

EXCHANGE RATE MOVEMENT AND NIGERIA'S CURRENT ACCOUNT

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DOI: 10.29816/sjss.8.2.1

ABSTRACT

The empirical evidence from literature on the link between exchange rate behavior and macroeco The study examines the effect of exchange rate movements on the current account component of balance of payments in Nigeria from 1980 to 2015. The data used for the study were from the Central Bank of Nigeria Bulletin. The study employed Error Correction Model (ECM) and Fully Modified Ordinary Least Square (FMOLS) to show the effect of exchange rate on the current account component of Nigeria's balance of payments. Our results show that exchange rate has positive but insignificant effect on the current account. Thus, it is imperative to stimulate production and consumption in the domestic economy through availability of domestic credit and market determined interest rate.

Keywords: Exchange rate, domestic credit, external reserve, balance of payments

JEL: C22, F31, F32, F41

Introduction

Exchange rate is a fundamental macroeconomic variable that guides investors in economic transaction and in their relationship with other trading partners. Exchange rate refers to the price of one currency (the domestic currency) in terms of another (the foreign currency) (Odili, 2007). The exchange rate between two currencies indicates the value or worth of one currency in terms of the other.

The balance of payments on the other hand is a country's state of affairs in international trade and transaction (Beatrice, 2001). An inextricable relationship therefore

exists between exchange rate and balance of payments. Consequently, nations in the pursuit of macroeconomic goals of healthy external balances as reflected in their balance of payments (BOP) positions, find it imperative to formulate and implement an exchange rate policy that would bring about the realization of these macroeconomic goals. Prior to 1986, Nigeria was on a fixed exchange rate system and the Naira was very strong in reference to dollar. The exchange rate was one naira to one U.S dollar. However, the fixed exchange rate determination system paved way a flexible exchange rate regime in September 26, 1986

due to increasing demand for foreign exchange and the inability of the exchange control system to develop an appropriate mechanism for foreign exchange allocation under the Structural Adjustment Programme (SAP) (Odili,2007).

Following the introduction of the Structural Adjustment Programme (SAP), exchange rate was subject to the market forces of demand and supply indicating that the monetary authority does not intervene in the determination of exchange rate. In practice, no exchange rate is clean or pure float, but rather the prevailing system is the managed float whereby monetary authorities intervene periodically in the foreign exchange market in order to achieve specific macroeconomic objectives. For several years, the Nigerian economy witnessed high volatility in foreign exchange dynamics, which aggravated the nation's balance of payments. Currently, the nation's exchange rate has fallen and has since been fluctuating. This so far has been due to unfavourable nation of the competing powers of the nation's currency and the currencies of the world. The economy for a long time has been struggling to resolve the problems of internal and external imbalances. This has manifested in the disequilibrium in her balance of payment while causing a balance of payment deficit (Odili,2014). Thus, adequate foreign exchange is required in the economy for the servicing of external debts, importation of raw materials, machines and spares and upgrading of industrial infrastructure for sustainable development. Against this backdrop, the concern of many scholars and economy watchers has to do with the fluctuations of foreign exchange, being contingent on the market forces of demand and supply, as well as their critical linkages with balance of payments. Additionally, given the fact that Nigeria is still fulfilling a number of loan obligations to international financial

organizations, it is quite apt and imperative to examine how movements in the country's exchange rate affect the current account component of the balance of payments. Thus, contrary to earlier studies, the objective of this paper is to specifically examine the effects of exchange rate on current account in Nigeria.

The remainder of the paper is organized as follows. Following section one is section two which deals with the literature review. In Section three, the methodological framework of the study is pursued while the empirical results are discussed in section four. Section five concludes the paper.

Literature Review

Plethora of studies exists on the relationship between exchange rate and balance of payments. In spite of the vastness of these studies, the effect of exchange rate on balance of payments remains dimly discerned.

Onafowara (2003) investigates the effect of real exchange rate changes on trade balance in three Asian countries namely Malaysia, Indonesia and Thailand. Vector error correction model and impulse response analysis indicated a positive long run relationship between exchange rate and trade balance in all the countries. Comparatively, the results showed that real exchange rate shocks worsened Thailand and Indonesia's balance of trade with respect to major economies such as Japan and the U.S. In all cases, co-integration analysis shows that there exists a stable long run relationship among current account balance, real income, real exchange rate, and real foreign income. Salasevicius and Vaicius (2003) use the vector error correction model (VECM) to test for Marshall-Lerner condition in the exchange rate-trade balance relationship in the Baltic States. The study found that Lithuania satisfied the Marshall-Lerner condition, but Estonia did not, while the result of Latvia was ambiguous.

Aliyu (2009) also finds that appreciation of exchange rate exerts positively on economic growth in Nigeria and improves the balance of payments position. Kariuki (2009) used inter-temporal approach to investigate determinants of current account balance in Kenya. Evidence from error correction model and Engle-Granger co integration shows one co integrating relationship between real exchange rate and economic growth rate, relative prices, degree of openness and level of money supply. Terms of trade, depreciation in real exchange rate, economic growth and fiscal balance have positive influence on current account balance. Shocks such as oil crisis, coffee boom have a significant negative impact on current account balance. This study also shows that degree of openness has an important implication on current account balance in the economy.

Britto and McCombie (2009) examine the validity of Thirlwall law in Brazil using the Autoregressive distributed lag (ARDL) model to estimate import demand function. The study estimated the import demand function and compared the estimated income elasticity from import demand function to the hypothetical income elasticity calculated by dividing average exports by average income. In the short run, the Thirlwall law is not applicable in Brazil meaning that balance of payment constraint is one of the real inhibitors of short run economic growth in the country. However, the long run model showed that there is a stable relationship between relative prices, exchange rate fluctuations and current account movement.

Umer, Abro and Ghazali (2010) examine factors influencing balance of payments deficit in Pakistan. The results show that monetary variables are not significant in the nexus between the balance of payment and economic growth.

Ogbonna (2011) investigate the empirical relationship between the real exchange rate and

aggregate trade balance in Nigeria. The result showed no co-integration for the trade balance model. The results further revealed that depreciation/devaluation improves balance of payments and Marshall-Lerner condition holds for Nigeria. Similarly, Oladipupo and Onotaniyohuwo (2011) investigate the impact of exchange rate on the Nigerian external sector (the balance of payments position) from 1970 to 2008 using the ordinary least square (OLS) method. The result revealed that exchange rate has a significant impact on the balance of payments position.

Razazadehkarsalari, Haghiri and Behrooznia (2011) find a significant positive effect of depreciation on real gross domestic product in Iran during stagnation and low-price period while it remained insignificant during high-price period.

Chi-wei (2012) finds a nonlinear relationship between the real exchange rate and macroeconomic variables in China. The study used the threshold error-correction model (TECM) to detect the nonlinear causal relationship between real exchange rate and macroeconomic variables. Mudida (2012) tests the applicability of Marshall-Lerner condition in Kenya using fractional integration and co integration methods. A co-integrating relationship exists between balance of payment, real exchange rate and real income. Ravn, Schmitt, and Uribe (2012) examine exchange rate and government spending within a quarter in Canada, Australia, United Kingdom and United States of America over the post Bretton Woods era, by imposing some additional structure on the vector autoregressive with assumption that only government spending shocks can impact government spending. The real exchange rate depreciated in response to positive government spending shocks.

Rasaq (2013) analyses the impact of exchange rate volatility on macroeconomic variables in Nigeria and finds that exchange rate volatility

has a positive influence on gross domestic product, foreign direct investment and trade openness, while inflationary rate exerts a negative influence. Meanwhile, Danmola (2013) finds exchange rate volatility to have a positive impact on gross domestic product, foreign direct investment and trade openness, but a negative impact on the inflationary rate in Nigeria. Agundu, Akani and Kpakol (2013) also find a significant relationship between exchange rate, external reserves and external debt balance of payment in Nigeria. Odili (2014) studies the effect of exchange rate and balance of payments using autoregressive distributed lag modeling in Nigeria. The result provided evidence of a positive and statistically significant relationship between balance of payments and exchange rate in the long run and also a positive but insignificant relationship in the short run. In addition, the study attests to the validity of Marshall-Lerner condition in Nigeria.

Boniface (2014) examines the relationship among the real exchange rate, current account balance and real income in Kenya using annual time series data from 1980 to 2011. The study employs error correction modeling to verify the condition of Marshall-Lerner and Thirlwall law. The finding shows that Marshall-Lerner conditions hold in Kenya and the J-curve phenomenon is valid.

Babatunde and Adekunle (2017) investigate the relationship between exchange rate volatility and Nigeria's balance of payments. The study employs the Johansen co-integration test for long run relationship while both ARCH and GARCH were employed to test for volatility of the exchange rate. The findings show that there was no long run relationship between exchange rate and balance of payments position of the Nigerian economy during the period under review (1985-2015) while the co-efficient of the ARCH is found to be statistically significant while the GARCH was found to be statistically insignificant. It concluded

that exchange rate liberalization should be adopted by the monetary authorities in order to promote fairness and attract foreign investment which will lead to favourable balance of payments in Nigerian economy

Nwanosike et al (2017) examines balance of payments trend in Nigeria between 1970-2014 to test for the Marshall-Lerner condition using multivariate regression model to ascertain the effect of devaluation of domestic currency on balance of payments. The result reveals that a unit devaluation of exchange rate will lead to decrease in the balance of payment (BOP) through balance of trade mechanism. The study concluded that the Marshall-Lerner condition is not satisfied in the short run in Nigeria within the period.

Echekoba (2017) investigates the effects of exchange rate fluctuations on the balance of payments in Nigerian economy using multiple regressions. The findings showed that foreign exchange rate fluctuations affect macroeconomic variables. The study concludes that government should admonize monetary and fiscal policies to boost non-oil exports and that a market driven exchange rate will encourage exports and take care of disequilibria in balance of payments.

Akatugba (2018) examines exchange rate volatility and balance of payments problem in Nigeria between 1980-2016 using the GARCH approach. The empirical results show that exchange rate is positively related to balance of payments: while real gross domestic, inflation rate and exchange rate are negatively related to balance of payments

Theoretical framework

Contemporary analytical discourse discussions on exchange rate and current account component of balance of payments have been dominated by two theories. These are:

Elasticity Approach

The theory states that when a country devalues its currency, the domestic prices of its imports are raised and the foreign prices of its exports are reduced. Thus, devaluation helps to improve BOP deficits of a country by increasing its exports and reducing its imports. But the extent to which it will succeed depends on the country's price elasticity of domestic demand for imports and foreign demand for exports. The main substance of Marshall-Lerner condition is that when the sum of price elasticity of demand for exports and imports in absolute terms is greater than unity, devaluation will improve the country's balance of payments. That is,

$$e_x + e_m > 1$$

Where e_x is the demand elasticity of exports and e_m is the demand elasticity for imports. On the contrary, if the sum of price elasticity of demand for exports and imports, in absolute terms, are less than unity, $e_x + e_m < 1$, devaluation will worsen (increase the deficit) the BOP. If the sum of these elasticities in absolute terms is equal to unity, $e_x + e_m = 1$, devaluation has no effect on the BOP situation which will remain unchanged. The elasticity approach to balance of payment is associated with the Marshall-Lerner (ML) condition (Marshall, 1923, Lerner, 1944).

However, the elasticity approach which applies the Marshallian concept of elasticity to solve balance of payment (BOP) deficit is misleading. This is because it has relevance only to incremental change along a demand or supply curve and to problems dealing with shifts in these curves. Moreover, it assumes constant purchasing power of money which is not relevant to devaluation of the country's currency.

The Absorption Approach

The absorption approach to balance of payments is general equilibrium in nature and is based on the Keynesian national income

relationships. Therefore, it is also known as the Keynesian approach. It runs through the income effect of devaluation as against the price effect to the elasticity approach. The theory states that if a country has a deficit in its balance of payments, it means that people are 'absorbing' more than they produce. Domestic expenditure on consumption and investment is greater than national income. If they have a surplus in the balance of payments, they are absorbing less. Expenditure on consumption and investment is less than national income. Here the balance of payment is defined as the difference between national income and domestic expenditure.

This approach was developed by Sydney Alexander. The analysis can be explained in the following form

$$Y = C + I_d + G + X - M$$

Where Y is national income, C is consumption expenditure, I_d total domestic investment, G is autonomous government expenditure, X represents exports and M imports (Alexander, 1952)

However, the absorption approach fails as a corrective measure of balance of payment deficit under a fixed exchange rate system. When prices rise with devaluation, people reduce their consumption expenditure. With money supply remaining constant, interest rate rises and brings about a fall in output along with absorption. Thus, devaluation will have little effect on balance of payment deficit. This approach also neglects the price effects of devaluation which are very important (Jhigan, 1997).

Methodology

Model Specification

To examine the effect of exchange rate fluctuations on balance of payments in Nigeria, the model of Oladipupo and Onotaniyohuwo (2011) was adapted and

modified to suite the nature of the research and data availability. Thus, the functional form of the model is:

$$BOP = f(EXRT, MS, ROUT, PRICE, INTR, INF, DOMC) \text{-----}(1)$$

Where:

BOP is balance of payments, EXRT is exchange rate, MS is money supply, ROUT is real output, PRICE is Price level, INTR is interest rate, INF is inflation rate while DOMC is nominal domestic credit.

Based on the objective of the current study and data availability, the empirical model is given as:

$$CRA = f(EXRT, NDC, INFR, INTR, EXTR) \text{-----}(2)$$

The econometric form of the model is stated in a dynamic form thus:

$$CRA = \beta_0 + \beta_1 \text{Log}EXRT + \beta_2 \text{Log}NDC + \beta_3 INFR + \beta_4 INTR + \beta_5 EXTR + \mu \text{-----} (3)$$

Where:

CRA is the current account component of balance of payments,

EXRT is exchange rate,

NDC is Nominal domestic credit,

INF is inflation rate

INTR is Interest rate,

EXTR is external reserve.

β_0 is constant, β_1 - β_5 are the parameter estimates and μ is the stochastic or error term.

All the variables in equation (3) above are assumed dynamic meaning they are determined within the model. This is consistent with the underlying theoretical framework i.e. the monetary variables explain the interrelationships among the variables in equation (3).

It is expected that $\beta_1, \beta_3, \beta_4 < 0$ and $\beta_2, \beta_5 > 0$.

Sources of data and Measurement

This study employed annual data that covers the period from 1980-2015 for Nigeria. The data is primarily gathered from various issues of Central bank of Nigeria statistical bulletin. The variables of interest are; current account, exchange rate, nominal domestic credit, interest rate, inflation rate and external reserves.

The variables used in the study and the model specification are based on established theoretical relationships, their use in previous studies and the availability of usable data.

Descriptive statistics and econometric procedure were utilized because secondary data were employed and divided into endogenous and explanatory variables. The current account serves as the endogenous variable while exchange rate, nominal domestic credit, inflation rate, interest rate and external reserve are the explanatory variables used in the model.

Estimation Techniques and procedures

The study employed Augmented Dickey Fuller (ADF) unit root test, Johansen co-integration test, Error Correction Model (ECM) and Fully Modified Ordinary Least Square (FMOLS) to show the effect of relevant variables on the current account components of the balance of payment. The Augmented Dickey-Fuller (ADF) test examines the unit root properties of the time series and determines the order of integration of each of the variables. Granger (1986) noted that a test for co-integration is conducted as a pre-test to avoid 'spurious regression' situations. Therefore, the widely used Johansen Co-integration technique was applied to determine if the variables are co-integrated i.e. if there is evidence for long run relationship among the variables. Further, Engle and Granger (1987) demonstrated that any set of co-integrated time series has an error correction representation; therefore, an Error Correction Model (ECM) was formulated

to show the speed at which the dependent variable adjusts to changes in the explanatory variables in an effort to achieve long run static equilibrium. Thereafter, the long run static regression analysis was estimated and the Fully Modified Ordinary Least Square (FMOLS) was used to show the long run effect of relevant variables on the current account components of the balance of payments. Akaike information criteria (AIC) and Schwarz criterion (SIC) were used to determine the optimal lag length for the model. The basis for

the usage of Akaike information criteria and Schwarz criterion was to avoid biasness in the selection of lag length for the model

Results and Discussion

Unit Root Test Result

The time series properties of each of the series are in the table 1 below, using the Augmented Dickey Fuller test at both level and first difference of the series.

Table 1: **Unit Root Test Result**

Variables	ADF	Critical Value @ 5%	Order of Integration(ADF)
CRA	-11.40565	-2.957110	I(1)
EXTR	-4.150587	-2.957110	I(1)
INFL	-4.890132	-2.963972	I(1)
INTR	-8.010686	-2.963972	I(1)
LNDC	-6.045828	-2.954021	I(1)
LEXR	-4.954605	-2.963972	I(1)

Source: Author, 2017

The stationary properties of the variables were determined using Augmented Dickey-Fuller test. The result shows that all of the series are stationary at first difference as the current account, exchange rate, nominal domestic credit, interest rate; inflation rate and external reserve test statistic are all higher than the 5% critical value of -2.96 for rejection

of a null hypothesis of a unit root. Therefore, the null hypothesis of non-stationary is consistently rejected for the current account, exchange rate, nominal domestic credit, interest rate, inflation rate and external reserve when they are expressed in first differences, suggesting that they are all integrated of order one (I(1)).

Co-Integration Test

Table 2: **Unrestricted Co-integration Test**

Unrestricted Co-integration Test				
Hypothesized	Trace	0.05	Max-Eigen	0.05
No. of CE(s)	Statistic	Critical Value	Statistic	Critical Value
None *	109.0123	95.75366	45.07839	40.07757
At most 1 *	63.93391	69.81889	27.49700	33.87687
At most 2	36.43691	47.85613	17.40698	27.58434
At most 3	19.02992	29.79707	10.40920	21.13162
At most 4	8.620720	15.49471	5.918955	14.26460
At most 5	2.701765	3.841466	2.701765	3.841466

Source: Author, 2017

The co-integrating test for the model was adjudged on both the trace test and Max-Eigen value, which indicate the existence of long run convergence in the model. Hence, both the Trace statistic and Max-Eigen statistic show that the null hypothesis was rejected which indicates the existence of one co-integrating equation in the model. Therefore, the table 2 shows that the variables converge

in the long run, thereby depicting the existence of long run relationship among the current account, exchange rate, nominal domestic credit, interest rate, inflation rate and external reserve. Thus, we conclude that a long run relationship exists among the variables. It means that the study can proceed to estimating the error correction model (ECM).

Error Correction Model

The result of the error correction model (ECM) is in table 3.

Table 3: Parsimonious Error Correction Model Estimation

Variables	Coefficient	Standard Error	T-Statistics	P-Value
D(CRA(-1))	-0.075725	0.319942	-0.236683	0.8161
D(CRA(-2))	0.511275	0.255682	1.999652*	0.0640
D(EXTR(-1))	-0.000567	0.000391	-1.450279	0.1676
D(EXTR(-2))	-0.000901	0.000500	-1.803287*	0.0915
D(LEXR(-1))	5375.097	6745.237	0.796873	0.4380
D(LEXR(-2))	-18285.05	8148.525	-2.243971**	0.0404
D(INFL(-1))	-76.94093	150.5129	-0.511192	0.6167
D(INFL(-2))	126.7847	173.6929	0.729936	0.4767
D(LNDC(-1))	-5481.125	5505.860	-0.995508	0.3353
D(LNDC(-2))	-7634.963	5966.847	-1.279564	0.2201
D(INTR(-1))	-2547.311	934.6076	-2.725541**	0.0156
D(INTR(-2))	46.55680	634.3806	0.073389	0.9425
D(LEXR(-3))	904.7524	9636.891	0.093884	0.9264
D(LNDC(-3))	-22722.02	9847.214	-2.307457**	0.0357
C	12603.54	5776.252	2.181959**	0.0454
ECT(-1)	-0.788540	0.357750	-2.204163**	0.0435
R-Squared	0.767999			
Adj R-Squared	0.535998			
F-Statistics	3.310329 (0.013284)**			
Durbin Watson	1.778035			

Source: Authors, 2017

*, **, & *** imply 10%, 5% and 1% level of significance

The table 3 above shows the parsimonious error correction model result of the effect of exchange rate fluctuations on current account using a parsimonious approach which was set at lag 3 in accordance with lag selection to

show the time lag it takes the current account to converge back to equilibrium from disequilibrium. The parsimonious interaction involves dropping insignificant variables. Based on the result, the error correction term

has the correct sign (negative), meaning that about 78.85 percent of the errors are corrected yearly. Precisely, the speed of adjustment shows that about 78.85 percent of errors generated in each period are automatically corrected by the system in the subsequent period and it is statistically significant. This implies that the adjustment takes place relatively quickly. It also implies that when there is any disturbance, convergence to equilibrium is relatively high with 78.85 percent of adjustment occurring in the first year. A highly significant error correction term is further proof of a stable long term relationship while the existence of a significant error is evidence of causality in at least one direction (Bannerjee et al, 1998; Granger, 1986). In terms of the significance of the individual variables, it is observed that the one-year and two-year lagged external reserve and the one-year lagged nominal domestic

credit have negative effects on the current account component of the balance of payments and are statistically insignificant. In addition, one-year and three-year lagged exchange rate and two-year lagged inflation rate have positive effects on the current account component of the balance of payments but are statistically insignificant. However, one-year interest rate and two-year lagged exchange rate have statistically significant negative effect on current account component of balance of payments. While the one-year lagged inflation rate has negative effect on current account, the two-year lagged interest rate has statistically insignificant positive effect on current account. More so, one-year lagged, two-year lagged and the three-year lagged nominal domestic credit have negative effect on current account component of balance of payments.

Table 4: Long Run Coefficient of the Effect of Exchange Rate Fluctuations on Current Account

Dependent Variable: CRA				
Method: Fully Modified Ordinary Least Squares (FMOLS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXR	1526.492	1726.500	0.884154	0.3844
EXTR	0.000295	8.30E-05	3.557792***	0.0014
LNDC	-5354.530	1792.576	-2.987059***	0.0059
INFL	0.514086	0.076166	6.749596***	0.0000
INTR	1538.366	384.6301	3.999598***	0.0004
C	115893.2	43617.10	2.657058**	0.0131

Source: Author, 2017

*, ** and *** implies 10%, 5% and 1% level of significance respectively

The table 4 above shows the long run effect of exchange rate on current account component of balance of payments. The results show that exchange rate, external reserve, inflation rate and interest rate have positive effect on current account while nominal domestic credit exerts inversely on the current account. In term of the significance of the individual variables, the result shows that nominal domestic credit, external reserve, inflation and

interest rate are statistically significant in influencing the current account, while exchange rate has no significant effect on current account.

Conclusion

From the analysis above, we could gather that exchange rate exerted an insignificant positive effect on the current account components of the balance of payments. On the other hand,

nominal domestic credit, external reserve, inflation and interest rate were very significant in determining the current of account components of the balance of payments in Nigeria. The implication of this is that when exchange rate increases, the current account component of the balance of payments improves. Thus, this was not in accordance with theoretical postulation

Thus, production of consumable goods for domestic consumption and exportation must be encouraged so as to improve self-

dependence of the Nigerian economy which lead to reduction in exchange rate thereby brings about favourable balance of payments. More so, there should be increase in the availability of the nominal domestic credit given its positive effect on current account via provision of more credits for investment and production of domestic product. Market determined interest rate should be encouraged towards stimulating economic growth and investment, thereby improving the balance of payments position.

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