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## Relative Effectiveness of Monetary Policy on Balance of Payment: Evidence from Nigeria

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### Abstract

**T**his study examined the effectiveness of monetary policy on Balance of Payment (BOP) positions in Nigeria. The effectiveness of monetary policy in correcting BOP deficit and maintaining external balance is the reason behind this study. Monetary instrument investigated are; Broad Money Supply (M2), Monetary Policy Rate (MPR) and Prime Lending Rate (PLR). The study employed time-series data which spanned between 1981 and 2016. Auto-Regressive Distributed Lag (ARDL) Model was used to examine the effects of stochastic shocks of the endogenous variables in the midst of Error Correction Model (ECM) technic to establish the long-run effect of Monetary Policy Instrument on Balance of Payment. The findings shows that Long run relationship exists among the monetary policy variables and BOP. The core outcome of this study is that monetary policy variables of Broad money supply, Monetary Policy Rate and Prime Lending Rate are major monetary factors that determine BOP in Nigeria. The study concluded that monetary policies and implementation capacity is important in the Nigerian economy, because it is very special for determining Balance of Payment positions and its spill over effect on Internal Balance. Also, from the study, Balance of Payment has been established to be a monetary phenomenon and monetary policy can be used by monetary authority to improve and stabilised the foreign sector performance in Nigeria.

**Key words:** monetary, payment, authority, external, instrument, relationship, economy.

JEL classification: P43, F4, E5 and F31

## INTRODUCTION

Over the years, the objectives of monetary policy have remained the need for attainment of internal and external balance (that is equilibrium in the balance of payments). However, emphases on technique/instrument to simultaneously achieve internal balance and equilibrium in the balance of payments have changed over the years. There have been two major phases in the pursuit of monetary policy in Nigeria before and after 1986, Danjuma, (2013). The first phase placed emphasis on direct monetary controls, while the second was based on market mechanisms. A review of Nigeria's monetary policy performance before 1986 shows that the economic environment that guarded monetary policy was characterized by the dominance of the oil sector and over-reliance on the external sector in order to maintain internal balance and a healthy balance of payments position. The monetary authority in Nigeria depended on the use of direct monetary instruments such as credit ceilings, selective credit controls, administered interest and exchange rates, as well as the prescription of cash reserve requirements and special deposits. The use of market-based instruments was not feasible at this point because of the underdeveloped nature of the financial markets and the deliberate restraint on interest rate.

The Central Bank of Nigeria (CBN) has over the years sought a predictable and stable money supply function. This is due to the fact that a stable money supply function augments economic growth and rise in the standard of living. It is often suggested that financial reforms could lead to an unstable supply for money and changes in money velocity and this in turn have consequences for monetary policy implementation, Danjuma (2013). In countries where the Central Bank targets a money aggregate, for instance using reserve money to implement monetary policy, the effectiveness of monetary policy rests mainly on the stability of the monetary transmission mechanism as well as money velocity. When this relationship is subjected to unexpected shifts, monetary targets lose their transparency and are less able to accurately signal the appropriate stance of monetary policy, Emmanuel & Inaya (2016),

Hence, a stable money supply function acts as a stabilization policy which depends on the ability of Central Bank to adjust money supply to its supply in order to avoid monetary disturbances from inhibiting external balance. It is argued that the relationship between money supply on one hand and prices, income, and balance of payment on the other is determined by the supply for money, and such relationship plays an important role in macroeconomic theory. Several important factors have influenced and shaped the evolution of empirical research on the supply for money. First, there is evolving nature of theories on the supply for money. Second, the growing arsenal of econometric techniques that has permitted more sophisticated examination of dynamics, functional forms, and expectations. Third, and most importantly, research has been spared by the apparent breakdown of existing empirical models in the face of newly emerging data (Tahir, 2005). Thus, in line with maintaining external balance, the apex bank strives to promote and maintain monetary stability through the management of debt and foreign exchange rate. In essence, appropriate supply and supply management policies by the CBN necessary for economic development requires money to be stable and functional (Nwafor, 2007).

Articulated efforts have been made by monetary authorities especially, Central Bank of Nigeria (CBN), on how to drastically reduce the Balance of Payments deficits in the economy. This is usually done through the formulation and implementation of appropriate monetary policy measures. The objective of this study is to; identify the extent to which monetary policy has achieved Balance of Payment stability in Nigeria from 1981-2016. The basic focus here is to

identify and define the extent to which monetary policy measures have achieved Balance of Payments stability in Nigeria.

### LITERATURE REVIEW

According to Otaki (2005) balance of payments is a systematic record of all economic transactions, visible as well as invisible between one country and the rest of the world over a given period of time. It shows the relationship between one country's total payments to all other countries and its total receipts from them. BOP, thus is a statement of payments and receipts and also international transactions. Payments and receipts on international account are of three categories; (a) The visible balance of trade (b) The invisible items and (c) Capital transfers.

Magee (1976) defines balance of payments as "a systematic record of all financial transactions between the residents of the reporting country and the residents of foreign countries during a given period of "time" usually a year. In the words of Loto (2012), "Balance of payments of country is record of the monetary transactions over a period with the rest of the world".

Tijani (2013) describes it as a statistical record of the character and dimension of the country's economic relationship with the rest of the world.

The balance of payment is defined as a systematic record of economic and financial transactions for a given period of time, say one year, between residents of an economy and non-residents and the rest of the world (Nwani, 2003). These transactions involves the provision and receipt of real resources, goods, services and income, changes in claims on and liabilities to the rest of the world. The balance of payment records transaction of goods, services and income, changes in ownership and other changes in an economy's holding of monetary gold, Special Drawing Rights (SDRs) and claims on and liabilities to the rest of the world. A negative balance of payments means that more money is flowing out of the country than coming in, and vice-versa. Balance Of Payments (BOP) may be used as an indicator of economic growth and political stability. For example if a country has consistently positive BOP, this could mean that there is significant foreign investment within that country. It may also mean that the country does not export much of its currency. Adamu and Itsede (2010) categories disequilibrium in the balance of payments of Sub-Saharan African to be either temporary or fundamental while Temporary disequilibrium is caused by random variations in trade, seasonal fluctuations, and the effects of unfavourable weather on agricultural production, which tend to be self- equilibrating within a short time. Amassoma (2011) examined the effect of monetary policy on macroeconomic variables in Nigeria for the period 1986 to 2009 by adopting a simplified Ordinary Least Squared technique and found that that monetary policy had a significant effect on exchange rate and money supply while monetary policy was observed to have an insignificant influence on price instability. Onyeiwu (2012) examines the impact of monetary policy on Balance of Payment using the Least Squares Method to analyse data between 1981 and 2010. The result of the analysis shows that monetary policy denoted by money supply exerts a positive and significant impact on GDP growth and Balance of Payment. Furthermore, the findings of the study support the Monetarist theory for Nigerian economy. Danjuma (2013) determine whether excess monetary policy has played a significant role in the disequilibrium of balance of payment in Nigeria between 1986 and 2010.

Using Cointegration, Vector Error Correction Mechanism and Forecast Error Variance Decomposition the results confirm that balance of payment in Nigeria is not a purely monetary affair and monetary authority in the country should seriously monitor monetary transmission mechanism because this also cause domestic credit increase. Imoisi (2012) examined the trends in Nigeria's Balance of Payments position from 1970-2010 using an econometric analysis and found that exchange rate and interest rate as monetary variable has a significant impact on Nigeria Balance of Payments and inflation rate was not significant. Tijani (2013) empirical Analysed

Balance of Payment Adjustment Mechanisms using Monetary Transmission in Nigeria from 1981– 2010. The regression analysis found a positive relationship between the BOP and Money Supply, Exchange Rate and Balance of Trade while Inflation Rate and Gross Domestic product have a negative effect and concluded that monetary Variables constitute immensely to the position of BOP, cause disturbances and also serve as adjustment mechanism to bring BOP to equilibrium depending on it application and policy mix by monetary authority. Imoisi, Olatunji and Ekpenyong (2013) study the efficacy of monetary policy in achieving Balance of Payments stability in Nigeria from 1980 to 2010 using an Ordinary Least Squares (OLS) technique of multiple regressions. The estimated result shows a positive relationship between the BOP and the monetary variables of Money Supply, Exchange Rate and Interest Rate. Specifically, Money Supply and Interest Rate had significant relationship with BOP, whereas Exchange Rate was not statistically significant. They concluded that the government should promote the exportation of Nigerian products especially the Non-oil products, as this will bring in more foreign exchange earning into the country, boost productive activities and improve the balance of payments position of the country. Ajayi (2015) examined the determinants of balance of payments in Nigeria from 1970-2012. The study employed the Johansen co-integration method to assess the long run relationship between macroeconomic variables and found a negative significant relationship between monetary policy instruments (i.e. monetary policy rate and money supply) and balance of payment. The study concluded that a larger exchange rate and a lesser monetary policy rate will increase the level balance of payments of the Nigerian economy.

Dhliwayo (2016) tests the monetary approach to Zimbabwe's balance of payments during the period 1980 to 2014 using multivariate co-integration and error- correction modelling, the results revealed that monetary policy played a significant role in determining the balance of payments and concluded that balance of payments disequilibrium can be corrected through appropriate financial planning and monetary targeting. Boateng and Ayentimi (2013) examined monetary approach to balance payment in Ghana using time series data set that covered 1980-2010. The least squares results showed that the balance of payments in Ghana is not totally a monetary phenomenon and found that monetary variables of domestic credit, inflation, interest have a significant impact on balance of payment proxy by net foreign assets. Ali (2010) examines monetary policy and Pakistan balance of payments for the period 1990–2008 employing a set of structural equations, he conducted a test to ascertain whether excess money supply played a significant role as a disturbance by using co-integration tests and error-correction mechanism. The empirical results showed that monetary variables do not play an significant role in determining Pakistan's balance of payments. The study also revealed that balance of payments is not a purely monetary affair. Therefore disequilibrium in the Balance of payments cannot be corrected only through monetary policy implementation by the authorities. Fleermuys (2005) examines Namibia monetary policy as a determinant of balance of payments for the period 1993–2003, the empirical results showed that monetary instruments do not play a significant role in determining Namibian balance of payments positions. The results indicated that, although some findings suggested by the monetary approach affects balance of payments disequilibrium but disequilibrium cannot be corrected only through monetary actions by the authorities. Furthermore, Umer, Muhammad, Abro, Sheikh and Ghazali (2010) in their study which examines the monetary approach to Pakistan's balance of payments for the period 1980-2008 using Co- integration test and error correction modelling, The empirical results revealed that showed that monetary variable does not have a significant impact on Pakistan's balance of payments and conclude that the balance of payments is not a purely monetary concept.

**THEORETICAL FRAMEWORK**

According to Snowdown and Vane (1999), the monetary approach in BOP equilibrium was developed in the 1950s and 1960s by the International Monetary Fund’s research department under Jacques J. Polak, and by Harry G. Johnson, Robert A. Mundell, and their students at the University of Chicago.

The monetary approach can be explained through a simple model connecting the balance of payments to expansions in the money market. Money market is said to be in equilibrium when the real money supply equals real money demand, that is, when

$$M^s/P = L(R, Y) \dots\dots\dots(3.1)$$

Now let  $F^*$  denote the central bank’s foreign assets (measured in local currency) and  $A$  its domestic assets (domestic credit). If  $\mu$  is the *money multiplier* that defines the relation between total central bank assets ( $F^* + A$ ) and the money supply, then

$$M^s = \mu (F^* + A) \dots\dots\dots(3.2)$$

The change in central bank foreign assets over any time period,  $\Delta F^*$ , equals the balance of payments (for a non -reserve currency country). By combining the preceding two equations, we can express the central bank’s foreign assets as

$$F^* = (1/\mu) PL(R, Y) - A \dots\dots\dots(3.3)$$

If we assume that  $\mu$  is a constant, the balance of payments surplus is

$$\Delta F^* = (1/\mu)\Delta[PL(R, Y) - \Delta A \dots\dots\dots(3.4)$$

The last equation summarizes the monetary approach. The first term on its right-hand side reflects changes in nominal money demand and tells us that, an increase in money demand will bring about a balance of payments surplus and an accompanying increase in the money supply that maintains money market equilibrium with all things being equal. The second term in the balance of payments equation reflects supply factors in the money market. An increase in domestic credit raises money supply relative to money demand, all things being equal: So the balance of payments must go into deficit to reduce the money supply and restore money market equilibrium.

**METHODOLOGY**

The research is empirical. Auto-Regressive Distributed Lag Model (ARDL) was adapted to explore the impact of public sector financing in the Nigerian economy. The technique was adapted to test of co-integration (long-run equilibrium relationship) and short-run relationship between the variables. The stationarity test (unit root test) will be carried out first using the Augmented Dickey Fuller (ADF) test on each variable to test for stationarity and avoid for spurious regression as suggested by Granger and Newbold (1975). If variables are found to be non-stationary, the co-integration test, which is a pre-test for spurious regression will first be carried out. The ARDL bound test by Pesaran (2001) co-integration test will be used to test for long run relationship between variables. Furthermore, the Error Correction mechanism will be used to check for short-run relationship.

The model specified is adapted from the study of Dhliwayo (2016) tests the monetary approach to Zimbabwe’s balance of payments during the period 1980 to 2014 using multivariate co-

integration and error- correction modelling. The model is modified to include monetary instruments only and is specified as follows;

$$BOP = f( MPR, M2, PLR).....(4.1)$$

Where;

BOP is Balance of Payment

MPR is Monetary Policy Rate

M2 is Broad Money Supply

PLR is Prime Lend Rate

Instructively, the ARDL model can be specified below as;

$$\Delta BOP_t = \alpha_0 + \sum_{j=1}^m \alpha_{1j} \Delta BOP_{t-j} + \sum_{j=1}^m \alpha_{2j} \Delta MPR_{t-j} + \sum_{j=1}^m \alpha_{3j} \Delta M2_{t-j} + \sum_{j=1}^m \alpha_{4j} \Delta PLR_{t-j} + .....(4.2)$$

$$\theta_1 BOP_{t-1} + \theta_2 MPR_{t-1} + \theta_3 M2_{t-1} + \theta_4 PLR_{t-1} + U_t$$

$\alpha_0 - \alpha_4$  are Coefficients to be estimated,

$U_t$  Is the Gaussian white noise that is independently and identically distributed random variable?

## DATA ANALYSIS AND INTERPRETATION

### Summary Statistics

The data for the study was extracted from Central Bank of Nigerian (CBN) Statistical Bulletin 2017 edition. Summary statistics was derived through E-Views 9.0 and it shows the Mean, Median, Maximum, Minimum, Standard Deviation, Skewness, Kurtosis, Jarque-Bera and Probability of each of the variables as presented below:

**Table 4.1: Summary Statistics**

	BOP	MPR	M2	PLR
Mean	7519.403	13.31818	4282.067	18.07000
Median	1408.600	13.00000	699.7000	17.95000
Maximum	99332.80	26.00000	20029.80	29.80000
Minimum	1.100000	6.000000	16.20000	7.750000
Std. Dev.	18478.37	4.201596	6369.217	4.584303
Skewness	4.040836	0.648103	1.374598	0.187082
Kurtosis	19.94927	4.138709	3.403886	3.820053
Jarque-Bera	484.8131	4.093113	10.61665	1.117168
Probability	0.000000	0.129179	0.004950	0.572019
Sum	248140.3	439.5000	141308.2	596.3100
Sum Sq. Dev.	1.09E+10	564.9091	1.30E+09	672.5068
Observations	33	33	33	33

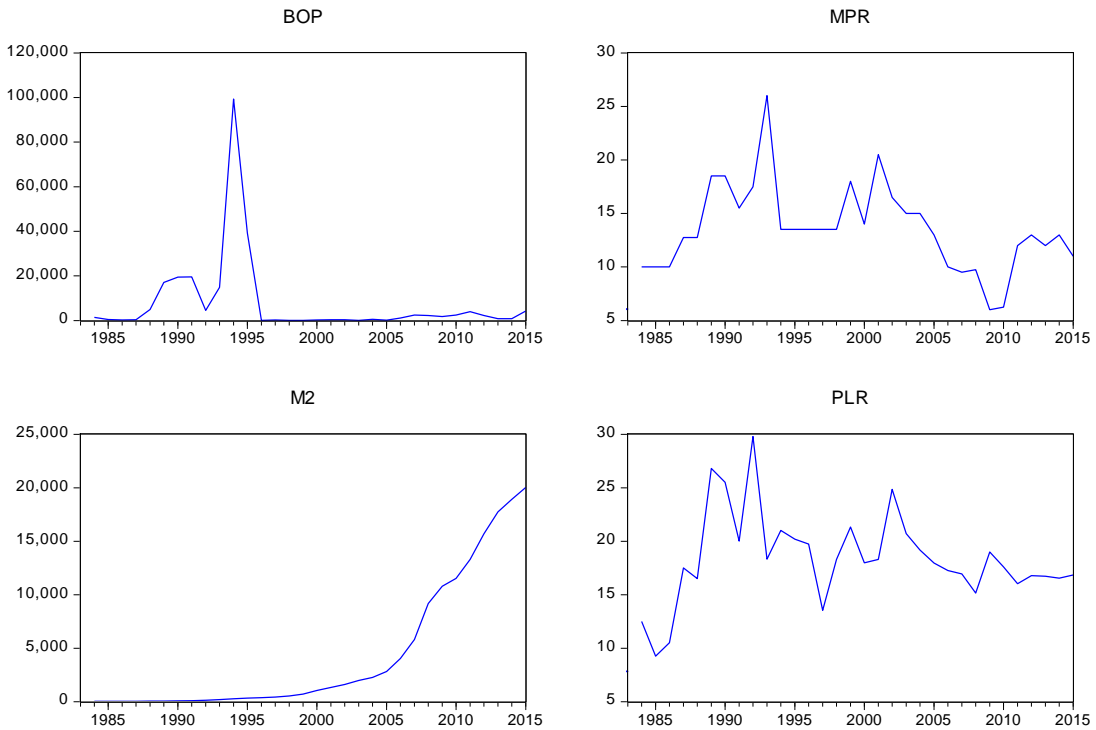
Sources: Author's computation using E-Views Software, Version 9.0

It was observed from the above summary statistics with reference to the Jarque Bera estimates and probability value that BOP and M2 are not normally distributed due to their low probability values of 0.00000 and 0.004950 respectively which is lower than the probability value of 0.05. From the central limit theorem (CLT), non-normality does not affect mean values and as such since regression parameters are mean values, the non-normality of the variables does not affect the parameters in the model to be estimated.

On the other hand it was observed that the probability values for MPR and PLR were normally distributed due to their high probability value of 0.129179 and 0572019 which are higher than the probability of 0.05.

**Trend Analysis**

Graphically, the trend analyses showed that the variables fluctuates at one point or the other during the period under review. These are presented graphically.



**Figure 1.0 Trend Analysis**

**Stationarity Result**

**Table 1: Unit Root Stationarity Result**

Variables	ADF Statistics	Critical Value	Stationary Status
BOP	-7.460302	-4.26274(1%) -3.55297(5%) -3.20964(10%)	I(1)
MPR	-8.382534	-4.26274(1%) -3.55297(5%) -3.20964(10%)	I(1)
M2	-6.009893	-4.26274(1%) -3.55297(5%) -3.20964(10%)	I(1)
PLR	-4.611492	-4.26274(1%) -3.55297(5%) -3.20964(10%)	I(1)

*The critical values for rejection of hypothesis of unit root were from MacKinnon (1991) as reported in e-views 9.0.*

**Source:** Author's computation using E-Views Software, Version 9.0

The Four variables (Balance of Payment, Monetary Policy Rate, Broad Money Supply and Prime Lending Rate) undergone unit root test using the Augmented Dickey-Fuller (ADF) test. As is the case most times, all the variables were found to be non-stationary at levels but at first difference. As such there is need to establish co-integration among the variables.

**Co-Integration Test**

**Table 2 ARDL Bound test of Co-integration**  
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	8.019585	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's computation using E-Views Software, Version 9.0

The Cointegration test was done using the ARDL Bound test. This became necessary to avoid a spurious regression result. Using the ARDL Bound test with critical value from Pesaran (2001), the variables were cointegrated at 1per cent level of significance since the Wald F- statistics is greater than the critical lower and upper bound (see Table 4.2).

**Table 3: ARDL Result for Error Correction Mechanism**

ARDL Cointegrating And Long Run Form  
Dependent Variable: LOG(BOP)  
Selected Model: ARDL(1, 1, 4, 0)  
Date: 07/23/17 Time: 07:59  
Sample: 1981 2015  
Included observations: 29

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(M2)	4.911979	3.579149	1.372388	0.1859
DLOG(PLR)	-3.454247	2.644535	-1.306183	0.2071
DLOG(PLR(-1))	-4.742399	2.018982	-2.348906	0.0298
DLOG(PLR(-2))	1.855399	1.980917	0.936637	0.3607
DLOG(PLR(-3))	4.439214	1.839008	2.413918	0.0260
DLOG(MPR)	-1.865764	1.643680	-1.135114	0.2704
CointEq(-1)	-0.389584	0.166679	-2.337335	0.0305

Source: Author's computation using E-Views Software, Version 9.0



Since the variables were found to be integrated implying that they have long run equilibrium relationship, it is necessary to test for short run relationship. From table 4.3, the ECM parameter is negative (-) and significant which is -0.389584, this shows that 38 percent disequilibrium in the previous period is being corrected to restore equilibrium in the current period.

It has been established that the variables are co-integrated and also have short run relationship established from the ECM.

**Table 4: Long run Coefficients**  
**Dependent variable: BOP**

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(M2)	-0.579718	0.141279	-4.124312	0.0084
LOG(PLR)	-6.526849	1.230998	-6.637948	0.0011
LOG(MPR)	-4.789113	0.968745	-4.577049	0.0037
C	35.949076	10.430379	3.521496	0.0068

Sources: Author’s computation using E Views Software, Version 9.0

From the Result, A percentage increase in Money supply will lead to 0.579718 percentage decrease in balance of payment. In addition to this the impact is statistically significant at 1% level of significance. This result support the monetary approach that the level of money supply determines balance of payment in Nigeria. The monetarist view is that an increase in money supply will lead to BOP deficit as the increase in money supply will raise income level which will increase the demand for foreign goods creating BOP deficit as import will exceed export.

A percentage increase in Prime Lend Rate will leads to 6.526849 percent decrease in Balance of Payment. The decrease is statistically significant at 1% level of significant. This result implies that increase in lending rate will lead to Balance of Payment deficit, an increase in prime lending rate will discourage investment as individual will switch consumption for investment creating Balance of Payment deficit.

Finally, a percentage increase in Monetary Policy Rate will lead to 4.789113 decrease in Balance of Payment. The decrease is statistically significant at 1% level of significant. This result is in line with monetarist theory of Balance of Payment as monetary policy rate will have a negative effect on Balance of Payment.

**CONCLUDING REMARKS**

From the Result, it is very evident that Balance of Payment is a monetary concept and monetary instrument is potent in stabilizing Balance of Payment in Nigeria. The general lesson that emerges from this study is that monetary policy and its implementation capacity is important in the Nigerian economy, because it is very special for determining the Balance of Payment which will have a spill over effect on internal balance in the economy. Also, the findings of this study show that Balance of Payment is a monetary phenomenon and monetary policy can be used to improving the foreign sector performance in Nigeria. The findings of this study support the proposition of the monetarist view on balance of payment which state that balance of payment is a monetary affair and only money matters in regulating balance of payment. The findings suggest that the government through the monetary authority should ensure that the domestic money stock is consistent with the macroeconomic objectives of the country in order to maintain sustainable BOP position. The government should also encourage export diversification. Non-oil sector exports should be encouraged. This will enhance BOP position in Nigeria. Furthermore,

Monetary authority should create and implement monetary policies that favoured efficient provider of more investment climate by facilitating the emergency of market based interest rate regimes that attract both domestic and foreign investor to invest in the Nigerian economy. Finally, The Central Bank should make more stringent punishment for non-compliance to the monetary policies by financial institutions mostly especially in the setting prime lending rate since lending rate has a significant effect on Nigeria BOPs.

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