



FFECT OF FOREIGN EXCHANGE RATE INSTABILITY ON BALANCE OF PAYMENT POSITION IN NIGERIA

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Abstract

The focus of this study is on the impact of the instability of foreign exchange rate on the balance of payment (BOP) position in Nigeria. This has become important since the instability of the exchange rate has been mostly blamed for the unfavourable BOP position in Nigeria. The main objective is thus to empirically ascertain the link between foreign exchange instability and the BOP. The study covered the period between 1980 to 2021. The co-integration and it's error correction model (ECM) framework was adopted for the study. The findings revealed that the exchange rate variability (EXRV) had a negative and significant impact on the BOP. Openness of theeconomy (OPEN) had a positive and insignificant impact on the BOP. The statistical significance of the ECM shows a satisfactory speed of adjustment. The study therefore recommended from our findings, amongst others, that the monetary authorities should adopt more unconditional foreign exchange rate management policies

Keywords: Foreign exchange rate instability; Balance of payment position, Openness of the economy, Co-integration, Error Correction Model

Introduction

The concept of exchange rate is concerned with the value of one currency compared to another. In order words, it is the number of units of one currency which may be bought or sold for one unit of another currency. (Hartzell, 2006; Wilkinson, 2007) Exchange rate may be as well appropriately considered as the price of one currency to another. This is because the exchange rate of all currency can be easily determined, like other prices, by the forces of demand and supply. Obviously such forces of demand and supply are determined by whether the economy's basic balance of payments position is in deficit or surplus. (Pearce, 1986)

Another point of view of exchange rate is that of the monetarist which sees exchange rate not as a price equating the flow of demand and supply of currencies to one another, but the relative price of the individual currencies to one another, such that any factor influencing the value of each of the currency will as well influence the international exchange rate of the currency. One of such major factor capable of influencing the value of any currency is expansionary monetary policy, which is more commonly embark upon by developing economies such as Nigeria, thereby expanding the domestic money supply astronomically, and consequently, the value of the exchange rate of such domestic currency will be drastically eroded relatively to the exchange rate of major international currencies. (Pearce, 1986)

The value of one currency can appreciate or depreciate against the value of another currency. For instance, if the exchange rate of the Nigeria Naira and the United States of America (US) dollar falls, the value of the Naira will appreciate against the US dollar, this is because the number of the Naira that will be needed to obtain one US dollar will be reduced relative to the change in the exchange rate. Thus, the appreciation of one currency against the other, implies a depreciation of the other currency relatively. In a free market condition determination of the exchange rate is a function of the forces of demand supply. The equilibrium exchange rate is that rate at which the balance of payment between two economies is at equilibrium over a particular period of time or the rate at which the supply of foreign exchange is equal to the demand for foreign exchange at that particular period of time. (Jhingan, 2003) In view of the foregoing analysis, the focus of this study is on the effect of the movement, volatility or instability of the Naira exchange rate on the Nigerian balance of payments position in relation to the currencies of other major economies in the international financial system, for the period under review.

State of Problems

As aforesaid, determination of exchange rate, in a free market condition, is a function of the forces of demand and supply. Obviously, the concept of the function of demand and supply is also a function of the rate or level of import and export attainable in an economy. An economy that is import dependent, for instance, as the Nigerian case, the Naira is always in pursuit of other currencies in order to effect payments or settlements of financial obligations incurred in respect of the imports of goods and services from the international market. In the early or first republic, the value of the Nigerian pound was equal or at par with the British pound and was higher relatively than the US dollar. That was when the Nigerian economy was export based. The major export products then include: Cocoa, Groundnut, Palm oil, Palm kernel, Rubber, Hide and Skin, etc. However with the advent of crude oil in the

early 60s, all attentions were diverted to the oil sector, to the shameful neglect of the sectors producing the export products of the economy. Today the Naira has become a weeping child to all major currencies in the international financial system and markets. Prices of both foreign and local products and services has skyrocketed due to the weakness of the Naira against all major international currencies, as the exchange rate and the value of the Naira is increasingly decreasing or depreciating at increasing rate each and every day. The thought of the effect of the present condition of the Naira exchange rate on the Nigerian balance of payment (BOP) position appears to be frightening. Thus the importance of this study cannot be overemphasized.

Objectives of the Study

The general and specific objectives of this study include:

- a) To determine the effect of exchange rate on the balance of payment position in Nigeria.
- b) To ascertain the effect of exchange rate volatility on the balance of payment position in Nigeria.
- c) To evaluate the effect of openness of the Nigerian economy on the balance of payment position in Nigeria.

Research Hypotheses

These include:

- a) Exchange rate has no significant effect on the balance of payment position in Nigeria.
- b) Exchange rate volatility has no significant effect on the balance of payment position in Nigeria.
- c) Openness of the Nigerian economy has no significant effect on the balance of payment position in Nigeria.

Review of Related Literature

Conceptual Framework

The relationship between the exports and imports of an economy with other economies is what defines its **Terms of Trade**. It is the price ratio between exports and imports as expressed in a form which is known as **Terms of Trade Index**. In other words, it is the rate at which products of an economy are exchanged with the products of other economies across the globe. In the same manner, **Balance of Trade** refers to the relationship between the visible import and visible export of an economy. The visible imports are tangible products, where the value of the visible imports are less than the value of visible exports, the **Balance of Trade** is considered favourable and vice versa. (Mayuku & Iboma, 2007)

Balance of Payments on the other hand is on the consideration of the values of the visible including invisible import and exports of an economy. It shows the relationship between total receipts and payments of an economy in financial flow with other economies globally. When total receipts are in excess of total payments, then **Balance of Payments** is considered **Favourable Balance of Payment** Position and vice-versa. When total receipts are less than total payments, it indicates a deficit in the balance of payment, while if total receipts are in excess of total payments, it's an indication of a surplus in the balance of payment, which is a favourable balance of payment position. (Mayuku & Iboma, 2007)

Theoretical Framework

According to Jhingan (2003) The theories of determination of exchange rate are mainly or popularly three and are hereunder discussed briefly.

These include:

- a) The Purchasing Power Parity Theory
- b) The Mint Parity Theory
- c) The Balance of Payment Theory

a) The Purchasing Power Parity Theory

This theory is of the view that the equilibrium exchange rate between two inconvertible paper currencies is a function of the equality of the relative change in relative prices in the two economies. This implies that the exchange rate is determined by the relative price changes in both economies. This theory is in two versions known as the Absolute and the Relative versions. To the Absolute Version, the exchange rate in currencies of two economies is equal to the ratio of the price indexes in the two economies. While to the Relative Version, the exchange rate is at the point where the equality between the respective purchasing powers of the two economies is expressed.

b) The Mint Parity Theory

This theory is concerned with the working of the international gold standard. To this theory, the value of any currency must be equal to weight of gold that the Central Bank of the economy would be ready to buy and sell the currency. It is therefore valued at the rate which the currency could be readily converted to gold without any significant loss of value.

c) The Balance of Payment Theory

This theory is concerned with the demand for supply of foreign exchange by an economy. When the balance of payment position of an economy is favourable, the exchange rate of the currency appreciates. And the exchange rate depreciates when the economy's balance of payment position is unfavourable in turn. Thus the exchange rate and the value of the currency of an economy is a function of balance of payment position of the economy.

Each of these theories have their advantages and disadvantages. However, the theory upon which this study is anchored, is the balance of payment position theory.

Empirical Review

Adelegan, Abiodu & Abraham (2022) Examined the long-term factors that influence Nigeria balance of payments, using the Autoregressive Distributed Lag Model (ARDL). The results showed that the exchange rate coefficient was negative, whereas the short-term results showed a positive value. Also, the coefficients of FDI, GDP growth, interest rates and crude oil prices were positive and significant.

Iheanachor & Ozebge (2021) Examined the effects of persistent exchange rate fluctuations on Nigeria economic performance. It was motivated by the quest to ascertain why concerted efforts of the monetary authorities in Nigeria to pursue internal and external balances yielded little or no positive results in recent periods. The study employed the Autoregressive Distribution Lag (ARDL) technique to test the short-run and long-run effects of exchange rate fluctuations on economic growth using annual time series data from 1986 – 2019. Findings showed that the exchange rate, net direct foreign investments and inflation rate had a significant adverse impact on Nigeria's economic growth in the long run. By implication, the net effect of this study established that excessive exchange rate fluctuations are detrimental to Nigeria's economic growth.

Nwachukwu (2021) Examined the impact of exchange rate on balance of payments in Nigeria. The data used for the study were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin for the period of 1981 – 2019. The Vector Error Correlation Mechanism (VECM) was used to analyze the data. Findings showed that there is a positive relationship between balance of payments and exchange rate in Nigeria. This implies that exchange rate has a significant impact on balance of payment position in Nigeria.

Nwobia, Ogbonna & Okoye (2020) Examined the effect of exchange rate fluctuation on Nigeria external trade for the period 2000 to 2019. The study made use of secondary data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin for the period under review. The data were analyzed using correlation and regression analysis of the Ordinary Least Square (OLS) technique. Findings showed that the three variables, exchange rate, balance of payment, and inflation rate have significant effect on the Gross Domestic product (GDP) and the external trade of Nigeria. Exchange rate has a negative effect on the GDP because as it increases, the external trade is also being negatively affected.

Etale & Ochuba (2019) Studied the effect of exchange rate volatility and trade balance on economic growth in Nigeria. The study used time series secondary data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin for the period of 2000 to 2017. Descriptive statistical and multiple regression analysis based on the EViews 10.0 software techniques was used for the analysis of data. Findings showed that exchange rate had an insignificant positive effect on the gross domestic product. While inflation had a negative but insignificant effect on the gross domestic product. Aidi, Suleiman & Saidi (2018) Investigated the relationship between exchange rate, inflation and balance of payments in Nigeria using yearly time series data spanning between 1986 to 2015. The study adopted the Ordinary least Square (OLS)

technique to analyze the data. Findings revealed that exchange rate and inflation have statistically significant negative impacts on the balance of payment. The result also showed that domestic credit, money supply and RGDP are statistically significant drivers of balance of payment in Nigeria for the period under review.

Nwanekezie & Oyiro (2018) Investigated the impact of exchange rate volatility on balance of payment in Nigeria for the period 1981 to 2016. The study utilized aggregate annual data. The data were analyzed using co-integration and Error correction (ECM) method. Findings showed that the systematic variation in the dependant variable (BOP) is explained by four independent variables which include nominal exchange rate, inflation rate, real interest rate and government expenditure. The result also revealed that there is a long-run relationship between exchange rate and balance of payment (BOP) volatility for the period under review.

Materials and Methods

The model used in analyzing the effect of foreign exchange instability on the BOP is stated below:

$$BOP = F (EXR, EXRV, OPEN) \quad (1)$$

This could be expressed in a linear form below:

$$BOP = \alpha_0 + \alpha_1 EXR + \alpha_2 EXRV + \alpha_3 OPEN + et \quad (2)$$
$$\alpha_1 \geq 0, \alpha_2 \geq 0, \alpha_3 > 0$$

Where:

BOP = Balance of Payment

EXR = Exchange Rate

EXRV = Exchange Rate Volatility

OPEN = Openness

et = error term

α_1, α_2 & α_3 = parameters to be estimated.

The co-integration technique and its implied Error Correction mechanism (ECM) was used in analyzing the data. The analysis commence with the descriptive statistics which was closely followed by the correlation matrix. The Augmented Dickey Fuller (ADF) unit root test was used to assess whether the variables are stationery or not and their order of integration. The Johansen Co-integration test was adopted to assess whether a long run relationship exists among the variables. The trace statistics and the Max-Eigen statistics were used in this regard. The ECM was used to analyse the short run dynamics. The various diagnostic checks and the impulse response test also forms part of this section.

Results and Findings

The results used for the descriptive statistics is shown in table 1 below:

Table 1: Descriptive Statistics

	LBOP	LEXR	LEXRV	OPEN
<i>Mean</i>	7.423441	3.582935	2.919516	0.481429
<i>Median</i>	8.053060	4.664490	2.952027	0.465000
<i>Maximum</i>	15.13412	5.959458	3.813307	0.880000
<i>Minimum</i>	1.000000	-0.604404	0.530628	0.160000
<i>Std. Dev.</i>	4.804369	1.990890	0.634431	0.162969
<i>Skewness</i>	-0.149941	-0.809324	-1.150714	0.005926
<i>Kurtosis</i>	1.696448	2.453928	5.917995	2.525499
<i>Jarque-Bera</i>	3.131060	5.106872	24.16971	0.394260
<i>Probability</i>	0.208977	0.077814	0.000006	0.821084

Source: Author's Computation

The mean for BOP is 7.42 and the median is 8.05, which implies a deteriorating BOP in the study period. The maximum value is 15.13 and the minimum value is 1.00. The standard deviation is 4.80 which is satisfactory. The mean for EXR is 3.58 and the median is 4.66 which depreciated in most of the study period. The maximum values for EXR are 5.96 and -0.60. The standard deviation of 1.99 shows a minimum discrepancy. The average values for EXRV are 2.92 and the median is 2.95. The highest and lowest values for EXRV are 3.81 and 0.53 respectively. The standard deviation of 0.63 did not show significant discrepancy. The average value of OPEN and the median are 0.48 and 0.47 respectively indicating that the country engaged more liberal trade during the study period. The maximum value is 0.88 while the minimum value is 0.16. The standard deviation of 0.01 is satisfactory. The skewness indicates that the series is skewed to the left implying that it has a long right tail. The Kurtosis indicates that it is only the OPEN that satisfies the condition with expected value of 3. The Jarque-bera test with probabilities of greater than 5 percent in most cases indicates that the residuals are normally distributed.

The result of the Correlation analysis is shown in table 2 below:

Table 2: Correlation Matrix Result

	LBOP	LEXR	LEXRV	OPEN
<i>LBOP</i>	1	0.14053135269	0.02512766557	0.23580963103
<i>LEXR</i>	0.14053135269	1	0.11613481856	0.56452777217
<i>LEXRV</i>	0.02512766557	0.11613481856	1	- 0.14287324479
<i>OPEN</i>	0.23580963103	0.56452777217	- 0.14287324479	1

Source: Author's Computation

The BOP has a positive and low correlation with the EXR with a co-efficient of 0.14. The correlation co-efficient between BOP and EXRV is 0.03 which is a low and positive correlation. The correlation coefficient between OPEN and BOP is 0.24 which is also a low and positive correlation on the average. The result of the correlation matrix shows that there is no serial correlation among the variables. The result of the static long run result is shown in table 3 below:

Table 3: Summary of Static Long Run OLS Result: Dependent Variable: LBOP

<i>Variable</i>	Coefficient	Std. Error	t-Statistic	Prob.
<i>LEXR</i>	0.213794	0.081912	2.610056	0.0120
<i>LEXRV</i>	-7.763426	0.553495	-14.02619	0.0000
<i>OPEN</i>	7.324695	5.810775	1.260537	0.2152
<i>C</i>	2.598492	4.577611	0.567652	0.5736

$R^2 = 0.86$, Prob (F Stat) = 0.0000, DW Stat = 2.05

Source: Author's Computation

The R^2 which is the coefficient of determination indicates that 80 percent of the total variation in the BOP has been explained by the EXR, EXRV and OPEN taken together. This is a good fit since the variations explained outside the model is just 1.4 percent. The result indicates that the EXR has a positive relationship with the BOP by 0.21 units. The instability of the exchange rate (EXRV) has a negative impact on the BOP. An increase in the EXRV by 1 unit worsened the BOP by 7.76 units. The OPEN has a positive impact on the BOP. An increase in the OPEN by 1 unit improved the BOP by 7.60 units. The result indicates that the EXR with t value of 2.61 and probability of 0.0121 is statistically significant. The EXR and the OPEN with t values of 2.61 and 14.03 with probability of 0.0120 and 0.0000 are statistically significant in explaining the change in the BOP. The DW statistic with a value of 2.05 show no evidence of first order serial correlation in the model.

The result of the ADF unit root test is shown in table 4 below:

Table 4: ADF Unit Root Test Result

<i>Variables</i>	Level Data	First Difference	Order of Integration
<i>BOP</i>	-1.88	-8.17°	I (1)
<i>EXR</i>	-2.29	-5.40°	I (1)
<i>EXRV</i>	-1.96	-6.97°	I (1)
<i>OPEN</i>	-1.74	-9.66°	I (1)

NB:

- 1, 5 and 10 percent critical values are -3.61, -2.94 and -2.61
- °, °° and °°° indicates stationery at the 1 percent, 5 percent and 10 percent levels
- I (I) is order of integration

Source: Author's Computation

The result indicates that all the variables were originally non-stationery, they however become stationery after the first difference was taken. All the variables were stationery at the 1 percent level. This paves way for the Johansen Co-integration Test analysis.

The result of the Johansen Co-integration test is shown in table 5 below:

Table 5: Summary of Johansen Co-integration Test Result

<i>Hypothesized CE(s)</i>	<i>No. of Eigen value</i>	<i>Trace Statistic</i>	<i>0.05 Critical Value</i>	<i>Prob. **</i>
<i>None</i>	0.394852	49.47635	47.85613	0.0454
<i>At most 1</i>	0.202410	17.38504	29.79707	0.6115
<i>At most 2</i>	0.137949	8.338621	15.49471	0.4299
<i>At most 3</i>	0.058259	2.400995	3.841466	0.1213

<i>Hypothesized No. of CE(s)</i>	<i>Eigen value</i>	<i>Max-Eigen Statistic</i>	<i>0.05 Critical Value</i>	<i>Prob. **</i>
<i>None</i>	0.394852	29.09131	27.58434	0.0349
<i>At most 1</i>	0.202410	9.046422	21.13162	0.8287
<i>At most 2</i>	0.137949	5.937626	14.26460	0.6212
<i>At most 3</i>	0.058259	2.400995	3.841466	0.1213

Source: Author's Computation

The result of the Johansen Co-integration test as shown by both the trace statistic and the max-eigen statistic indicates the existence of a long run equilibrium relationship among the variables. The result thus allows us to estimate the parsimonious and over parameterized ECM models. The result of the over parameterized ECM is shown in table 6 below:

Table 6: Summary of Over Parameterized ECM. Dependent Variable: LBOP

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
<i>LEXR</i>	0.788283	0.125185	6.296956	0.0000
<i>LEXR(-1)</i>	0.913460	4.581157	0.199395	0.8433
<i>LEXR(-2)</i>	-0.839819	3.064509	-0.272047	0.7859
<i>LEXRV</i>	-0.421072	1.779816	-0.236582	0.8146
<i>LEXRV(-1)</i>	-676805.2	181606.0	-3.726778	0.0011
<i>LEXRV(-2)</i>	0.917427	1.667625	0.550140	0.5863
<i>OPEN(-1)</i>	-2.850553	8.346799	-0.341514	0.7351
<i>OPEN(-2)</i>	8.369940	8.693294	0.962804	0.3433
<i>ECM(-1)</i>	-0.336929	0.087377	-3.856037	0.0006
<i>C</i>	1.228186	7.448932	0.028940	0.9771

$R^2 = 0.85$, AIC = 6.32, SC = 6.75, DW = 2.05

The parsimonious or preferred ECM model was gotten by deleting the insignificant variables from the over parameterized ECM and the model re-estimated. The Akaike Information Criterion (AIC) and the Schwarz Criterion (SC) will help in determining the appropriate lag length. The result of the parsimonious ECM is shown in table 7 below:

Table 7: Summary of Parsimonious ECM Result. Dependent Variable: LBOP

<i>Variable</i>	Coefficient	Std. Error	t-Statistic	Prob.
<i>LEXR</i>	2.349655	0.539483	4.355383	0.0002
<i>LEXRV(-1)</i>	-0.776944	0.152439	-5.096760	0.0001
<i>OPEN</i>	6.048979	5.922141	1.021418	0.3139
<i>ECM(-1)</i>	-0.153421	0.067894	-2.259704	0.0341
<i>C</i>	1.228186	4.619578	0.265865	0.7919

$R^2 = 0.85$, AIC = -6.06, SC = -6.27, DW = 2.02

Source: Author's Computation

The R^2 indicates that 84 percent of the total variation in the BOP has been explained by the EXR, EXRV (-1), and OPEN taken together. This is good enough with unexplained variations of 16 percent. The coefficients indicate that the EXR has a positive relationship with the BOP. A depreciation of the exchange rate by 1 unit improved the BOP by 2.35 units. EXRV has a negative impact on the BOP. An increase in the EXRV by 1 unit reduced the BOP by 0.78 units. This result insinuates that foreign exchange instability worsens the BOP condition of Nigeria.

Test of Hypotheses

The t-Statistic indicates that the EXR with a value of 4.36 with probability of 0.002 is statistically significant in explaining the changes in the BOP. This result indicates the validation of the alternative hypothesis of a significant relationship between the EXR and the BOP. The EXRV has a t value of -5.10 and probability of 0.0001 indicates that the EXRV is statistically significant is explaining the changes in the BOP. An indication of the validation of the alternative hypothesis that foreign exchange instability has a significant impact on the BOP. The OPEN has a t value of 1.02 and probability of 0.3139 indicates that OPEN is statistically significant in explaining the changes in the BOP. This suggests a validation of the alternative hypothesis that the liberalization of trade through more openness of the economy has not significantly improved the BOP. The statistical significance of the ECM shows a satisfactory speed of adjustment. It shows that 15 percent of the errors are corrected in each period.

The result of the diagnostic checks are shown in table 8 below:

Table 8: Summary of Diagnostic Checks Result

	F Statistic	Probability
<i>Jarque-bera</i>	3.68	0.1589
<i>Breusch-Godfrey</i> <i>Serial</i> <i>Correlation LM test</i>	1.91	0.1637
<i>Harvey Heteroskedasticity test</i>	1.68	0.6901

Source: Author's Computation

The result of the jarque-bera normality with an F value of 3.68 and probability of 0.15894 indicate the validation of the hypothesis that the residuals are normally distributed. The result of the Breusch-Godfrey Serial Correlation LM test indicates the validation of the hypothesis that the residuals are not serially correlated. The result of the Harvey heteroskedasticity with probability of 0.6901 indicates the acceptance of the hypothesis that the residuals are serially correlated.

Conclusion

Striking a balance between a favourable and a stable exchange rate has created a challenge for policy makers over the years. This is why countries in both the industrialized and developing countries have been paying special attention to exchange rate management. The industrialized world has achieved a reasonable fit in this regard while the developing countries particularly in Africa, Nigeria inclusive are still battling with foreign exchange management. The monetary authorities in Nigeria which include the CBN and the ministry of finance has been ineffective in this regard since they focus on what we can simply described as window-dressing. This is because they merely attempt to manage foreign exchange fluctuation rather than taking the core issue of increasing in productivity that would have gone a long way to stabilize the exchange. Our result using co-integration framework concludes that the instability in the foreign exchange has hindered and deteriorated the BOP position of Nigeria. The findings also enable us to conclude that a depreciation of the exchange rate, if well managed could improve the BOP position of Nigeria.

Recommendation

On the basis of the study we therefore recommend as follows:

- a) That the CBN should adopt unconventional foreign exchange management policies instead of copying everything from the IMF and World Bank hook-line and sinker.
- b) The CBN should match exchange rate devaluation to increased productivity which will facilitate the maximum benefit from such devaluation through lower exports prices.

- c) The monetary authorities should adopt exchange rate targeting policies. This will reduce the instability of the foreign exchange.

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