The Empirical Analysis of Monetary Policy on Balance of Payments Adjustments in Nigeria: A Bound Testing Approach

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Abstract

This study investigates the impact of monetary policy on balance of payments (BOP) adjustment in Nigeria within the periods, 1980-2015. The study used the bound testing approach to show the relationship that exists among monetary policy variables (money supply, domestic credit, inflation and exchange rate), output growth, and trade balance and BOP adjustment in Nigeria. The study shows that there is a long-run relationship between monetary policy variables and balance of payment adjustment. The findings further revealed that in the long-run, money supply and trade balance have positive impact on balance of payments adjustment in Nigeria. On the other hand, domestic credit, exchange rate, inflation rate and gross domestic product suggest a negative impact on balance of payments in Nigeria. An important observation from the empirical estimate is that money supply has more of a long-term impact on BOP adjustment than other monetary policy variables. This study suggests that in stabilizing the BOP position of the country, the apex bank should try as much as possible to balance money supply and demand for money so as to avoid distortion in price.
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1. Introduction
Every economy always strive to achieve the five macroeconomic goals in which the aim of the current monetary policy is to maintain

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price stability and equilibrium balance of payments. The other three goals which are promotion of output growth, equal distribution of income and employment generation are secondary. In Nigeria, the balance of payments (BOP) has been unfavorable because of the country's nature of import and export. This has invariably led to depletion in her foreign reserves, depreciation of Naira, reduction in the productive sectors and persistent price instability. The country's apex bank has taken steps to reduce the BOP deficits through various policy formulation and implementation which has not yielded concrete results. Data from the Central Bank of Nigeria (CBN) shows that the country experienced twenty-nine years of BOP deficits since independence till 2015 (CBN statistical bulletin, 2015).

There have been different schools of thought on the balance of payments adjustment. The classical school centered on gold standard and lay emphasizes on the role of prices and interest rates. The limitations of the approach was that the flows of gold are indirectly related to domestic money supply, and any fall in money supply reduces output and employment rather than prices, while full employment is unattainable which invariably make prices increases as money supply increases (Tijani, 2014). The Keynesian school lay on this weakness and they stressed on income changes affecting BOP adjustment. It shortcomings was however noted that, countries with surplus in income experience rising national income, leading to an increased demand for imports- partially offsetting the surplus, this is otherwise for the deficit nations. For instance, if two countries trade as one country experiences deficit, another country experiences surplus. The Monetary approach was developed as the modern approach in order to overcome the deficiency of the other approaches. It focuses on the role of money in BOP changes and adjustment. The approach also noted that the disequilibrium of BOP is as a result of imbalance between the supply and demand for money. Carbaugh (2004) noted that excess supply of money encourages imports, which results in foreign exchange reserves flowing overseas and reducing the money supply.

Several studies have been conducted on the monetary approach to balance of payments using different estimation techniques. However, this study employs the autoregressive distributed lag (ARDL)

technique to examine the monetary approach of BOP adjustment in Nigeria within the periods, 1980-2015. The importance of this approach is that it allows greater insights on the long run relationship between monetary policy and BOP adjustment. In addition, the approach distinguishes the long-run elasticities from short-run elasticities, and uses the short-run model to estimate the speed of adjustment in BOP adjustment after a shock to the estimated system. Estimating both the long-run and short-run elasticities are important for both policy purposes and additional econometric modelling, such as forecasting.

The rest of this paper is divided into four sections. Section II contains the literature on the monetary approach of BOP adjustment. Section III presents the methodology. Section IV provides the discussion of the estimation technique while section V summarizes and conclude with some policy implications.

2. Literature Review
A thought-provoking issue that remains controversial and even among monetary experts for decade is the applicability of monetary policy in accomplishing all macro-economic goals. Nonetheless, there exists the lack of consensus among economists concerning how effective and/or the size of its impact on the overall economy. The monetarist approach to balance of payments emanates from the David Hume price-specie-flow mechanism, which was launched as a counter-argument to the mercantilist belief that a country can achieve a relentless balance of payments surplus by import-substituting and export-promoting policies. The thought, which regards the balance of payments as a "*monetary phenomenon*", expresses the relationship between a country's balance of payments and its money supply (Chacholiades, 1990: 463). Furthermore, it argues that there is disequilibrium in the money market if there are surpluses and deficits in the balance of payments. Deficits are caused by money supply exceeding money demand, while surpluses are caused by money demand exceeding money supply (Howard & Mamingi, 2002). The monetary approach largely emphasizes the monetary implications of balance of payments disequilibria. In terms of prices, it regards the general price level as the determinant of the real value of nominal

assets, money and international debt. Relative prices seem to play a secondary role as they are considered to have only a transitory effect on the balance of payments.

Several studies have been carried out in this regards. Using a panel regression approach, Adamu and Itsede (2010) investigate the monetary approach of balance of payment in West African Monetary Zone. The panel estimation techniques employed are pooled Ordinary Least Square (OLS), fixed effects, Differenced Generalized Method of Moments (GMM) and system GMM. The results revealed that the gross domestic product (GDP) growth had a direct effect on the change in net foreign assets, implying that a country's income plays a significant role for its net assets. The study further showed that estimated parameter on the change in domestic credit was statistically significant and consistent with theoretical expectation. The findings showed an indirect relationship between domestic credit and net foreign asset, which implies that balance of payment adjustment worsen as domestic credit increases. Inflation rate was found to be a weak determinant of balance of payment position in the region. The study concluded that the monetary approach is applicable for both within-country and cross-country. Similarly, the findings of an earlier study by Looney (1991) using the Ordinary Least Squares (OLS) method showed that monetary approach is appropriate in explaining balance of payments fluctuations in the Caribbean. The results revealed that all indicators considered (interest rates, prices and gross domestic products) were statistically significant at the conventional level which also came out with appropriate signs.

For country-specific studies, Radulescu (2007) examined the monetary factors influencing the elements of the balance of payments in Rome. The study used Augmented Dickey Fuller (ADF) to test the stationarity level and OLS to evaluate the long-run estimates. The author found that the monetary policy of the central authority did not support the efforts for the recovery of the economy. Almost during the entire decade, the monetary policy was harsh, restrictive, basically oriented towards controlling inflation, thus neglecting the other macroeconomic variables, such as the local savings discouraged by the high inflation and the investments that would have supported the economic growth. Dhliwayo (1996) used data for the period 1980-

1991 to investigate the monetary approach to balance of payment in Zimbabwe. His findings indicate a one to one negative relationship between domestic credit and the flow of international reserves. The empirical results validate the MABP in Zimbabwe, which implies that money plays a significant role in the determination of deficit in the balance of payments.

While investigating the monetary approach to balance of payment in Ghana for the period of 1980-2010, Alexander (2013) found that inflation is statistically significant but 1% increase in domestic credit leads to 6.6% decrease in reserve which implies that excessive generation of credit causes differences in reserve. The study concluded that though monetary variables are not solely responsible for the disequilibrium in balance of payments, other factors such as government expenditure also play a role. Boateng and Ayetimi (2013) also provided an empirical analysis of balance of payments in Ghana using the monetary approach. The results from the Error Correction Model (ECM) approach employed revealed that balance of payments disequilibrium in Ghana was not influenced only by monetary variables. The study found that domestic credit and interest rate were negatively related to net foreign assets while GDP growth is positively related. The study argued that government expenditure and public debt may have influenced balance of payments in Ghana.

In Nigeria, Obioma (1998) used data for 1960-1993 to test the validity of monetary approach to balance of payments adjustment under fixed and flexible exchange regimes. The author found that an increase in domestic credit on money stock leads to external reserves outflow or adverse balance of payment during the fixed exchange rate regime. But in the flexible exchange rate era, an increase in domestic credit brings about exchange rate depreciation. Using Johansen cointegration and Error Correction Model approaches, Nwani (2003) considered other economic indicators by investigating the long-run determinants of balance of payments dynamics in Nigeria between 1981 and 2002. Prior to the long-run relationship test, the author found that all the variables except balance of payments, exhibited non-stationarity. The results also indicate that balance of payments cointegrated with all the identified explanatory variables, suggesting that balance of payments fluctuations in Nigeria could be caused by

the level of trade openness, external debt burden, exchange rate movement and domestic inflation. The study concluded that a reduction in fiscal deficits, an increased domestic production through private investment, inflation targeting and regulated capital market integration are the panacea to the negative fluctuation in the Nigerian balance of payments. Imoisi (2012) also got a similar result conducted for Nigeria only where the author found out that balance of payments and inflation rate have insignificant relationship whereas, exchange rate and interest rate report significant impact on balance of payments. The result also conforms to the theory. A study by Jimoh (2004) used data from 1960-1995, also found that the monetary approach is relevant in analyzing balance of payments adjustments in Nigeria.

Imoisi, Olatunji and Ekpenyong (2013) examine the efficacy of monetary policy in achieving balance of payments stability in Nigeria with a time series data from 1980-2010. Using the Ordinary Least Squares (OLS) technique, the result showed a positive relationship between the balance of payments and monetary policy variables like money supply, exchange rate and interest rate. Money supply and interest rate had significant relationship with balance of payments, whereas exchange rate was not statistically significant. Tijani (2014) also made attempt to investigate the monetary approach of balance of payment adjustment in Nigeria so as to correct disequilibrium in balance of payments using a data set from 1970 to 2010. The results reported direct relationship between the balance of payments and its factor determinants such as domestic credit, exchange rate and balance of trade while inflation rate and gross domestic product indicated indirect relationship. The study concluded that though not entirely, monetary measures constitute immensely to the position of balance of payments, cause disturbances and also serve as adjustment mechanism to bring BOP to equilibrium depending on its application and policy mix by monetary authority.

Imoughele and Ismaila (2015) investigate the monetary policy approach to balance of payment in Nigeria within the periods, 1986 to 2013. Employing the Error Correction Model (ECM), the study revealed that the major monetary policy variables that determine the stability of balance of payment are exchange rate, money supply and domestic credit to the private sector. The authors concluded that

balance of payment is a monetary phenomenon. While examining the determinants of balance of payment adjustment within the period of 1970 to 2010, Ajayi (2015) found that a higher exchange rate and a lower monetary policy rate and money supply will boost balance of payment in Nigeria. Proso, Inaya and Okoye (2017) examine the impact of monetary policy (money supply, interest rate and exchange rate) on balance of payment in Nigeria from the periods, 1980-2015. Using Ordinary Least Square (OLS), the coefficients were all consistent with a'priori expectation but money supply and interest rate had significant relationship with balance of payments whereas exchange rate was not statistically significant. Nwanosoke et al. (2017) verified the Marshall-Lerner hypothesis by investigating whether a nominal devaluation of exchange rate improves the balance of payment position of the Nigerian economy. The results revealed that the condition is not meant in the short-run as a negative relationship exists between exchange rate and balance of payment. The study however revealed that money supply improves the balance of payment position within the periods considered.

The study found that a sizeable number of empirical studies have been done in this regard. Also, the review exposed previous studies on methodological problem which have reflected in their results. Most of the variables combine both stationary at levels and first difference data in their analysis by default. This study seeks to evaluate the objectives using the autoregressive distributed lag (ARDL) model to establish short-run and long-run estimates. The method is appropriate for this study as the series combines both levels and first difference and the period of analysis is greater than thirty. The approach also allows greater insights on the long run relationship between monetary policy and BOP adjustment.

3. Methodology
3.1 Model Specification and Data Source
This study investigates the impact of monetary policy transmission on the balance of payment adjustment in Nigeria. Several scholars have identified the contemporary relationship between monetary policy variables and balance of payment but this study reestablished if the relationship still exists, their magnitude and direction. The general

framework of balance of payment (BOP) was adapted for this study as described by Kallon (1994), and the money supply equation by Johnson (1977). The empirical model for this study modified the model of Tijani (2014), which is stated as:

$$BOP_t = \beta_0 + \beta_1 MS_t + \beta_2 DC_t + \beta_3 TB_t + \beta_4 EXR_t + \beta_5 INF_t + \beta_6 GDP_t + e_t \tag{1}$$

Where: *BOP* is balance of payments; *MS* is money supply; *DC* is domestic credit; *TB* is trade balance; *EXR* is exchange rate; *INF* is inflation rate; *GDP* is gross domestic product; β_0 is constant, β_{1-6} are slopes, e is error term; and t is time. The theoretical expectation of the model expects the slope of money supply to be positive or negative. An increase in money supply will bring about an increase in the total money in circulation in the country. Invariably, it will increase aggregate demand and lead to a rise in productive activities and investment opportunities in the economy. This rise in the productive activities in the economy will lead to a rise in the export of goods and services, thus, leading to a rise in the balance of payments position of the country. It can also be negative as excess money in circulation prompt citizens in many developing countries to depend on imported commodities which will have adverse effect on balance of payment. In addition, a direct relationship between trade balance and BOP is expected because balance of trade is favorable i.e. when export is greater than import, and then there is favorable balance of payments.

However, domestic credit is expected to have a negative relationship with balance of payments. An increase in exchange rate (price of a country's currency with respect to other currencies of the world) will make the domestic currency cheaper in the foreign exchange market. This depreciation in the domestic currency will make our exports cheaper and imports expensive in the international market for goods and services. As a result of this, our goods and services would be more in demand thus, leading to a rise in the balance of payments position of the country. It is also expected that the growth of GDP will increase when export exceed import which invariably increase the balance of payments. Moreover, when there's inflation in an economy people

tends to rely on imported goods whose price does not change, therefore it brings about unfavorably balance of payment.

The data used is mainly secondary, which are sourced from the Central Bank of Nigeria (CBN) statistical bulletin 2015, volume 26 and National Bureau of Statistics (NBS). The period considered is from 1980 to 2015.

3.2 ARDL Bounds Cointegration Test

The study employs the Autoregressive Distributed Lag (ARDL) bounds test by Pesaran, Shin and Smith (2001) to examine the effects of monetary policy transmission on balance of payments in the long and the short run periods in Nigeria. With this approach, balance of payments is expressed as a function of the lagged value of itself and the current and the lagged values of the explanatory variables.

$$
\begin{aligned}
\Delta bop_t &= a_{0nose} + \sum_{p=1}^{n} b_{pnose}\Delta bop_{t-p} + \sum_{p=1}^{n} c_{pnose}\Delta ms_{t-p} + \sum_{p=1}^{n} d_{pnose}\Delta dc_{t-p} \\
&+ \sum_{p=1}^{n} e_{pnose}\Delta tb_{t-p} + \sum_{p=1}^{n} f_{pnose}\Delta exr_{t-p} + \sum_{p=1}^{n} g_{pnose}\Delta inf_{t-p} + \sum_{p=1}^{n} h_{pnose}\Delta gdp_{t-p} \\
&+ \rho_{1nose}bop_t + \rho_{2nose}ms_t + \rho_{3nose}dc_t + \rho_{4nose}tb_t + \rho_{5nose}exr_t + \rho_{6nose}\,inf_t \\
&+ \rho_{7nose}gdp_t + \varepsilon_t
\end{aligned}
$$

(2)

where Δ is the first difference operator. The parameters ρ_i, where i = 1,2,3,4,5,6,7 are the respective long run multipliers while the parameters b, c, d, e, f, g, h are the short run dynamic coefficients of the underlying ARDL model in the equation. ε_t denotes the white noise error term. The Bounds cointegration test will involve estimating equation (1) and restricting the parameters of the lag level variables to zero. Based on this equation, we tested the following null and alternative hypotheses:

$H_0 = \rho_1 = \rho_2 = \rho_3 = \rho_4 = \rho_5 = \rho_6 = \rho_7 = 0$ (i.e. no cointegration or level relationship) as against $H_1 = \rho_1 = \rho_2 = \rho_3 = \rho_4 = \rho_5 = \rho_6 = \rho_7 \neq 0$.

The existence of cointegrating relationship among the variables is determined by testing the significance of the lag levels of the variables using the F-test. The calculated F-statistic is compared with the two critical values for the upper and lower bounds tabulated by Narayan (2004). Owing to the fact that the direction of cointegration is not a priori established, then each variable is normalized as dependent variable while the existence of level relationship is tested. The study also conducted diagnostic tests such as serial correlation, normality, functional form and heteroscedasticity tests.

4. Data Analysis and Interpretation
4.1 Descriptive Analysis
Table 4.1 presents the descriptive analysis of the time series properties of the variables included in the model. The descriptive statistics was carried out between money policy transmission and balance of payments adjustment in Nigeria from 1980 to 2015.

The table shows that the mean value of balance of payments (BOP), money supply (MS), domestic credit (DC), trade balance (TB), exchange rate (EXR), inflation rate (INF) and gross domestic product (GDP) stood at -0.27%, 10.9%, 10.4%, 6.9%, 1.87%, 15.57% and 11.55% correspondingly. The standard deviation of balance of

Table 4.1: Descriptive Statistics

	BOP	MS	DC	TB	EXR	INF	GDP
Mean	-0.2680	10.8495	10.3893	6.8505	1.8693	15.4779	11.5485
Maximum	14.396	16.7547	16.7427	15.5773	5.2806	72.8100	18.0500
Minimum	-14.2626	5.5895	4.6944	-14.6179	-0.6045	0.2900	7.8196
Std. Dev.	9.5010	3.6516	3.8278	8.0456	2.3380	16.7539	2.5627
Skewness	0.1166	0.1055	0.1367	-0.9506	0.2717	1.7527	0.3090
Kurtosis	1.5980	1.7225	1.7653	2.8627	1.3359	5.3805	3.2172
Jarque-Bera	4.7130	3.9121	3.7319	8.4772	7.1508	41.895	1.0012
Probability	0.0948	0.1414	0.1548	0.0144	0.0280	0.0000	0.6062
Obs.	36	36	36	36	36	36	36

Source: Author's computation (2017).

payments (BOP), money supply (MS), domestic credit (DC), trade balance (TB), exchange rate (EXR), inflation rate (INF) and gross domestic product (GDP) from their respective long term mean values every year point at 9.5%, 3.65%, 3.82%, 8.05%, 2.34%, 16.75% and 2.56%. The probability value of Jarque-Bera statistics for all variables shows their distribution level at mean zero and constant variance. It indicated that balance of payments, money supply, domestic credit and gross domestic product are normally distributed among all the variables of interest.

Figure 4.1a: Monetary Policy Instrument, Trade Balance and Balance of Payment in Nigeria (1980-2015)

Figure 4.1a-b illustrates the relationship among monetary policy instrument, output growth and balance of payment in Nigeria during the period of 1980 to 2015. The relationship between the variables is not clear enough to indicate whether it is positive or negative. To some extent, there is similar movement between money supply and domestic credit throughout the periods. The growth rate of output fluctuates between 7.81% and 18.05%. The growth in balance of payments changes from 1980-2015, likewise inflation rate.

Figure 4.1b: Monetary Policy Instrument, Output Growth and Balance of Payment in Nigeria (1980-2015)

Thus, the inconclusiveness of the direction of our variables necessitates the need for an empirical analysis.

Table 4.2: ADF Unit Root Test Results

Variables	ADF Tau Statistics		Order of Integration
	Intercept	Linear Trend	
BOP	-9.8851 (1) [-3.5600]*	-9.8605 (1) [-4.1409]*	1
MS	-3.8149 (0) [-3.5575]*	-3.7344 (0) [-4.1373]*	1
DC	-5.0183 (0) [-3.5575]*	-4.9720 (0) [-4.1373]*	1
TB	-3.5553 (0) [-3.5550]*	-4.0508 (0) [-3.4937]*	0
EXR	-5.7924 (0) [-3.5575]*	-5.8375 (0) [-4.1373]*	1
INF	-3.4829 (0) [-3.5550]**	-3.4694 (0) [-3.4937]**	0
GDP	-7.3547 (0) [-3.5575]*	-7.4264 (0) [-4.1373]*	1

Note: * significant at 1%; ** significant at 5%; *** significant at 10% Mackinnon critical values and are shown in parenthesis. The lagged numbers shown in brackets are selected using the minimum Schwarz and Akaike Information criteria.
Source: Author's computation (2017).

4.2 Unit Root Test Results
Table 4.2 presents the results of the time series properties of the variables included in the model. This pre-test was carried out before estimating the long-run and short-run relationship among monetary policy and balance of payment in Nigeria (1980-2015).

The Augmented Dickey Fuller (ADF) unit root test results is presented in table 4.2 indicate that trade balance (TB) and inflation rate (INF) are stationary at levels [I(0)]. However, balance of payments (BOP), money supply (MS), domestic credit (DC), exchange rate (EXR) and gross domestic product (GDP) were reported to be stationary at first difference [I(1)]. Thus, these series are non-mean reverting at levels and do not converge to their long-run equilibrium until they are first differenced.

4.3 Autoregressive Distributed Lag (ARDL) Results
4.3.1 ARDL Cointegration Result
Econometric literature argued that regressing a stationary series on non-stationary series has severe implications in drawing policy inference. The data series provides evidence for the use of Autoregressive Distributed Lag (ARDL) technique of analysis. As posited by Pesaran et al. (2001), ARDL is more suitable for variables at different order of integration. The F-statistics estimate for testing the existence of long-run relationship between monetary policy transmission and balance of payment in Nigeria are presented below thusly:

Table 4.3: Existence of Long-Run Relationship between Monetary Policy and Balance of Payment

Test Statistic	Value	k
F-statistics (BOP| MS, DC, TB, EXR, INF, GDP)	7.8518	6
Critical Value Bounds		
Significance	**I0 Bound**	**I1 Bound**
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Source: Author's computation (2017).

The estimated F-statistics of the normalized equations (F_{arb} = 7.8518) is greater than the lower and upper critical bound at 1% significance level. It implies that the null hypothesis of no long-run relationship is rejected at 1% significance level. The implication of the above estimation is that balance of payments (BOP), money supply (MS), domestic credit (DC), trade balance (TB), exchange rate (EXR),

inflation rate (INF) and gross domestic product (GDP), all have equilibrium condition that keep them together in the long-run.

4.3.2 Results of Long-run Estimates of Monetary Policy and Balance of Payment Using the ARDL Approach
The table below reveals the long-run estimates between monetary policy and balance of payment adjustment in Nigeria.

Table 4.4: Long Run Coefficients [ARDL: 2, 3, 1, 0, 1, 0, 4]

Dependent Variable: Balance of Payments (BOP)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
MS	11.557071	8.871754	1.302682	0.2014
DC	-8.390269	8.204471	-1.022646	0.3137
TB	0.520373	0.159189	3.268900	0.0025
EXR	-0.859197	1.239420	-0.693225	0.4929
INF	-0.112958	0.064450	-1.752639	0.0887
GDP	-3.907067	1.581591	-2.470340	0.0187
C	9.309993	9.338791	0.996916	0.3258

***,**,* indicate 1%, 5% and 10% level of significance respectively
Source: Author's computation (2017)

The long-run estimates suggested that money supply (MS) and trade balance (TB) have positive impact on balance of payments (BOP) adjustment in Nigeria and all these conform to theoretical expectation. Specifically, a 1% point increase in money supply (MS) and trade balance (TB) increase balance of payments (BOP) by 11.56% and 0.52% respectively.

However, domestic credit (DC), exchange rate (EXR), inflation rate (INF) and gross domestic product (GDP) suggest a negative impact on balance of payments (BOP) in Nigeria. This does conform to a priori expectation except exchange rate and output growth. Thus, if the domestic credit (DC), exchange rate (EXR), inflation rate (INF) and gross domestic product (GDP) increase by 1%, balance of payments (BOP) is expected to reduce by 8.39%, 0.86%, 0.11% and 3.91% correspondingly. The table shows that trade balance and gross domestic product were statistically significant respectively at 0.05 critical values, whereas inflation rate was significant at 10% significance level.

4.3.3 Error Correction Models using the ARDL Approach

The short-run dynamic relationship between monetary policy and balance of payments in the Nigeria indicating the second part of the estimated ARDL model is reported below in Table 4.5. The lag lengths were selected based on Akaike Information Criterion (AIC). The table below reveals the short-run dynamic estimates among variables of interest.

Table 4.5: Estimated Short-run Error Correction
Model [ARDL: 2, 3, 1, 0, 1, 0, 4]

Dependent Variable: Balance of payments (BOP)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Δ(BOP(-1))	0.376191	0.127774	2.944186	0.0058
Δ(MS)	2.514590	9.942766	0.252906	0.8019
Δ(MS(-1))	12.339789	17.057075	0.723441	0.4744
Δ(MS(-2))	-29.843982	9.646877	-3.093642	0.0039
Δ(DC)	10.252902	8.932534	1.147816	0.2591
Δ(TB)	0.600037	0.167893	3.573930	0.0011
Δ(EXR)	-9.333366	4.213939	-2.214880	0.0336
Δ(INF)	-0.130251	0.078895	-1.650952	0.1080
Δ(GDP)	0.845915	1.512775	0.559181	0.5797
Δ(GDP(-1))	-3.072644	2.024639	-1.517625	0.1384
Δ(GDP(-2))	1.630787	3.650458	0.446735	0.6579
Δ(GDP(-3))	7.782849	3.045778	2.555291	0.0153
ECT(-1)	-0.115309	0.014518	-7.942686	0.0000

***,**,* indicate 1%, 5% and 10% level of significance respectively.
Source: Author's computation (2017)

The short-run estimates suggested that the first lag of balance of payments exact positive and significant impact on the current balance of payment adjustment in Nigeria. Thus, the short-run estimates of the money supply, domestic credit and inflation rate were also shown in the table. The error correction term indicates the speed of adjustment to restores equilibrium in the model. The value is negative also significant at 1% significance level. Specifically, the lag of the error correction term (ECT) was found statistically significant at 1% level with the co-efficient of -0.1153. This indicates that 11.5% of the distortion in the short-run is corrected in the first year in attaining equilibrium or balance of payment adjustment on the basis of the changes in the monetary policy variables, output growth and trade balance in Nigeria.

4.3.4 Diagnostic Tests

The estimated ARDL model is tested for heteroscedasticity, serial correlation, functional form misspecification, parameter stability and normality. The results from these tests are shown in the Table 4.6.

Table 4.6: Diagnostic Tests of Selected ARDL Model

Results	
Serial Correlation: 2.6848 [0.0836]	**Normality Test:** 1.2162 [0.5444]
Functional Form: 1.5666 [0.1267]	**Heteroscedasticity Test:** 1.5564 [0.1332]

Source: Author's computation (2017)

The estimated ARDL model revealed that the model passed the serial correlation, normal test, heteroscedasticity Ramsey RESET tests, that is the error terms are uncorrelated, normally distributed, same variance and the model is not mis-specified. Thus, they were satisfactory for the ARDL model.

5. Summary and Conclusion

This paper examines the effect of monetary policy on balance of payments adjustment in Nigeria between the periods, 1980-2015. Using the bound testing approach, the study reveals the relationship that exists among monetary policy variables, output growth, trade balance and BOP adjustment in Nigeria. However, there are few studies that examine these relationships while their results are best described as mixed based on the approaches of the different school of thoughts. Based on the ARDL estimates, it was observed that in the long-run, money supply and trade balance have positive impact on balance of payments adjustment in Nigeria. However, domestic credit, exchange rate, inflation rate and gross domestic product suggest a negative impact on balance of payments in Nigeria. An important observation from the empirical estimate is that money supply has more of a long-term impact on BOP adjustment than other monetary policy variables. Thus, the study supports the monetary approach of the Chicago schools. Following these findings, this study proposes that in stabilizing the BOP position of the country, the apex bank should try as much as possible to balance money supply and demand for money so as to avoid distortion in price. The protection of infant industries should be taken into consideration in order to earn foreign

currency through diversifying of export which will stabilize both exchange rate and balance of payments.

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