has been the structure of imports since exchange rate reforms? Has there been shift in expenditure from consumer goods imports to capital and raw materials imports? Is there the need for any additional policy measures to complement existing exchange rate reforms in order to achieve the goals of exchange rate reforms?

Two monetary perspectives have been distinguished in literature: the monetary approach and the Keynesian monetary view, Frenkel and Johnson (1977). Some of the basic assumptions underlying each of these perspectives are the following. With respect to the monetary approach: (1) there is full employment; (2) there is perfect arbitrage in the world markets, (3) money and other assets may exist, which are close substitutes for domestic and foreign goods or assets. This approach has also been called the "global monetarist" (Whitman, 1975). The Keynesian view has the following assumptions: (1) there is unemployment, (2) price sluggishness, (3) and money is a close substitute for other assets, (Whitman 1975). According to the Monetarist view, increases in the money supply propel real balances above levels considered optional by economic agents, resulting in increased expenditure out of a given income thus stimulating imports and causing the trade balance to deteriorate. In essence, the monetary approach argues that changes in nominal exchange rate can have only temporary effect and that there will be no long-run equilibrium relationship between the trade balance and the real exchange rate (Salasevicius and Vicious, 2003). In effect, co integration analysis for trade balance-exchange rate relationship need not yield any long-run -relationship between the two variables.

The Absorption Approach: emphasizes changes in real domestic income as a determinant of a nation's balance of trade and exchange rate relationship. It treats prices as constants and therefore all variables are in real term. This approach disaggregates expenditures into consumption (c), investment (i), government expenditure (g) and imports (m). The sum of these four expenditure variables is defined as the domestic absorption (a), which in equation form is expressed thus: $a = c + i + g + m$

The absorption approach, though a simple theory is of great assistance in understanding a nation's external sector performance in periods of economic contraction and expansions. For instance, if a nation experiences an economic contraction, does its current account balance necessarily improve and its currency definitely appreciate?. In the scenario of economic expansion, if the real income rises thereby increasing absorption, the direction of trade balance adjustment depends on the relative changes in the two variables. If real income rises faster than absorption, then the trade balance will be exposed to positive adjustment and vice-versa. On the whole, absorption approach stresses real income in trade balance and exchange rate determination and further suggests that relative changes in real income (output) and absorption, determine a nation's trade balance and exchange rate performance.

Empirical Literature

Since the breakdown of Breton Wood Accord in 1973, and the advent of floating exchange rates, there has been renewed interest on the effect of depreciation on the trade balance of both developed and developing countries. Exchange rate depreciation is said to have adverse effect on the trade balance first before resulting in an improvement, yielding a short-run pattern known as the J-curve effect. In the empirical economic literature, an important question has centered on the effects of trade balance to exchange rate depreciation. The literatures supporting the J-curve are mixed with some economists arguing that a possible way to improve trade balance would be through the depreciation of the real exchange rate. However, real exchange rate depreciation would only improve trade balance if the well-known Marshall Lerner (ML) condition subsists in the domestic economy, then in the long run the trade balances position would witness positive adjustment. This position is not supported by many empirical results.

Empirically, the evidence has been inconsistent in either rejecting or supporting the BRM or Marshall-Lerner conditions. In the vast number of cases where these conditions have been deduced, drawing primarily on data from developed countries, the testing procedure has relied on direct estimation of elasticities (see Artus and McGuirk, 1981; Artus and Knight, 1984; Krugman and Baldwin, 1987; Krugman, 1991). As is well known in the literature, estimated elasticities suffer problems ranging from measurability to identification. As a consequence, the evidence is suspect. Moreover, the results have been contradictory, depending on whether data from developed and developing countries are used (see Cooper, 1971; Kamin, 1988; Edwards, 1989; Paredes, 1989; Rose and Yellen, 1989; Rose, 1990, 1991; Gylfason and Radetzki, 1991; Pritchett, 1991; Bahmani-Oskooee and Alse, 1994).

With regard to lessons of experience, historical data for developed and developing countries have shown that devaluation may cause a negative effect on the trade balance in the short run but an improvement in

the long run; that is, the trade balance followed a time path which looked like the letter "J". The main explanation for this J-curve has been that, while exchange rates adjust instantaneously, there is lag in the time consumers and producers take to adjust to changes in relative prices (Junz and Rhomberg, 1973; Magee, 1973; Meade, 1988). In terms of elasticities, domestically, there is large export supply elasticity and a low short-run import demand elasticity. Moreover, the most recent literature on similar settings, which has used dynamic-general equilibrium models, has found that the trade balance is negatively correlated with current and future movements in the terms of trade (which are measured by the real exchange rate), but positively correlated with past movements (Backus 1994). This has been called the J-curve because of the asymmetric shape of the cross-correlation function for the trade balance and the real exchange rate.

Oyinlola, Adeniyi and Omisakin (2013) examined the long-run and short-run impacts of exchange rate and price changes on trade flows in Nigeria using exports and imports functions. The bounds testing (ARDL) approach to co integration was applied on a quarterly data from 1980Q1 to 2007Q4.This study employs an annual times series data as opposed to quarterly data.

Adeyemi ., Paul and Oluwatomsin . (2013) investigated the impact of currency devaluation on Nigeria trade balance using the Johansen co-integration and variance decomposition analyses from 1970-2010 with the following variables; domestic income, domestic and foreign money supply, domestic interest rate and nominal exchange rate. The absence of trade balance variable in the model casts doubt on the usefulness of this analysis.
Yasmina Guechari (2012) estimated the effects of Real Effective Exchange Rate (REER) on Algeria's trade balance (TB) with variables: Real effective exchange rate (REER), foreign income (Y*) and real domestic income (Y). This study used unit root tests, co-integration techniques, Error Correction Model (ECM) and impulse response function with time series data covering the periods of 1981Q1-2009Q4.The omission of export and import variables in a trade balance analysis is bound to produce an unrealistic estimation.

Ogbonna B.C (2010) focused on the relationship between the exchange rate and trade balance in Benin Republic for the period 1950 to 2008. The author employed co integration, vector error correction modeling (VECM) and causality tests to determine the long run, as well as short-run dynamics, between the exchange rate and the trade balance for Benin.

Data

The data for this study covered the period of 1986-2014 and were sourced from Central Bank of Nigeria Statistical Bulletin, Annual reports and Statement of Accounts various issues and online source from data.worldbank.org/indicators, all within the period under consideration.

III. Method of Analysis

In order to produce a meaningful estimate to determine the sustainability of the employed time series data we conducted a unit root test. When all variables were found to be stationery at first difference 1(1), we proceeded to investigate for possible long run relationship among the variables using Johansson co integration approach. Co integration equations were identified which led to the specification and estimation of VECM to enable us investigate both the long run and short run effect of the exchange rate depreciation. The long run causal effect was equally estimated and the diagnostic test for stability of the estimated model was concluded using cusum test, the Mackinnon (1991) critical value or residual procedure is adopted in this study.

Model Specification

Bickerdike (1920), Robinson (1947) and Metzler (1948) developed a model which has come to be known as the Bickerdike Robinson-Metzler (BRM) model, or the elasticity approach (EA) to the balance of trade. The focus of this view is the substitution effects in consumption (explicitly) and production (implicitly) induced by the relative price (domestic versus foreign) changes caused by a depreciation (Rincon 2013)
According to Rincon (2013) a sufficient condition for trade balances improvement, and drawing from it, for stability of the foreign exchange market under the model, is provided by the BRM condition.' Differentiating and putting the results in elasticity form; a general algebraic condition is derived." This condition relates the response of the trade balance to exchange rate changes and the domestic and foreign price elasticities of imports and exports:"

$$\frac{dB}{dE} = P_x X^s \left| \frac{(1+\varepsilon)\eta^*}{(\varepsilon+\eta^*)} \right| \quad \text{- } \lfloor(\varepsilon+\eta) \text{ .....1}$$

where ɳ and e denote the price elasticities (in absolute values) of domestic demand for imports and supply of exports. Analogously, ɳ* and l denote the respective foreign price elasticities. As can be shown, if B=O (initial equilibrium), then dB/dE> 0 if and only if

$$(\varepsilon+\eta\ )(\varepsilon\ +\eta) \quad \text{.....2}$$

Given the theoretical exposition of this study which is derived from the BRM model, the exchange rate shall be used as the independent/explanatory variable following the influence it has on balance of trade which is the dependent variable. Other explanatory variables adopted in this study include; foreign direct investment, given mathematically as:

BOT = f (EXR, FDI)……3

BOT= bo+b1 EXR +b2FDI+ Ut.....4

Where: BOT depicts balance of trade, bo = coefficient of intercept or constant, b1…b4 = coefficients of the employed independent variables

EXR means exchange rate and FDI denotes foreign direct investment

UT = Variables not included in the model.

IV. Empirical Results and Discussion

This segment is centered on the result for data analysis. Data analysis involves working to reveal model and trends in data sets while interpretation involves explaining those model and trends. Data analysis is considered an important step and it is the heart of the research in any research work. When data has been collected with the assistance of relevant tools and methods, the next logical step, is to analyze and interpret the data with a view to arriving at empirical solution to the problem. Hence, the results for the analysis are presented below.

Unit Root Test

The Augmented Dickey-Fuller (ADF) and Philip Perron (PP) formulae were employed to test for the existence of unit roots in the data using trend and intercept. The results are presented in table one below.

Table 2: Augmented Dickey Fuller Unit Root Test

Trend and Intercept @ Levels

Series	ADF Test Statistic	5% critical values	10% critical values	Remarks
BOT	-1.069579	-3.5806223	-3.225334	Not Stationary
EXR	-2.250966	-3.5806223	-3.225334	Not Stationary
FDI	-1.710040	-3.5806223	-3.225334	Not Stationary

Sources: Researcher's compilation from E-view (version 7.0)

Table 3: Phillips-Perron Unit Root Test

Trend and Intercept @ Levels

Series	PPTest Statistic	5% critical values	10% critical values	Remarks
BOT	-1.472441	-3.5806223	-3.225334	Not Stationary
EXR	-2.250966	-3.5806223	-3.225334	Not Stationary
FDI	-1.710040	-3.5806223	-3.225334	Not Stationary

Sources: Researcher's compilation from E-view (version 7.0)

Table 4: Augmented Dickey Fuller Unit Root Test

Trend and Intercept @ 1st Difference

Series	ADF Test Statistic	5% critical values	10% critical values	Remarks
BOT	-4.202682	-3.587527	-3.229230	Stationary
EXR	-4.780034	-3.587527	-3.229230	Stationary
FDI	-3.939473	-3.587527	-3.229230	Stationary

Sources: Researcher's compilation from E-view (version 7.0)

Table 5: Phillips-Perron Unit Root Test

Trend and Intercept @ 1st Difference

Series	PP Test Statistic	5% critical values	10% critical values	Remarks
BOT	-4.239558	-3.587527	-3.229230	Stationary
EXR	-4.780034	-3.587527	-3.229230	Stationary
FDI	-3.939473	-3.587527	-3.229230	Stationary

Sources: Researcher's compilation from E-view (version 7.0)

Cusum Test

The Structural stability test of the model was conducted using the Cumulative Sum of recursive residuals (CUSUM) test. This is necessary in view of the fact that stability of model will determine the extent to which we can make forecast concerning behavior of the variables in the model.

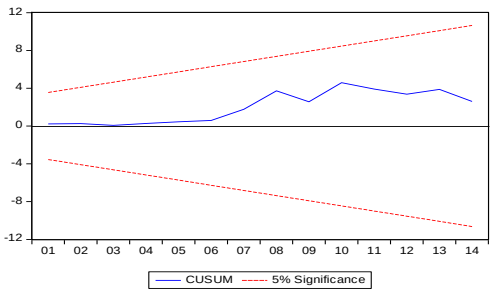

Figure 3: Test of structural Stability

Co-Integration Test

This technique is employed to testing for the presence of co integration between the series of the same order of integration through forming a co integration equation. The basic idea behind co integration is that if, in the long-run, two or more series move closely together, it is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary. Lack of co integration implies that such variables have no long-run relationship.

Table 6: Johansen co-integration test for the series; BOT, EXR and FDI

Unrestricted Co integration Rank Test (Trace)

Unrestricted Co integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.720361	68.98113	29.79707	0.0000
At most 1 *	0.686203	37.12477	15.49471	0.0000
At most 2 *	0.278182	8.149559	3.841466	0.0043
Trace test indicates 3 co integrating eqn(s) at the 0.05 level				
Unrestricted Co integration Rank Test (Maximum Eigen value)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.720361	31.85636	21.13162	0.0011
At most 1 *	0.686203	28.97521	14.26460	0.0001
At most 2 *	0.278182	8.149559	3.841466	0.0043
Max-Eigen value test indicates 3 co integrating eqn(s) at the 0.05 level				

Under the Johansen Co-integration Test, there are three co-integrating equations. In Johansen's Method, the trace statistic determines whether co-integrated variables exist. It was also confirmed by the Max-

Eigen Statistic.

Vector Error Correction Mechanism (VECM)

The presence of long run equilibrium relationship among the variables as found from the Johansen co integration led to the application of VECM. With this approach, both the long run equilibrium and short run dynamic relationships associated with variables under study is established.

Table 7: VECM SYSTEM EQUATION

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.994993	0.235169	-4.230978	0.0008
C(2)	0.792561	0.220305	3.597555	0.0029
C(3)	0.965630	0.212416	4.545945	0.0005
C(4)	0.541426	0.201853	2.682284	0.0179
C(5)	-3019.051	9316.688	-0.324048	0.7507
C(6)	-34859.82	9602.171	-3.630410	0.0027
C(7)	-25085.92	10947.40	-2.291495	0.0380
C(8)	2.178963	2.413366	0.902873	0.3819
C(9)	3.606446	2.555713	1.411131	0.1800
C(10)	-6.302391	2.747789	-2.293623	0.0378
C(11)	385754.5	170595.8	2.261219	0.0402

R-Squared = 0.757288, F-Statistic = 4.368, Prob (F-Statistic) = 0.006346, DW = 2.31

The existence of co integration among the variables as indicated above presents an evidence of long-run economic relationship among the variables. This implies that, vector error correction model is the best option for further analysis. It captures both the long run equilibrium and short run dynamic relationships associated with the above results.

Granger Causality Test

With this test, the pair-wise relationships between the estimated variables are ascertained. Thus the table is presented below:

Table 8: VEC Granger Causality

Dependent variable: D(BOT)			
Excluded	Chi-sq	Df	Prob.
D(EXR)	17.04292	3	0.0007
D(FDI)	10.71178	3	0.0134
All	22.88834	6	0.0008

Test of Research Hypotheses

Hypothesis testing is the use of statistics to determine the probability that a given hypothesis is true or not. Thus, in testing the first hypothesis, trace statistics of the Johansen co integration test is employed. In the second hypothesis, P-value of the F-statistic in Wald test is used while in testing the third hypothesis, P-value of the F-statistic in Granger causality is used.

Hypothesis I

There exist no significant long-run relationship existing between exchange rate depreciation and trade balance in Nigeria.

Decision Rule: If the trace statistic is greater than 0.05 critical values, the null hypothesis is rejected and it is concluded that there is existence of long run association among the variables under study.

The statistical test for the first hypothesis is trace statistics. This is found in the Johansen co integration test. The trace statistics [68.981 > 29.79707], [37.125 > 15.49471] and [8.149 > 3.841466]. Since the trace

statistics are greater than the 0.05 critical values respectively, we conclude that there is significant long-run relationship existing between exchange rate depreciation and trade balance in Nigeria within the period under study.

Hypotheses II

Exchange rate depreciation has no significant effect on trade balance in Nigeria, within the period under review.

Decision Rule: If the chosen level of significance (0.05) is greater than the P-value, the null hypothesis is rejected and it implies that the estimated variable has significant impact on the dependent variable.

Table 9: Wald Test			
Equation: Untitled			
Test Statistic	Value	Df	Probability
F-statistic	5.680975	(3, 14)	0.0093
Chi-square	17.04292	3	0.0007
Null Hypothesis: C(5)=C(6)=C(7)=0			

Observe that F-test has a p-value of 0.0093 is less than any alpha (0.05) level of significance. We can reject the null hypothesis, implying that $C(5)=C(6=C(7)) \neq 0$. Meaning that combining influence of D(EXR(-1)), D(EXR(-2)) and D(FDI(-3)) in the short run impact on BOT. Thus, exchange rate depreciation has no significant effect on trade balance in Nigeria, within the period under review.

Hypotheses III

There is no significant causality existing between exchange rate depreciation and trade balance in Nigeria.

Decision Rule: If the chosen level of significance (0.05) is greater than the P-value, the null hypothesis is rejected and it implies that there is causality which runs within the variables.

The statistic for EXR => BOT is 17.04 and its P-value is [0.0007]. The statistical value for causality from FDI => BOT is 10.71 while its P-value is [0.0134]. The causality that runs from [EXR=>BOT] is statistically significant as confirmed by P-value [0.0007]. More so, the causality from [FDI=>BOT] is also statistically significant. This is confirmed by their P-values respectively. Therefore, there is significant causality existing between exchange rate depreciation and trade balance in Nigeria.

V. Conclusion

It was found that there existed significant long-run relationship between exchange rate depreciation and trade balance in Nigeria. This implies that in the long run exchange rate depreciation will significantly influence balance of trade. In the short run, it was also found that exchange rate will significantly affect BOT. Thus, both in the short and long run, exchange rate depreciation significantly impacted on BOT within the period under study. In the VECM result, it was seen that any increase in the depreciation of Naira with respect to dollar will bring about a fall in the balance of trade. This implies that depreciation cannot improve the trade balance in the Nigerian economy in the short run as depreciation can only benefit countries that are originally export based before the depreciation of a currency. This was evident in a period, two and three year lag of EXR. It is estimated from a year period lag of C (8) that N1 increase in FDI, will bring about N2.18k increase in balance of trade (BOT). The result shows that a rise in foreign direct investment (FDI) will promote trade in the economy.
The causal relationship between BOT and EXR indicated that exchange rate granger cause balance of trade. This implies that exchange rate variable influence balance of trade in the economy. This was ascertained likewise in the relationship between BOT and FDI. The causality runs from FDI to BOT. It denotes the influence of FDI on BOT within the period under study.

Based on the findings, the study makes the following recommendations;
To retain the continuous long run relationship among BOT and other explanatory variables (EXR, FDI), effort should be made through the use of appropriate policy instruments to diversify sources of foreign exchange in the country so as to sustain such positive relationship in the long run.

Since, it was seen that any increase in the depreciation of Naira with respect to dollar will bring about a

fall in the balance of trade, Government should discourage further depreciation of the naira as this is unfavourable to the economy The result shows that a rise in foreign direct investment (FDI) will promote trade in the economy; hence Government should encourage foreign direct investment by improving on local security, revitalizing our power sector and other social services that can attract foreign investment.

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