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The Balance Of Payment As A Monetary Phenomenon: An Econometric Study Of Nigeria (1986 - 2016)

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ABSTRACT:*The paper econometrically analyses of the balance of payment as a monetary phenomenon: an econometric study of Nigeriafrom 1986 to 2016. Unit root test, cointegration test, pairwise granger causality test andAutoregressive Distributed Lag (ARDL) modelwere the tools used to establish the relationship between exchange rate and balance of payment. The results revealed a negative and statistically significant relationship in both short-run and long-run between balance of payment and exchange rate of the Nigerian Economy during the period under review. The Granger Causality/Block Exogeneity further revealed that the major determinant of exchange rate is real GDP. It further reveals that the nexus among the variables is indeterminate. Therefore it was recommended amongst other things that the policy of exchange rate depreciation should be maintained through the government intervention guide. Government through Central Bank of Nigeria (CBN) should apply expenditure reducing monetary policies through money supply and domestic credit to promote favourable BOT which invariably could stabilizes the BOP.*

KEY WORDS: *exchange rate, balance of payments, ARDL.*

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I. INTRODUCTION

Debate on exchange rate started predominantly when the Gold Standard collapsed in the 1930s and subsequent emergence of the Bretton Wood system of adjustment peg from the 1940s, through the espousal of flexible exchange rate experienced by the developing nations in 1970 and those carrying out structural reforms in the 1980s as well as in the wake of the currency crises in developing economics in the 1990s (Azeez, Kolapo&Ajayi, 2012). In the 1980s, international organizations such as the World Bank and the international monetary fund (IMF) proposed currency depreciation as a contrivance for alleviating balance of payments problems and promoting economic growth and stabilization in Less Developing Countries (LDCs). Nigeria, being one of the LDCs, faced the problem where exchange rate devaluation had an unfavorable impact on the trade balance, economic growth, balance of payment and government budget (Agbola, 2004). The government budget and domestic borrowings to finance the deficit was causing excessive monetary growth and inflation. Besides, non-economic factors, namely political instability also played a significant role in the economic crisis. In actual fact, any country that has its own currency must decide what type of exchange rate arrangement to maintain. Therefore, in reaction to the proposal, opinions among Nigerian economists and policy makers on foreign exchange rate were divided. Some supported fixed exchange regime while others place emphasis on floating exchange rate regime. In a fixed exchange regime, the government (or the central bank acting on behalf of the government) intervenes in the foreign exchange market so that the exchange rate is fixed administratively. In a floating exchange regime, the exchange rate is determined directly by market forces of demand and supply, and is liable to fluctuate continually as dictated by changing market conditions (Isard, 1999). Although a nation's policy on foreign exchange is derived from the observed macro-economic objectives to be attained and the likely trend of growth in the economy. In actual fact, the acknowledged objectives of foreign exchange policy remain the attainment of a favorable balance of payments position as well as the achievement of a realistic exchange rate (Anthony, 2015).

Following the failure of the fixed exchange rate to yield favorable balance of payment, Nigerian adopted structural adjustment programme (SAP) in September 1986. The naira was deregulated in September 1986 under the structural Adjustment Programme Package. Following the oil glut of early 80s, it became glaring that Nigerian economy which depends on oil was not able to sustain the fixed exchange regime because national currency was over-valued and its foreign reserves not only depleted but foreign debt also mounted. This was the second phase of exchange rate history in Nigeria. As an integral part of the Structural Adjustment Programme introduced in 1986, the country adopted a flexible exchange arte through the Second tier Foreign Exchange

Market (SFEM). Several modifications were made in order to achieve the objectives of SFEM, from Foreign Exchange Market (FEM) on July 2, 1987 to Autonomous Foreign Exchange Market (AFEM) in 1995, to Dutch Action System in October 25, 1999 and, to the wholesale Dutch Auction System on February 20, 2006.

Despite all the programmes that followed the end of the oil boom period when the Nigerian economy benefited from a steady balance of payment surplus, her balance of payments has been fluctuating between positions of surplus and deficit. Nigeria has recorded well over fifteen deficits in her balance of payments account between 1970 and 2015. These deficits were recorded in 1976, 1977, 1981, 1982, 1983, 1988, 1995, 1998, 1999, 2002, 2003, 2009, 2010, 2013, 2014, 2015 and 2016 (CBN, 2006; NBS, 2011).

Structural Adjustment Programme (SAPs) has come and gone but the national economic ailment remains. Despite the efforts of the Nigerian government to maintain a relatively stable rate of exchange, the naira has continued to depreciate after the introduction of SAP leading to a large number of balance of payment deficits. The general view is that depreciation enhances export competitiveness, encourages export diversification, protects domestic industries from imports, improves trade balance and ultimately improve balance of payments. But statistics shows that depreciation of the national currency has not really translated into balance of payments improvement in Nigeria. It was then felt that a depreciation of the naira would relieve pressures on the balance of payments. But the irony of this policy instrument is that the new exchange rate policy did not satisfy the condition for a successful balance of payment policy.

The statement of the problem is that, despite all the efforts made by the previous researchers to carry out rigorous studies in order to produce robust results on the impact of exchange rate on balance of payments, their studies still suffer problems in one way or the other. Some of these problems include: failure to test unit root. Testing of unit root has already become a standard procedure in the study of time series and the application Augmented Dickey-Fuller and Philips-Perron are the more popular tests for unit root. Unit root test is necessary because the existence of non-stationary variables will generate a spurious regression through high R^2, t-values and F-values, low Durin-Watson statistic and R^2 tends to be greater than Durin-Watson statistic and the resultant effect is that residuals are likely to be autocorelated. In fact, spurious regression produces no economic meaning. Some of the previous studies did not check the existence of unit root associated with time series data. Therefore, this affects their findings. Some of these studies include Bonface (2013); Agu (2002); Oladipupo and Onotaniyohuwo (2011) among others. By the same token, the related work conducted by Oladipupo and Onotaniyohuwo (2011), Umoru and Odjegba (2013), Okwuchukwu (2014), Nawaz et al (2014), Agu (2002), FN (2005) Ibrahim (2008), Boniface (2014), Priyatharsiny (2017) and Bonface (2013) suffered from methodological problem by violating the assumptions of Classical Linear Regression Model (CLRM).In addition, stability of model was not tested in their studies with the exception ofOkwuchukwu (2014), Boniface (2014) andNawaz et al (2014). Hence, there is need to fill these gaps.

Therefore, this research employs the role of monetary approach to empirically investigate the relationship between floating exchange rate,balance of payment and other associated variables in Nigeria,determine the direction of causality among floating exchange rate, balance of payments and other captured macro-economic variables, investigate the major determinants of exchange rate which in turn influence balance of payment and examine the nexus between exchange rate and balance of payment in Nigeria over a period of 31 years (1986-2016), with a view to suggesting a bail out strategy.

The rest of the paper is arranged in sections, namely: review of exchange rate policy in Nigeria, theoretical framework, empirical review of related literature, research methodology, data presentation and analysis, summary of findings, and recommendations.

2.1. Review of Exchange Rate Management in Nigeria Prior to 1986

Before the enactment of Exchange Control Act of 1962, foreign exchange was earned by private sector operators. These were hold in their banks overseas which then acted as agents for local exporters. These were mainly foreigners doing business in Nigeria. During this period, Agricultural exports contributed the buck of foreign exchange receipts. By then, the currency, Nigeria Pound was tied to the British Pound with ease of convertibility. But this caused delay in the development of active exchange market. However, with the establishment of the Central Bank of Nigeria (CBN) in 1958, there was centralization of foreign exchange authorities in the CBN. Then there came a need to develop a local foreign exchange market (Umeora, 2013).

The immediate post-independence era witnessed a regime of fixed exchange rate in Nigeria. The fixed exchange rate was in vogue between 1962 and 1986. It developed from a fixed parity in 1960 when it was solely tied with the British Pound Sterling. By 1967, when the British pound sterling was devalued, Nigeria government included the US dollar in the parity exchange by deciding to peg the domestic currency to the dollar at an overvalued rate in other to make imports cheap for the import substituting industries. They relied heavily on foreign inputs and plants and machinery (Christopher &Tomilade, 2012). In 1972, the parity exchange with the British Pound was suspended as a result of the emergence of a stronger US dollar. In 1973, Nigeria reverted to a fixed parity with the British Pound following the devaluation of the US dollar. In 1974, in order to

minimizes the effects of devaluation of a single individual currency, Nigeria currency was fixed using import weighted baskets of currencies of Nigeria's seven trading countries (US dollar, British pound, German Mark, French Franc). In 1978, when the USA decided not to desist from converting the dollar into gold, the value of naira was adjusted in relation to the America dollar against a basket of twelve (12). However, the 1978 policy was jettisoned in 1985 in favour of quoting the naira against the US dollar. Throughout the 1970s, a lot of imports were done through Inward Bill for Collections (IBCs) whereby imports were made with acceptance bills of 90 days and above. These bills were paid in local currency but are to be remitted in foreign currencies. By 1981 crisis over the un-remitted bills necessitated the need to control the nation's foreign exchange. It was not until 1982 that comprehensive exchange controls were introduced. By 1985, the naira was quoted against the US dollar, which became the intervention currency to date (Umeora, 2013; Christopher &Tomilade, 2012).

2.2. Review of Exchange Rate Management in Nigeria After 1986

The naira was deregulated in September 1986 under the structural Adjustment Programme Package. Following the oil glut of early 80s, it became glaring that Nigerian economy which depends on oil was not able to sustain the fixed exchange regime because national currency was over-valued and its foreign reserves not only depleted but foreign debt also mounted. This was the second phase of exchange rate history in Nigeria. As an integral part of the Structural Adjustment Programme introduced in 1986, the country adopted a flexible exchange are through the Second tier Foreign Exchange Market (SFEM). SFEM was expected to usher in a mechanism for exchange rates determination and allocation in order to ensure short term stability and long term Balance of Payments equilibrium. As stated by Mordi (2006) the essential objectives of SFEM include to achieve a realistic naira exchange rate through the market forces of demand and supply, ensure more efficient allocation of resources, stimulate non-oil efforts, encourage foreign exchange in flow and discourage outflow, eliminate currency trafficking y wiping out unofficial parallel foreign exchange market, and lead to improvements on the Balance of Payments (Eze&Okpala, 2014). Several modifications were made in order to achieve the objectives of SFEM, from Foreign Exchange Market (FEM) to Autonomous Foreign Exchange Market (AFEM), to Dutch Action System and, to the wholesale Dutch Auction System.

The management of exchange rate after 1986 became more market oriented. This started by introducing the second tier foreign exchange rate and foreign exchange allocation for private sector, and was freely determined by forces of demand and supply; while the central bank determines the supplies of the foreign exchange on a weekly basis. The introduction of SFEM was followed by depreciation of naira to ensure the efficient allocation of resources. It was envisaged that the depreciation of naira will increase local sourcing of raw materials and bring about growth in manufacturing while discouraging the excessive demand for import as was experienced during the fixed exchange era. The SFEM which comprises of first tier and second tier exchange rate was merged into a unified foreign exchange market (FEM) on July 2, 1987 with all transaction guided by market forces. An autonomous foreign exchange market which was created in 1988 was highly destabilized due to its speculative tendencies and was subsequently merged with (FEM), when the interbank foreign exchange market (IFEM) segment in which authorized dealers were allowed to transact.

The authority, however, reverted to a fixed exchange rate regime in 1994 in which naira was pegged at ₦21.9960 per US dollar. This regime worsened the situation in the FEM as naira depreciated sharply and demand for foreign exchange continued to rise. However, because of inherent abuses and bureaucratic bottlenecks associated with regulation, the authority later returned to the dual exchange rate regime in 1995. It was a policy of guided deregulation known as the Autonomous Foreign Exchange Market (AFEM). It was a combination of official makrte and Autonomous Foreign Exchange transaction. AFEM was introduced following the promulgation of Foreign exchange (Monitoring and Miscellaneous Provisions) decree 17 of 1995 and the abolition of Exchange Control Act of 11962. Under AFEM, CBN was to intervene in the market at short notice and sell foreign exchange to end users through authorized dealers (commercial banks) at market based exchange rates.

The failure of AFEM led to the introduction of inter-bank Forex Market (IFEM), a pre-cursor to the Dutch Auction System (DAS) in October 25, 1999. IFEM was aimed at, among other things, deepening inter-bank Forex market as well as having a stable naira exchange rate. The IFEM therefore was intended to diversify the supply of foreign exchange in the economy by encouraging the funding of the inter-bank operations from privately-earned foreign exchange rate. Development in IFEM namely, persistent high demand for Forex, continued depreciation of the naira with the premium between official rate and those in parallel market widened from ₦7.0470 per US dollar in 1999 to ₦16.3808 per US dollar in 2002, and continued depletion of reserves position led to its abandonment and the re-introduction of DAS in July 22, 2002. DAS, as a means of exchange rate management was not new in Nigeria as it was practiced in 1987, 1990 and 1991. It was re-introduced to address the failure of IFEM. Okwuchukwu (2014) revealed that SFEM was aimed at achieving the following objectives: to reduce the parallel market premium (i.e narrowing the gap between the official market and parallel market rates), conserve the dwindling external reserves and achieve a realistic exchange rate for the naira. The

DAS helped to stabilize the naira exchange rate, reduce the widening premium, conserve external reserves, and minimize speculative tendencies of authorized dealers. The foreign exchange has been relatively stabilized since 2003. The DAS was conceived as a two-way auction system in which both the CBN and authorized dealers would participate in the foreign exchange market to buy and sell foreign exchange. The CBN is expected to determine the amount of foreign exchange it is willing to sell at the price buyers are willing to buy. The "marginal rate", which by definition is the rate that clears the market, represents the "ruling" rate at the auction. Since July 2002, the foreign exchange market became a little restricted by abolishing the interbank transactions, while transactions were made through Dutch Auction System (DAS) which was regarded as a better alternative (Christopher &Tomilade, 2012).

In order to further liberalize the market, narrow the arbitrage premium between the official interbank, ensure bureau de change segments of the markets and achieve convergence, the CBN introduced the Wholesale Dutch Auction System (WDAS) on February 20, 2006. (Umeora, 2013).

2.3 Review of Empirical Literature

A vast amount of empirical studies has been conducted within and across the countries to reveal whether exchange rate causes movements in macro-economic variables, particularly, balance of payment. Prominent scholar Ibrahim (2008) examined the monetary approach to balance of payments to explain the Sudan's balance of payments deficit during the period 1970-2005. He examined whether money supply played a role in explaining the behaviour of balance of payments using cointegrating and error-correction modelling. The empirical results suggest that money did not play a significant role in explaining the behaviour of Sudan balance of payments. The long-run restriction and unrestricted test indicated that monetary variables (money supply and net foreign assets) could not explain the behaviour of the balance of payments. The estimated short-run dynamics showed that to some extent monetary variables play role in explaining the behaviour of balance of payments. But the main variables that play a significant role are real variables (GDP and aggregate expenditure). Agu (2002) examined the real exchange rate distortions and external Balance Position of Nigeria from 1960 to 1990, using the single equation procedure. He found that over the sample period, real exchange rate misalignment (measured as the deviation of the actual from the estimated equilibrium path) was irregular but persistent. After generating the misalignment and volatility of the real exchange rate, he proceeded to ascertain the influence of these distortions on the balance of payment – a gauge of the external balance position of the country. It was then observed that real exchange rate distortions (misalignment and volatility) hurt both the trade balance and the capital account. However, while RER misalignment is critical to the two external sector variables, volatility matters more to the flow of capital.

Oladipupo and Onotaniyohuwo (2011) empirically investigated the impact of exchange rate on the Nigeria External sector (the balance of payments position) using the Ordinary Least Square (OLS) method of estimation for data covering the period between 1970 and 20087. He found that exchange rate has a significant impact of the balance of payments position. He found out that improper allocation and misuse of domestic credit, fiscal indiscipline, and lack of appropriate expenditure control policies due to centralization of power in government were some of the causes of persistent balance of payments deficits in Nigeria.

Umoru and Odjegba (2013) analyzed the relationship between exchange rate misalignment and balance of payments (BOP) mal-adjustment in Nigeria over the sample period of 1973 to 2012, using the vector error correction econometric modelling technique and Granger Causality Tests. They found that exchange rate misalignment exhibited a positive impact on the Nigeria's balance of payments position. The Granger pair-wise causality test result indicated a unidirectional causality running from exchange rate misalignment to balance of payments adjustment in Nigeria. In the year that followed, Okwuchukwu (2014) examined the impact of exchange rate on balance of payment in Nigeria, using annual data from 1971 to 2012. The empirical methodology employed were autoregressive distributed lag (ARDL) and co-integration estimation technique to detect possible long-run and short-run dynamic relationship between the variables used in the model. He also tested the Marshall-Lerner (ML) condition to see if it is satisfied for Nigeria. He found evidence in favour of a positive and statistically significant relationship in the long-run and also a positive but not statistically significant relationship in the short-run between balance of payment and that Marshall-Lerner (ML) condition subsists for Nigeria. In the following year, Anthony (2015) examined exchange rate variations and balance of payments position in Nigeria over the period of 1960 to 2013. The econometric techniques of ordinary least squares, co-integration and error correction mechanism were used to analyzed the sourced data. He fund that exchange rate had more impact on the balance of payments position during the deregulated period than the regulated period in Nigeria.

Martins and Olarinde (2014) investigated the impact of exchange rate on the balance of payments (BOP) in Nigeria over the period 1961-2012. The analysis is based on a multivariate vector error correction framework. A long-term equilibrium relationship was found between BOP, exchange rate and other associated variables. The empirical results are in favour of bidirectional causality between BOP and other variables

employed. Results of the generalized impulse response functions suggest that one standard deviation innovation on exchange rate reduces positive BOP in the medium and long term, while results of the variance decomposition indicate that a significant variation in Nigeria's BOP is not due to changes in exchange rate movements.

Bonface (2013) examined the relationship between exchange rate vitality and BOP Kenya. The study adopted a qualitative comparative design and simple linear regression model to determine the relationship between the two variables. Monthly data on the exchange rates and BOP for the period between the years 2001 and 2012 were used. From the analysis, the exchange rate affects the prices at which a country trades with the rest of the world and is important for economic analysis and policy formulation. He found that there is a direct relationship between foreign exchange rate volatility and balance of payments. As the Kenya currency depreciates, the balance of payments for Kenya worsens. The study concluded that apart from the exchange rates, there are other factors having greater influence on the levels of BOP. In the year that followed, Nawaz et al (2014) provided empirical estimates of the impact of exchange rate on Balance of Payments in Pakistan. Annual time series data for the period between the years 2007 and 2013 were used. In order to achieve the purpose various tests such as unit root, ARDL and Granger causality tests were employed. They found that a significant and positive relationship existed between exchange rate and BOP. Therefore, they concluded that stability of exchange rates may create a positive environment by encouraging the investment, and this can improves balance of payment.

Julius (2014) empirically Analyses balance of payment adjustment mechanisms in Nigeria between1970 and 2010 using linear regression analysis.The estimated result shows a positive relationship between the dependent variable (Balance of Payments) and the Independent variables (Domestic Credit, Exchange Rate andBalance of Trade)while (Inflation Rate and Gross Domestic product) are otherwise.

II. REVIEW OF THEORETICAL FRAMEWORK

3.1 The Monetarist Theory of Balance of Payment

The monetary theory of exchange rate determination is one of the most recent theories. It is indeed a very popular model that has generated a lively debate in International Economics and Finance. The arguments for the relationship between the foreign sector and the domestic sector of an economy through the working of the monetary sector can be traced to Hume's (1752) price specie flow mechanism. The theory is the last in the well-known tradition of the monetarists or the monetarist school, which regards money as the prime factor that moves the economy. Thus the monetary approach, as it is sometimes called, directs attention to the money stock as a primary determinant of the level of exchange rates. Its major thrust is the assertion that exchange rate fluctuations are largely explicable in terms of variations in the relative supplies of national currencies. The monetary approach focuses on both the current and capital accounts of the balance of payments. This is quite different from the elasticity and absorption approaches, which focus on the current account only. As pointed out by Melvin, (1992), the general view of monetary approach makes it possible to examine the balance of payments not only in terms of the demand for goods and services, but in terms of the demand for and the supply of money. According to this approach, BOP deficit is always and everywhere a monetary phenomenon. Therefore, it can only be corrected by monetary measures. The demand for money is a stable function of income, prices and rate of interests. The money supply is a multiple of monetary base which consists of domestic money (credit) and country's foreign exchange reserves. The automatic adjustment mechanism in the monetary approaches is explained under both the fixed and flexible exchange rate systems.

(Adamu and Osi, 2011) revealed that under a system of fixed exchange rates excess money supply induces increased expenditure, hence increased domestic demand for foreign goods and services. The high domestic demand needs to be financed by running down foreign exchange reserves, thereby worsening the balance of payments. The outflow of foreign exchange reserves reduces money supply until it is equal to money demand, thereby restoring monetary equilibrium and halting an outflow of foreign exchange reserves. An excess demand for money leads to an opposite adjustment, which in turn induces foreign exchange reserves inflow, and hence causes a BOP surplus.

Under a system of flexible (or floating) exchange rates, when there is a BOP surplus or deficit, changes in the demand for money and exchange rate play a major role in the adjustment process without any inflow or outflow of foreign exchange reserves. Suppose the monetary authority increases the supply of money $M_S > M_D$ and BOP is deficit. People having additional cash balances buy more goods thereby raising the prices of domestic and imported goods. The rise in prices, in turn, increases the demand for money thereby improving balance of payment bringing the equality of M_S andM_D without any outflow of foreign exchange reserves. The opposite will happen when $M_D > M_S$ there is fall in prices and depreciation of the domestic currency which automatically eliminates the excess demand for money thereby causing balance of payment deficit (Jhingan, 2003).

III. METHODOLOGY

4.1Type, Source of Data, Sample Size and Sampling Technique

The study utilized annual time series secondary data sourced from the Central Bank of Nigeria's statistical bulletin (2016) and the National Bureau of Statistics (NBS) (2011). The sample size employed for the study covered a period of 31 years (1986 - 2016). The justification for the choice of this period is that it corresponds to the period when Nigeria economy was deregulated and exchange rate was liberalized and consistent data on the relevant variables are available. The selection of this period also conforms to time series research requirement of a minimum of thirty (30) observations (Gujarati, 2007).

4.2Model Specification

To empirically analyzes the balance of payment as a monetary phenomenon in Nigeria, Autoregressive Distributed Lag(ARDL) model was employedfollowing the work of Dayo and Akindele (2017), Nawaz et al (2014) andOkwuchukwu (2014).The functional relationship that exists between the dependent variable and its respective independent variables is presented as:

BOP = f(EXR, RGDP, MS, INF, INT, CPS) ----------(1)

Put in an explicit form, the LM model becomes:

$BOP_{t-1}= \beta_o+ \beta_1EXR_{t-1} + \beta_2RGDP_{t-1} + \beta_3MS_{t-1}+\beta_4INF_{t-1} + \beta_5INT_{t-1} +\beta_6CPS_{t-1}+\epsilon t$ --------- (2)

Where:

BOP = Balance of Payment (Dependent variable)

β_o = Constant parameter

β_1-β_6 = Coefficient of independent variables

EXR_{t-1}= Lag value of exchange rate

$RGDP_{t-1}$ = Lag value of real GDP

MS_{t-1} = Lag value of money supply

INF_{t-1} = Lag value of inflation rate

INT_{t-1} = Lag value of interest rate

CPS_{t-1} = Lag value of credit to private sector

ϵt= error term

The ARDL approach to co-integration analysis involves estimation of Unrestricted Error Correction Model (UECM). Hence the ARDL model for testing the relationship between balance of payment and its determinants is stated as follows:

$$\Delta \text{ In } BOP_t= \beta_0 + \delta_1InEXR_{t-1} + \delta_2InRGDP_{t-1}+ \delta_3InMS_{t-1}+\delta_4INF_{t-1}+ \delta_5INT_{t-1}+\delta_6InCPS_{t-1} \sum_{t=1}^{n} \emptyset_i \Delta InBOP_{t-1} + \sum_{t=0}^{m}$$

$$\varphi_j\Delta InEXR_{t-1}+ \sum_{t=0}^{m} \gamma_l\Delta InRGDP_{t-1}+ \sum_{t=0}^{m} \alpha_m\Delta MS_{t-1}+ \sum_{t=0}^{m} \omega_k\Delta InINF_{t-1}+ \sum_{t=0}^{m} \partial_f\Delta InINT_{t-1}+ \sum_{t=0}^{m} \theta_g\Delta InCPS_{t-1} +\varepsilon_t$$ ----------(3)

Where δi is the long run multipliers, c0 is the intercept and εt are white noise errors. The first step in the ARDL bounds testing approach is to estimate equation (3) by Ordinary Least Squares (OLS) in order to test for the existence of a long run relationship among the variables by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables, that is: H_0; δ1= δ2= δ3= δ4 = δ5= δ6=δ7= 0 against the alternative

H_1; δ1≠ δ2≠ δ3≠ δ4 ≠ δ5≠δ6≠δ7≠0

We denote the test which normalizes on BOP by F_{BOP} (BOP|EXR, RGDP, MS, INF, INT, CPS)]. Two asymptotic critical value bounds provide a test for cointegration when the independent variables are I(d) [where 0≤d≤1]: a lower value assuming the regressors are I(0) and an upper value assuming purely I(1) regressors. If the F-statistic is above the upper critical value, the null hypothesis of no long run relationship can be rejected irrespective of the orders of integration for the time series. Conversely, if the t-statistic falls below the lower critical value, the null hypothesis cannot be rejected. Finally, if the statistic falls between the lower and upper critical values, the result is inconclusive. The approximate critical values for the F-statistic test were obtained from Pesaran, Shin and Smith (2001). Once cointegration is established the conditional ARDL (n, m_1, m_2, m_3, m_4, m_5, m_6) long run model for HD_t can be estimated as:

$$\Delta InBOP_t= \beta_0 +\delta_1InEXR_{t-1} + \sum_{t=0}^{m} \delta_2InRGDP_{t-1}+ \sum_{t=1}^{m} \delta_3InMS_{t-1}+ \sum_{t=1}^{m} \delta_4InINF_{t-1}+ \sum_{t=1}^{m} \delta_5InINT_{t-1}+ \sum_{t=1}^{m} \delta_6InCPS_{t-1B}$$ -------+ ------ε_t----------(4)

This involves selecting the orders of the ARDL (P, q1, q2, q3, q4, q5, q6) model in the sevenvariables using Aikaike Information criteria (AIC) and Schwartz information criteria (SIC). The next step is to obtain the

short run dynamic parameters by estimating an error correction model associated with the long run estimates. This is specified as:

$$\Delta \text{In BOP}_t = \beta_0 + \sum_{t=1}^{n} \emptyset_i \Delta \text{InEXR}_{t-1} + \sum_{t=0}^{m} \varphi_j \Delta \text{InRGDP}_{t-1} + \sum_{t=1}^{m} \gamma_l \Delta \text{InMS}_{t-1} + \sum_{t=1}^{m} \alpha_m \Delta \text{ININF}_{t-1} + \sum_{t=1}^{m} \omega_k \Delta \text{ININT}_{t-1} + \sum_{t=1}^{m} \partial_f \Delta \text{InCPS}_{t-1} \text{----------} + \text{----------} \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Here,□ ,□ ,□ □ ,□ □ ,θ and □are□the short run dynamic coefficients of the model's convergence to equilibrium and □ □is the speed of adjustment. Where $\varepsilon_t$is the error correction mechanism represent the coefficient of the ecm term.

4.3Methods of Data Analysis

The study utilized secondary data in the form of time series spanning the period of thirty one (31) years as earlier mentioned. As widely known time series macro-economic data are notably not stationary due to change in their trend. Thus the desire to have models which combine both short run and long run features and maintain stationarity in all the variables is a process this study cherish and tend not to discard. Since the study used time series secondary data, it began its empirical analysis by testing the statistical properties of the variables to ascertain its statistical adequacy. Our diagnostic tests involved: (i) Descriptive statistics (ii) Checking the temporal properties of the variables in the model via unit root tests to determine the stationarity of the variables in order not to obtain spurious result using Augmented Dickey-Fuller (ADF, 1979) test and Philip Perron test; (iii) Determination of a meaningful long-run equilibrium relationship among the variables, that is, to determine if the variables in the equation are co-integrated using ARDL Bound testing; (iv) optimal lag selection; (v) Vector Error Correction Model was estimated to model the short-run dynamics; (vii) the VEC Granger Causality Block/Exogeneity Wald tests was conducted to determine the causality relationships among variables; (viii) and lastly, in addition to the VECM estimates, post-diagnostic tests such as, Breusch-Godfrey LM test for autocorrelation, Breusch-Pagan-Godfrey heteroskedasticity, Jarque-Bera (JB) test for Normality and Ramsey RESET test were also employed to test the, adequacy, reliability and validity of the data and model. Student t test and Wald test were used to test for significance and to compare hypothesized coefficient. All these models were used in order to avoid a number of challenges in econometric studies. Some of these challenges include the issue of subjectivity and spurious and bias of result.

IV. DATA PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

Table 1: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
BOP	31	71.66613	806.2000	0.170614	3.514560	0.492394
EXR	31	95.99774	64.99030	0.046544	2.428607	0.432909
RGDP	31	32827.58	17304.81	0.819177	2.262128	4.170362
MS	31	4842.210	6626.223	1.235275	3.133355	7.906774
INF	31	20.70452	19.45031	1.574415	4.249124	14.82244
INT	31	18.80806	3.833962	1.922709	4.46633	7.176109
CPS	31	4476.244	6594.423	1.311135	3.243367	8.958396

Table 1 indicates the descriptive statistics result of the data covering the period under study using thirty one observations in each of the variables to estimate the impact of floating exchange rate on balance of payment in Nigeria from 1986 to 2016. It provides information about the Mean, Standard deviation, Skewness, Kurtosis and Jarque-Bera of the variables. The Mean provides the average value in the series, the Standard deviation provides the volatility of the data or amount of variation of the data from the average, the skewness measures whether the distribution of the data is symmetrical or asymmetrical and the Kurtosis measures the peak of the data compared to normal data.

The variables BOP, EXR, RGDP, GEXP, MS, INF and INT with skewness of 0.170614, 0.046544, 0.819178, 1.235272, 1.574415, 1.922709 and 1.311135 respectively are positively skewed or are rightward skewed, indicating that the distribution of the data is symmetrical and have a long tail toward large value within the study period. The fact that the values of skewness fall between the range -1.96 and +1.96, shows that the data are normally distributed. The kurtosis of 3.514560 for BOP, 2.428607 for EXR, 2.262128 for RGDP, 3.133355 for MS, 4.249124 for INF, 4.466333 and 8.958396 for INT suggested that the data used for the study are normally distributed.

Table 2: Unit Root Test Result

	ADF Test		PP Test	
Variables	**Level**	**1st Diff.**	**Level**	**1st Diff.**
Balance of Payment (BOP)	-5.299568	-5.509985**	-2.380101	-4.421371**
Exchange Rate (EXR)	0.8011995	-3.444076**	0.713576	-3.304719**
Real GDP (RGDP)	-5.031668	-6.064658**	-5.029784	-25.59132**
Money Supply (MS)	-2.689626	-6.445711**	3.204254	-6.356631**
Inflation Rate (INF)	-2.173516	-6.566314**	-2.695375	-6.421521**
Interest Rate (INT)	-4.471259*	5.475478**	-4.591429	-10.00073**
Credit to Private Sector (CPS)	-4.356263	-.97190*	4.087546	-4.603073*

Source: Author's computation using EVIEWS software. *, ** and *** denote level of significance at 1%, 5%and 10% respectively.

Table 2 presents the results of both Augmented Dickey-Fuller (ADF) and Philip-Peron (PP) test. Based on the fact, that Bounds test is on the assumption that variables are either integrated of 1(0), 1(1) or combination of both. Before performing the bounds test, it is essential to check for the stationarity of the data series to be used. This is also important in order not to obtain an unbiased estimation from the granger causality tests. However, the summary of the result reveals that all the variables are non-stationary at the level, with the exception of interest rate(INT). According to Chigusiwaet al.(2011), in the presence of 1(2) variables the computed F-statistics of the bounds test are rendered invalid. Hence, with the existence of series into 1(1) lead to the application of ARDL as theoretically supported.

Table 3: Bounds F-test Results for Cointegration

Dependent variable	**Function**		**F-statistic**
BOP	F_{BOP}(BOP,EXR,RGDP,MS,INF,INT,CPS)		17.09813*
EXR	F_{MAN}(EXR,BOP,RGDP,MS,INF,INT,CPS)		69.70382*
RGDP	F_{SOM}(RGDP,BOP,EXR,MS,INF,INT,CPS)		19.99855*
MS	F_{CPNG}(MS,BOP,EXR,RGDP,INF,INT,CPS)		2182.118*
INF	F_{AGR}(INF,BOP,EXR,RGDP,MS,INT,CPS)		43.70672*
INT	F_{SVC}(INT,BOP,EXR,RGDP,MS,INF,CPS)		2.761917*
CPS	F_{LAB}(CPS,BOP,EXR,RGDP.MS,INF,INT)		935.3743*
Asymptoticcritical value	10%	5%	1%
Lower bound	1.99	2.27	2.88
Upper bound	2.94	3.28	3.99
F-statistic	Value = 13.42743		K = 6

Table 3 tests whether long-run relationship existsamong the variables. The result of the bounds tests for cointegration is presented in all functional models. The fact is that, the computed F-statistic for various functional models was discovered to be greater than both lower and upper bounds at 1%, 5% and 10% levels of significance. Hence, this suggests the rejection of null hypothesis that there is no long-run relationship between floating exchange rate and balance of payment in Nigeria. However, as stated earlier, the bound test results also indicate that when all the independent variables are taken as dependent variables, the computed F-statistic is higher than both lower and upper bound critical value at all levels. This also indicates the rejection of null hypothesis of no long run relationship among the variables under study.

Table 4: Results of Estimated Long run Coefficients Using ARDL Approach
ARDL, (2, 0, 2, 2, 0, 0, 1) Selected Based on Akaike Information Criterion

Regressor	**Coefficient**	**Standard error**	**T-ratio**
Dependent variable: BOP			
EXR	-6.764007	3.096445	-2.184442**
RGDP	0.133161	0.050840	2.619226**
MS	1.133425	0.538684	2.104065***
INF	-3.685671	4.192625	-0.879084
INT	-16.599973	21.063495	-0.788092
CPS	-1.277634	0.4378097	-2.916326**
C	1609.98	958.7758	-1.679209

Source: author's computation using EVIEWS software. *,**,*** indicate the level of significance at 1%, 5% and 10% respectively.

Table 4 indicates the existence of a long run relationship between the dependent variable (BOP) and independent variables. The long run coefficients are estimated using the ARDL. The ARDL model is estimated by setting the maximum lag length to be 2 and using Akaike Information Criterion in selecting the optimum lag order for the model. This was based on automatic selection.

V. DISCUSSION OF FINDINGS

From the model, the estimate shows that holding all variables constant, BOP was positively influenced by 1609.98. The coefficient of EXR is negatively related to BOP and statistically significant at 5% level. This means that 1% increase in exchange rate in Nigeria will result into 6.76% decrease in the level of balance of payment, which is not in line with monetary theory. This result is in line with the findings of Anthony (2015); Oladipupo and Onotaniyohuwo (2011); Bonface (2013), and Martins and Olarinde (2014). The coefficient of RGDP is positively related to BOP and statistically significant at 5% level, indicating that 1% increase in real GDP in Nigeria will result to 0.13% increase in the level of balance of payment. It is expected that as real GDP rises, the BOP position improves. This result is thus in conformity to the monetary theory that states that an increase in the national income improves BOP. The result is in conformity to the findings of Oladipupo and Onotaniyohuwo (2011) whose findings showed a positive relationship between the variables.

More so, the coefficient of MS is positively related to BOP and statistically significant at 1% level, showing that 1% increase in money supply in Nigeria will result into 1.13% increase in the level of balance of payment. It is known that an increase in money supply has the tendency to raise the level of income, and consequently reducing the level of interest rates. A fall in the level of interest rate improves the investment level and thus employment and production which can consequently improve a country's net export and thus the BOP position. The negative relationship between the two variables is not in line with theoretical preposition of monetarists which states that if money supply is increased people will have additional cash balances to buy more goods thereby raising prices of domestic and imported goods, thereby improving balance of payment. The result is in line with the findings of Oladipupo and Onotaniyohuwo (2011).

The coefficient of INF is negatively related to BOP but not statistically significant, indicating that 1% increase in inflation rate in Nigeria will result into 3.69% decrease in the level of balance of payment. The coefficient of INT is negatively related to BOP but not statistically significant, indicating that 1% increase in inflation rate in Nigeria will result into 16.6% decrease in the level of balance of payment.The coefficient of INT is positively related to BOP but not statistically significant. The coefficient of CPS is negatively related to BOP and statistically significant at 5% level, indicating that 1% increase in inflation rate in Nigeria will result into 16.6% decrease in the level of balance of payment.The coefficient of INT is positively related to BOP but not statistically significant.

Table 5: Error Correction Representation for the selected ARDL model
ARDL, (2, 2, 2, 1, 2, 2, 1) Selected Based on Akaike Information Criterion

Regressor	Coefficient	Standard error	T-ratio
Dependent variable: ΔBOP			
ΔEXR	-5.285938	3.368690	-1.569138
ΔRGDP	0.104380	0.052505	1.987996***
ΔMS	0.972835	0.383225	2.538549**
ΔINF	-3.503970	4.139403	-0.846492
ΔINT	2.185710	19.75529	0.110639
ΔCPS	-1.081673	0.275173	-3.930880*
ECM (-1)	-0.847965	0.153596	-5.520769*
R^2	93%		
D.W	2.52		

Source: author's computation using EVIEWS software. *,**,*** indicates the level of significance at 1%, 5% and 10% levels. Δ represents all short run coefficients at their first difference, while the values in the parentheses are the p-values.

Table 5 shows an estimated coefficient value of ECM (-1) (-0.847965) implying that the variables are well defined given the usual negative sign of (-0.847965) which enables it to adjusts to equilibrium position whenever the system is out of equilibrium. The ECM value is high, less than unity and statistically significant at 1%. The estimated coefficient shows that about 85% of this disequilibrium in the economy is corrected annually. In other words, almost 85% of the equilibrium of the previous year's shock is adjusted back to the long-run equilibrium in the current year. The negative sign confirms our earlier findings that BOP and its independent variables are cointegrated. The value of Durbin-Watson (2.52), which falls between the range 1.7 and 2.3 and that the value of DW is greater than R^2 (93%), means that the model is adequate and not spurious.The coefficient of determination R^2 is 0.635367 indicating that about 64% of the variation of BOP was explained by the variables controlled in the model between the year 1986 and 2016 while the remaining 36% were explained by other variables not captured by the model, which is represented by the error term. In addition, the result shows that the F-statistic is 4.356214 showing statistical significance at 5% level.

The short-term dynamic of the model has been examined by estimating an error correction model. In the short run, the deviations from the long run equilibrium can occur as a result of the shocks in any of the variables in the model. Table 5 shows the result of the short run dynamic coefficients associated with the long-

run relationships obtained from error correction model. The signs of the dynamic impacts in the long-run coefficients are maintained in the long run with the exception of (INT) interest rate.

Table 6: Results of Granger Causality Tests

Null Hypothesis	Lags	Obs	F-statisic	P-value
BOP does not Granger cause MS	2	29	6.37653	0.0060
CPS does not Granger cause BOP	2	29	8.88267	0.0013
RGDP does not Granger cause EXR	2	29	3.17041	0.0600
EXR does not Granger cause INF	2	29	6.10217	0.0072
EXR does not Granger cause INT	2	29	4.31568	0.0251
RGDP does not Granger cause MS	2	29	0.47944	0.0054
RGDP does not Granger cause INT	2	29	2.25909	0.0917
RGDP does not Granger cause CPS	2	29	8.16561	0.0020
CPS does not Granger cause MS	2	29	5.16468	0.0136
INF does not Granger cause INT	2	29	0.19036	0.0298

Source: author's computation using EVIEWS software.

Table 6 provides the results of granger causality tests. The decision on the direction of causality was made from the probability values of the test. The results indicate an evidence of unidirectional causality running from balance of payment to money supply, domestic credit to balance of payment,from exchange rate to inflation rate, from real GDP to money supply and from real GDP to domestic credit all at 1% level of significance. The results also indicate an evidence of unidirectional causality running from exchange rate to interest rate, from domestic credit to money supply and from inflation rate to interest rate all at 5% level of significance.The results also indicate an evidence of unidirectional causality running from real GDP to exchange rate and from real GDP to interest rate. It is noteworthy that the main determinant of exchange rate is real GDP.

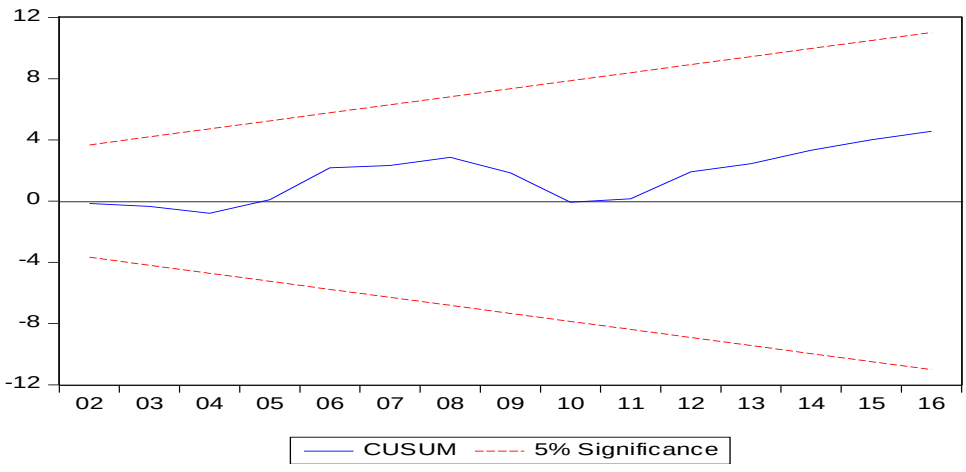
Table 7: Post-estimated Diagnostic Test Results for VECM

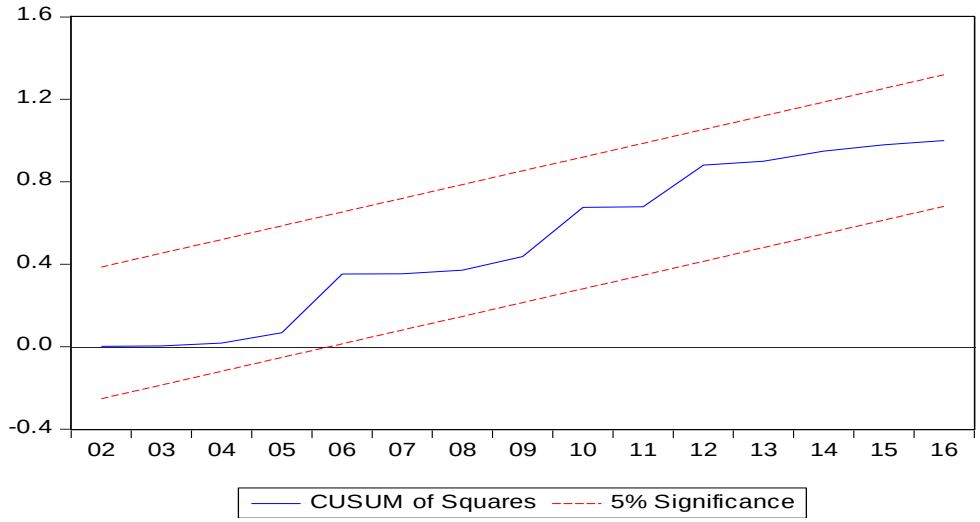
Tests	Coefficient/JarqueBera	P- Value
Serial Correlation LM Test	4.408181	0.1104
Ramsey RESET	0.011230	0.9171
Residual Heteroskedasticity Test	1.538391	0.2840
Jarque-Bera Residual Normality Test	2.0775580	0.353883

As presented in table 7, there is no evidence of diagnostic problem with the model. The lagrange multiplier (LM) test of serial correlation indicates the evidence of no serial correlation with P-value of 0.1104. The Ramsey RESET for functional specification shows that there is no evidence of misspecification with P-value of 0.9171. The Breusch-Pagan test (BP) for heteroskedasticity shows that the disturbance term in the model is homoskedastic with P-value of 0.2840. Also, the Jargue-Bera normality test implies that the residuals are normally distributedwith P-value of 0.353883and thus, the ARDL model is correctly specified given that all the P-values are greater than 5% level of significance.

VI. STABILITY OF THE ESTIMATED PARAMETERS

Model stability is necessary for prediction and economic inference. This is regarded as a sufficient condition, hence the study employed stability test for estimated parameters by using the cumulative sum of recursive residual (CUSUM) and cumulative sum of square (CUSUMS Q) tests. The graphical presentation of these tests is presented in the figures 1 and 2.





The results of the CUSUM and CUSUMSQ test are represented in figures 3 and 4 for the short run equilibrium respectively. Figure 3and 4 indicate that the model is stable, since CUSUM and CUSUM square lines are both within the 5 percent critical bound. This indicates that the coefficients of the error correction model are stable.

VII. CONCLUSION AND RECOMMENDATION

The main topic of discussion was not only to empirically investigate the impact of floating exchange rate on balance of payment, but also to relate the findings of this study to the theoretical propositions related to this study as well as the related previous studies. However, based on the findings of this study, we conclude that floating exchange rate contributed positively to balance of payment in both short-run and long-run. For causality relationship, balance of payment has unidirectional causality relationship with money supply and domestic credit. Hence, the major determinant of exchange rate is real GDP which in turn influenced balance of payment during the study periods in Nigeria. We also conclude that the nexus among the variables is inconclusive.

Noteworthy is the fact that the policy implication of this is that exchange rate depreciation which has been preponderant in Nigeria especially since 1986 has not been very useful in promoting the country's positive BOP due to the negative relationship between balance of payment and exchange rate, and internal forces. It is important to stress that the results of the study are based on the proxies employed and that the findings may be country-specific.

Therefore it was recommended amongst other things that the policy of exchange rate depreciation should be maintained but with government intervention guide. Government through Central Bank of Nigeria (CBN) should apply expenditure reducing monetary policies through money supply and domestic credit to promote favourable BOT which invariably stabilizes BOP.

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