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The Effect of Monetary Policy on Price Stability in Nigeria (1970 – 2014)

by

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Abstract

The effect of monetary policy on price stability in Nigeria was empirically examined for the period 1970 to 2014 using time series data. The study employed the monetarist approach as its theoretical basis and used the Ordinary Least Square (OLS) regression technique to establish the empirical relationship among the variables of interest. The unit root and co-integration tests were conducted on all the variables and the result revealed the existence of stationarity and long run relationship, suitable for OLS estimation. The empirical results of the model showed monetary variables such as money supply, monetary policy rate and credit to private sector as percentage of GDP as having a positive relationship with inflation rate in Nigeria. The study further showed money supply growth to be significant which means that inflation in Nigeria is a monetary phenomenon. As expected, past inflation indicated a significant positive effect on current inflation while exchange rate significantly impacted on inflation rate. However, the dummy variable capturing the different phases of monetary policy was positive but insignificant which means that monetary policy was insufficiently effective in controlling price stability in Nigeria for the period under review. Therefore, it was recommended from the study that the Central Bank of Nigeria should implement monetary policy that is consistent with achieving price stability as the basis for macroeconomic stability and sustainable economic growth.

Keywords: Monetary Policy, Price Stability, Gross Domestic Product and Broad Money Supply.

1. Introduction

All over the world the major preoccupation of central banks is the formulation and implementation of monetary policy as a tool for enhancing macroeconomic management of the economy. In the past years, the Central Bank of Nigeria (CBN) had adopted various monetary policy measures aimed at promoting price stability, economic growth, full employment and viable external sector. Onyeiwu (2012) posited that, in

Nigeria, monetary policy has been used since the Central Bank of Nigeria was established by the Central Bank Act of 1958 and saddled with the responsibility of formulating and implementing monetary policy for the country.

According to Uchendu (2009), monetary policy is defined as the use of some combinations of instruments by the central bank to influence the availability and cost of credit and/or money supply in the domestic economy with a view to achieving macroeconomic balance. Also, the Research Department of CBN defined monetary policy as the combination of measures designed to regulate the value, supply and cost of money in the economy (CBN, 2002). Monetary policy can also be defined as a deliberate action by the monetary authorities to alter certain monetary aggregates, such as the stock of money, the rate of interest or the size of bank credit with a view to influencing other macroeconomic variables in the economy in line with the pre-determined objectives of economic policy.

The ultimate goal of monetary policy is to ensure the achievement of a consistency between the expansion in domestic liquidity and government's macroeconomic objectives of price and exchange rate stability, higher output growth, full employment of resources, balance of payments equilibrium, promotion of a sound financial system and sustainable growth and development. The achievement of this consistency is paramount in the design and conduct of monetary policy by the central bank, as an excess or shortage in the supply of money could either induce excess aggregate demand, resulting in higher inflation rate or stagnation thus retarding economic growth and development (Okafor, 2009). The smoothing of the business cycle, preventing financial crisis and stabilizing long term interest rates and real interest rate have been identified recently as other supplementary objectives of monetary policy because of the weaving global financial crisis which engulfed major developed and emerging economies of the world (Mishra and Pradhan, 2008).

In the views of Okwo, Eze, and Nwaha (2012), the general task of a central bank is to administer a national policy within the framework of macroeconomic objectives and considerations laid down by government. In pursuance of these objectives, the Central Bank of Nigeria (CBN) generally has the core mandate of maintaining internal and external value of the currency. In the domestic economy, this translates to keeping inflation low, maintaining low interest rate, ensuring a good Gross Domestic Product value and appropriate exchange rate policy.

The specific objective and the focus of monetary policy may change from time to time, depending on the level of economic development and economic fortunes of the economy. The choice of instrument used to achieve the objective would depend on the policy stance of the government. The Central Bank of Nigeria (CBN), in the past years had used various monetary policy instruments for the conduct and implementation of monetary policies in Nigeria. According to Oke (1995), monetary policy instruments are the tools at the disposal of the central bank to conduct or implement monetary policy .There are direct and indirect instruments. Until 1993 when Open Market Operations (OMO) was introduced, the Central Bank of Nigeria (CBN) relied almost exclusively on varying combinations of direct instruments of monetary control. These instruments were credit ceilings, sectoral credit allocation, interest rate controls, and imposition of special deposits, moral suasion, movements of government deposits, stabilization securities and exchange rate controls. During this period, the major objective of monetary policy was to promote rapid and sustainable economic growth through credit allocation to sectors of the

economy especially to the preferred sectors namely; agriculture, manufacturing and construction (Uchendu, 2009).

In the mid 1980's, the Central Bank of Nigeria (CBN) started the process of shifting from the use of direct instruments to market based instruments. The most significant move in the new direction came in June, 1993 when the Central Bank of Nigeria(CBN) introduced a market-based instrument known as Open Market Operations (OMO), which involves the supply or withdrawal of liquidity from the economy by the Central Bank through secondary market dealings in treasury securities and issuance/purchase of central bank securities (Uchendu,2009). According to Nnanna (2001), Open Market Operations (OMO) entail the sale or purchase of eligible bills or securities in the open market by the Central Bank of Nigeria for the purpose of influencing deposit money banks' reserves balances, the level of base money and consequently the overall level of monetary and financial conditions. The transactions carried out in Open Market Operations are outright sales or purchases of securities in the market, repurchase transactions (REPOS) and matched sales purchase transaction. Other market- based instruments introduced in addition to Open Market Operations (OMO) were; reserve requirement which specifies the proportion of bank's total deposit liabilities that should be kept with the central bank and discount window operations under which the central bank performs the role of lender of last resort to deposit money banks as well as moral suasion adopted as a means of establishing a two-way communication with the banks thereby creating a better environment for the effectiveness of monetary policy (Nzotta,1999).

Ojo (1989) explained that since the 1980's, some relationships exist between the stock of money and economic activity and that Nigeria has been controlling her economy through variation in the stock of money. Thus, the notion that the stock of money varies with economic activities applies to the Nigerian economy (Laidler, 1993).

Despite efforts in the past years to evolve a monetary policy framework that would enhance the achievement of macroeconomic and price stability in Nigeria, there are still constraints militating against the attainment of these objectives. The attainment of internal and external balance has remained the greatest challenge of monetary policy in Nigeria. However, emphasis on techniques, strategies and instruments to achieve these objectives have changed over the years .The identification and analysis of the various monetary policy instruments and their effects on price stability would provide useful information and policy recipe for effective and efficient management of monetary policy in Nigeria. It is against this backdrop that this study is undertaken to evaluate the effect of monetary policy on price stability in Nigeria.

2. Review of Related Literature

Monetary policy as defined by CBN (1992) refers to the combination of measures designed to regulate the value, supply and cost of money in an economy, to match with the level of economic activities. It can also be described as the act of controlling the direction and movement of money supply and credit facilities in pursuance of stable price and economic growth in an economy. In contemporary economies, the central bank is the authority with the mandate of formulating and implementing monetary policy, through the use of monetary policy instruments, in order to achieve the desired macroeconomic objectives which include; the achievement of price stability with respect to both domestic and external prices.

According to Ditimi et al (2011), price stability occurs when goods and services in general, are not getting rapidly more expensive (that is inflation) or less expensive (that is deflation), or keeping inflation on average over the medium term. Inflation on the other hand, depicts an economic situation where there is a general rise in the prices of goods and services, or a continuous rise in the prices as measured by an index such as the consumer price index (CPI) or by the implicit price deflator to Gross National Product (GNP). The central bank uses inflation rate to track movement in the domestic prices while exchange rate policy is used as a tool for ensuring external stability (Neaime, 2008).

The concept of inflation which models money supply as an exogenous variable with causality running from money supply to prices characterized the work of Neaime (2008), among others. Accordingly, Fakiyesi (1996) in his study of inflation in Nigeria, argued that inflation depends on growth in broad money (M2), the rate of exchange (TRE), the growth of real income (GRI), the level of rainfall (R) and the level of anticipated inflation which is based on the previous year's level of inflation ($P_i - i$).

The causal relationship between money, prices and income have been an important area of investigation in economics. Bilquees et al (2012) investigated the dynamic interactions among macroeconomic variables such as money supply, prices, interest rate, exchange rate and output level using the quarterly data for Pakistan for the period 1972 to 2009. The study employed the Johansen multivariate co-integration technique, Granger causality test and variance decomposition and the result indicated the existence of co-integration, while the outcome of the causality test tended to support a bi-directional causality between money supply and price level, and interest rate and price level. Similarly, Ahmed et al (2013), analyzed the fundamental relationship between money supply, prices and income in Pakistan, and the result indicated a positive relationship between the growth of money supply and inflation during the period 1973 - 2007.

Liang and Huang (2011), examined the relationship between money supply and economic output in United States and found that changes in Gross Domestic Product play a significant role in estimating the changes in broad money supply (M2). The study of Muhd (2007) which examined the causal relationship between monetary aggregates, output and prices in Malaysia using Vector Auto regression (VAR), showed a two-way causality running between monetary aggregates, M2 and M1, and output but a one-way causality running from monetary aggregate, M1 and output. The result further suggested that all monetary aggregates have a strong one-way causality running from money to prices but no evidence for the opposite direction.

In Nigeria, Adesoye (2012), examined the relationship between price, monetary aggregate and real output from 1970 to 2009 and found that inflation is a monetary phenomenon as previous prices and output gap are strong indicators of controlling monetary aggregate in Nigeria. In the same vein, the study of Onayemi (2013), showed a significant causality among money supply, economic growth and price level in Nigeria during the period 1970-2011.

The analysis of the causality between money supply, price and output in Nigeria from 1970-2005 using co-integration and granger causality test was the work of Omoke and Ugwuanyi (2010). The result revealed money supply to Granger-cause both output and inflation and that monetary stability can contribute towards price stability in Nigeria, since the variation in price level is mainly caused by money supply and concluded that inflation in Nigeria is to an extent a monetary phenomenon. The study of Ogunmuyiwa and Ekone (2010), which investigated the impact of money supply on economic growth in

Nigeria between 1980 and 2006, showed money supply to be positively but insignificantly related to economic growth.

Also, Akinbobola (2012) provided quantitative analysis of the dynamics of money supply, exchange rate and inflation in Nigeria using Vector Error Correction Mechanism (VECM). The result indicated that in the long run, money supply and exchange rate have significant inverse effects on inflationary pressure, while real output growth and foreign price changes have direct effects on inflationary pressure. However, there exists a causal linkage between inflation, money supply and exchange rate in Nigeria. Emerenini and Eke (2014), using Ordinary Least Square (OLS) method investigated the impact of monetary policy rate on inflation in Nigeria, and found an insignificant relationship between inflation and monetary policy rate in Nigeria.

3. Theoretical Framework

3.1 The Classical Theory of Monetary Policy

The classical theory of monetary policy is based on the quantity theory of money which states that an increase or decrease in the quantity of money leads to a proportional increase or decrease in the price level while the real income, the rate of interest and the level of real economic activity remain unaffected (Jhingan, 2010). The classicists posited that money is neutral in its effect on the economy because it simply affects the price level. They explained the relationship between money and the price level based on the quantity theory of money which is usually discussed in terms of the equation of exchange given as $MV=PT$ where P denotes the price level, T denotes the level of real total output, Hence, M denotes the supply of money over which the central bank has some control, and V denotes the velocity of circulation, which is the average number of times money is spent on final goods and services over the course of the year. The equation of exchange is an identity which states that the supply of money multiplied by the velocity of circulation of money (MV) is equal to the current market value of all final goods and services (PT). The assumptions which transform the equation of exchange from an identity to a theory of money and monetary policy are that Y is fixed for at least in the short run and the economy is always at or near the natural level of real GDP. The velocity of circulation of money tends to remain constant so that V can be regarded as fixed (Anyanwu and Oaikhenan, 1995).

3.2 The Keynesian Theory of Monetary Policy

In the Keynesian analysis, monetary policy plays a crucial role in affecting economic activity. The Keynesians do not agree with the classical view that the supply of money influences the price level directly and that the economy always stays at full employment level. They also rejected the notion that the velocity of circulation of money is constant. Instead the Keynesians believed in an indirect link between money supply and real GDP. They contended that an expansionary monetary policy increases the supply of loanable funds through the banking system causing interest rate to fall. With lower interest rates, aggregate expenditures on investment and interest-sensitive consumption

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employment (Jhingan, 2010).

In the Keynesian monetary policy, the rate of interest is determined by the demand for and supply of money and changes in equilibrium rate of interest are caused by

changes in demand and supply of money. Since the supply of money is determined by the monetary authority which is normally fixed in the short run, then the money supply curve is perfectly inelastic. The Keynesians viewed the demand for money as the desire to hold cash for transaction, precaution and speculative purposes. The speculative demand for money depends upon the rate of interest or bond prices while the precautionary and transaction demand for money depends on the level of income. In a situation of unemployment, Keynes posited that unemployment arises from inadequate aggregate demand which can be increased by increase in money supply which generates increase spending, increase employment and economic growth (Onyeiwu, 2012).

The Keynesians, however, remained skeptical about the efficacy of monetary policy under certain conditions. They argued that expansionary monetary policy that increases the reserves of the banking system need not lead to a multiple expansion of money supply because banks can simply refuse to lend out their excess reserves. Furthermore, the lower interest rates that result from an expansionary monetary policy need not induce an increase in aggregate investment and consumption expenditures because firms and households demands for investment and consumption goods may not be sensitive to the lower interest rates. The Keynesians believed in the concept of liquidity trap which is a situation in which real interest rates cannot be reduced by any action of the monetary authorities. Hence, at liquidity trap, an increase in the money supply would not stimulate economic growth because of downward pressure of investment owing to insensitivity of interest rate to money supply and the only way out is fiscal policy. For these reasons, the Keynesians placed less emphasis on the effectiveness of monetary policy and more emphasis on fiscal policy, which they regarded as having a more direct effect on real GDP (Adefeso and Mobolaji, 2010; Jhingan 2010).

3.3 The Monetarist Theory

The monetarists are the economists who criticized Keynesian economics and laid emphasis on the importance of monetary policy, especially money supply. The role of monetary policy in influencing price stability was effectively discussed by the monetarists whose position is that “inflation is always and everywhere a monetary phenomenon” (Onyeiwu, 2012). The monetarists argued that the demand for money is stable and is not sensitive to changes in the rate of interest. Hence, expansionary monetary policy only serves to create a surplus of money that household will quickly spend, thereby increasing aggregate demand. They viewed money supply as a strategic variable in the transmission process which affects income directly as follows; $\uparrow\text{OMO} \rightarrow \uparrow\text{Ms} \rightarrow \uparrow\text{SPENDING} \rightarrow \uparrow\text{GNP}$, where OMO is Open Market Operations, Ms is money supply and GNP is Gross National Product (Anyanwu and Oaikhenan, 1995). This means that an expansionary monetary policy through the use of Open Market Operations leads to increase in money supply and expenditure which ultimately affects economic activities positively.

Unlike the classical economists, the monetarists acknowledged that the economy may not always be operating at the full employment level of real GDP. Thus, in the short-run, expansionary monetary policy may increase the level of real GDP by increasing aggregate demand but in the long-run, when the economy is operating at the full employment level, the monetarists argued that the classical quantity theory remains a good approximation of the link between the supply of money, the price level and the real GDP. Thus, in the long-run, expansionary monetary policy only leads to inflation and do not affect the level of real GDP.

4. Monetary Policy Management in Nigeria

4.1 The Exchange Rate Targeting Regime (1959-1973)

According to Nnanna (2001), the conduct of monetary policy in Nigeria under the colonial government was largely dictated by the prevailing economic conditions in Britain. The instrument of monetary policy at that time was the exchange rate which was fixed at par between the Nigerian pound and the British pound. This was very convenient, as fixing the exchange rate provided a more effective mechanism for the maintenance of balance of payments viability and for control over inflation in the Nigerian economy. However, this fixed parity lasted until 1967 when the British pound was devalued.

The Exchange Rate Targeting period was also associated with the establishment of the Central Bank of Nigeria as the apex regulatory body which commenced operations on 1st July, 1959 as well as the independence of Nigeria on 1st October, 1960 (Nzotta, 1999). The money and capital markets were established during this period as well as the introduction of treasury bills in 1959 which was used mainly as a tool of fiscal policy (Okpara, 1997). Later, the call money and commercial bills were introduced in 1962 and treasury certificates were introduced in 1968.

Owing to the civil war that occurred in late 1960s, the monetary authorities did not consider it expedient to devalue the Nigerian currency in sympathy with the British Pound. The reasons were that a considerable proportion of the country's resources were being diverted to finance the war and there was the apprehension that the devaluation of the Nigerian currency would only raise the domestic price of imports without any appreciable impact on exports, which were largely primary products. Rather than devalue, the monetary authorities decided to peg the Nigerian currency to the US dollar with strict administrative controls on foreign exchange. Following the severe drawbacks of pegging the Nigerian currency (Naira) to a single currency, the need to independently manage the exchange rate became imperative. Hence, in 1978 Nigeria pegged her currency (Naira) to a basket of 12 currencies of her major trading partners (Nnana, 2001).

4.2 Direct Controls Period (1973-1985)

The major objective of monetary policy during this period was to promote rapid and sustainable economic growth. Consequently, the monetary authority relied heavily on sectoral credit allocation, credit ceiling, cash reserve requirement, administrative fixing of interest and exchange rate, as well as imposition of special deposit (Uchendu, 2009). The monetary authorities imposed differential quantitative ceilings on all sectors of the economy, given more of such credit ceiling to the preferred sectors of the economy such as agriculture, manufacturing and construction. The preferred sectors benefited from credit allocation below market lending rate. This was to ensure that these sectors were given the utmost attention to take the lead of growing the economy through the multiplier effect.

According to Nnanna (2001), empirical evidence during the control regime revealed that the flow of credit to the priority sectors did not meet the prescribed targets and failed to impact positively on investment, output and domestic price level. For instance, between 1972 and 1985, bank aggregate loans to the productive sector averaged 40.7 percent instead of the stipulated target of 49.4 per cent. Accordingly, a major factor which impaired the effectiveness of monetary policy was the lack of instrument autonomy by the Central Bank of Nigeria (CBN) as monetary policies were mainly directed by the Ministry of Finance and as such, were influenced by short term political considerations.

Nzotta (1999) observed that from 1980, crude oil prices took a downturn as prices fell from the peak of US\$40 per barrel to US\$28 per barrel in 1982 and below US\$10 per barrel in the first quarter of 1986. This led to severe external sector imbalance and the emerging economic development made Nigeria to adopt the Structural Adjustment Programme (SAP). The emergence of SAP ushered in a regime of financial sector reforms characterized by the use of indirect instruments of monetary policy. The strategy was to introduce measures that would increase competition, strengthen the supervisory and regulatory capacity of the CBN, improve the financial structure and redress the financial repression already identified (Oke, 1995).

4.3 The indirect monetary policy Regime (1986-2014)

The adoption of Structural Adjustment Program (SAP) in Nigeria, offered an era of policy change in monetary policy management in Nigeria with the introduction of indirect monetary policy. This was borne out of the desire to eliminate distortions and inefficiencies in the financial system caused by the prolonged use of administrative control and the need to engender competition among banks and other operators in the financial system. The operational framework for the indirect monetary policy management involved the use of market instruments to regulate the growth of major monetary aggregates. Under this framework, only the operational variables, monetary base or its components are targeted, while the market is left to determine the interest rates and credit allocations efficiently (Nnanna, 2001).

According to Ditimi *et al* (2011), the deregulation exercise in the financial system, led to the establishment of two foreign exchange markets (the first and the second tier foreign exchange market) in 1986. In 1987, Interest rate controls was completely removed, the liberalization of bank licensing was enforced and the foreign exchange markets was unified. The foreign exchange bureau and the Nigerian Deposit Insurance Corporation were established in 1988 as well as the relaxation of restrictions on bank portfolio. In 1989, banks were permitted to pay interest on demand deposits and the auction market for government securities was introduced, the capital adequacy ratios were reviewed upward and the extension of credit based on foreign exchange deposits was banned. In 1990, the risk-weighted capital standard was introduced and banks' required paid-up capital was increased. Also, a uniform accounting standards was introduced for banks while a stabilization security to mop up excess liquidity was also introduced.

In 1991, there was an embargo on bank licensing while the administration of interest rate was introduced. Also in the same year, the Central Bank was empowered to regulate and supervise all financial institutions in the economy through the strengthening of the CBN Act. Nnanna (2001) explained that the first of such laws was the CBN Decree 24 of 1991 and the Banks and Other Financial Institutions Decree (BOFID) 25 of 1991. In 1992, the interest rate controls was removed once again while the privatization of government-owned banks commenced. More so, capital market deregulation commenced and credit control was dismantled while the foreign exchange market was reorganized.

In 1993, indirect monetary policy instruments were introduced. The indirect (market-oriented) instruments are market induced action taken by the Central Bank to influence the availability and the rate of return on financial asset, thus affecting the desire of the public to hold money balances and the willingness of financial institutions to accept deposit and lend them to users. Examples of such instruments are open market operations, discount window operations and reserve requirement.

The interest and exchange rate controls were re-imposed in 1994. In 1996, all mandatory credit allocations on banks by the CBN guidelines were abolished while in 1997 the minimum paid up capital of merchant and commercial banks was further raised to a uniform level of ₦500 million. In addition, the operational environment for banks was further liberalized in 2001 with the introduction of universal banking system while in 2005 the minimum paid up capital was further raised to ₦25billion naira for all commercial banks in accordance with the recapitalization exercise.

In 2006, the Central Bank of Nigeria introduced a new monetary policy implementation framework, Monetary Policy Rate (MPR)) to replace the Minimum Rediscounted Rate (MRR). The Monetary Policy Rate serves as an indicative rate for transaction in the inter-bank money market as well as interest rate of other Deposit Money Banks (DMBs). Specifically, the Monetary Policy Rate(MPR) was introduced in order to dampen the volatility of interest rate in money market and stimulate a transaction rate that would improve the transmission of monetary policy actions and ultimately to achieve a stable value of the domestic currency. An important implication of the various policies initiated under the indirect monetary policy up to date is to bring about stability in the macroeconomic variables. The liquidity management efforts of the CBN yielded the expected results as single-digitinflation rate of 8.6 percent in 2006 and 6.6 percent in 2007, respectively, were achieved (CBN, 2008).Monetary policy outcomes improved with the new monetary framework. The success of monetary policy was further enhanced by the prudent fiscal operations of the Government.

During the period 2008 and 2012, the conduct of monetary policy was largely influenced by the global financial crisis which started in the United States and later spread to other regions, including emerging markets. The crisis created liquidity crunch in the banking system due to large capital outflows which exerted pressures on the foreign exchange market as well as induced large volume of non-performing loans in the banking sector and a crash in stock market prices. Specifically, the monetary environment in 2012 was characterized by continuing threat of inflationary pressure against the backdrop of declining trend in output. The key concerns included sustaining a stable exchange rate for the naira, creating a buffer for the external reserves, sustaining stability in money market rates, narrowing the spread between the lending and deposit rates and mitigating the impact of the continued slowdown in global economic activities on domestic economy. In view of these challenges, monetary policy during the period focused on deploying the mix of appropriate instruments to deliver on price stability. Consequently, the MPR was maintained by the CBN at 12 percent with a symmetric corridor of +/- 200 basis points. To further sustain the tightening stance, the Cash Reserved Ratio (CRR) was raised from 8.0 to 12 percent and Net Open Position (NOP) limit was reduced from 3.0 to 1.0 percent in July, 2012. The Liquidity Ratio was retained at 30.0 percent with the mid-point of exchange rate maintained at N155/US\$ within a band of +/- 3.0 percent (CBN, 2014).

The monetary policy in 2013 was aimed at sustaining the already moderate rate of inflation which was achieved in the first half of the year under review. The benign headline inflation rate at 8.0 per cent at end of December, 2013 from 8.4 per cent at end of June, 2013 was evidence of the effectiveness of the policy. The Monetary Policy Rate (MPR) was the principal instrument used to control the direction of interest rates and anchor inflation expectations in the economy. The other intervention instruments include Open Market Operations (OMO), Discount Window Operations, Cash Reserve Ratio (CRR) and foreign exchange Net Open Position (NOP). The MPR was successively maintained at 12.0% with a symmetric corridor of +/- 200 basis points. The sale of CBN

bills through Open Market Operations (OMO) declined by 52.8 per cent in the first half. In the second half, the volume of transactions of the standing lending facility window rose by 30.66 percent, while that of standing deposit facility window increase by 53.6 per cent compared with the first half. In order to tighten money supply, the CBN increased Cash Reserve Ratio (CRR) for public sector deposits to 50 per cent, while Net Open Position limit and Liquidity Ratio (LR) was sustained as 1.0 percent and 30.0 percent respectively (CBN, 2014).

In 2014, monetary policy management was focused on achieving the objectives of price and exchange rate stability. The Central Bank of Nigeria (CBN) sustained its tight monetary policy stance with a view to ensuring that electioneering spending did not result in increase in inflation. Headline inflation fluctuated between 7.7 and 8.5 percent within the period. The exchange rate experienced significant pressure especially during the second half of the review period, due to the impact of US Fed tapering, declining oil prices, depletion of the foreign exchange reserves, and the absence of fiscal buffers. In response to the situation, the CBN moved the exchange rate mid-point from N155/US\$ to N168/US\$ and widened the band around the mid-point from +/-3 percent to +/- 5 percent. The MPR was also raised by 100 basis points from 12.0 percent to 13.0 percent, while the symmetric corridor of +/-200 basis points around the MPR was maintained. The CRR on private sector deposit was raised by 500 basis points from 15.0 percent to 20.0 percent, while the CRR on public sector deposit was raised from 50.0 per cent to 75.0 percent. The CBN retained the Liquidity Rate at 30.0 percent in order to address the liquidity surfeit in the system (CBN, 2015; CBN, 2014).

5. Materials and Method

5.1 Model Specification.

This study looks at the effect of monetary policy on price stability in Nigeria from 1970 to 2014.

The study adopts the monetarist approach in which inflation relates to money supply via the equation of exchange, $MV = PT$. The monetarists saw the arrow of causation in the equation of exchange as moving from left to right, showing that increase in money supply causes increase in prices (Anyanwu and Oaikhenan, 1995). Accordingly, the monetarists posited that in every case in which a country's inflation rate is extremely high for any sustained period of time, its rate of money supply growth is also high (Mishkin, 2010). Consequently, we hereby specify a linear model to analyze the effect of monetary policy on price stability in Nigeria in line with the works of Fakiyesi (1996), Onyeiwu (2012), and Okwo et al. (2012). In the functional form, the model is stated as:

$INF = f(MPR, CPS, EXCH, MS, INF_{t-1}, DUM)$

While in econometrics form, the model is stated as follows:

$$INF = B_0 + B_1MPR + B_2CPS + B_3EXCH + B_4MS + B_5INF_{t-1} + B_6DUM + U \dots \dots \dots (1)$$

Where:

INF = Inflation rate – a proxy for price stability

MPR = Monetary Policy Rate

CPS = Credit to Private Sector as a percentage of GDP

EXCH = Exchange Rate

MS = Growth Rate of Broad Money Supply

INF_{t-1} = Past Inflation rate

DUM = Dummy variable included to capture the effect of monetary policy in Nigeria,.

U = Error term

A priori we expect $MPR < 0$ and $EXCH, CPS, MS, DUM, INF_{t-1} > 0$

The data for the study was sourced from the Central Bank of Nigeria Statistical Bulletin.

A priori, we expect, monetary policy rate to be negative. This is because, as an indicative rate, monetary policy rate is manipulated either for contractionary or expansionary policy by the Central Bank of Nigeria. Also, the exchange rate is expected to be positive since high exchange rate increases domestic inflation level in an import dependent economy like Nigeria. Other variables such as credit to private sector as a percentage of GDP, money supply, past inflation rate and dummy are expected to be positively related to inflation for the period under review.

6. Presentation and Analysis of Data

6.1 The Unit Root Test

A time series is said to be stationary if its mean and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2009). In this study, the Augmented Dickey-Fuller (ADF) Unit Root test is applied. The general specification of the unit root model is given as follows;

$$\Delta Y_t = B_1 + B_2 + \delta Y_{t-1} + \sum \alpha_t \Delta Y_{t-1} + U_t \dots \dots \dots (1)$$

Where Y_t is the variable under investigation and U_t is a random error term.

6.1.1 The Augmented Dickey-Fuller (ADF) Unit Root Test Results:

The results of the ADF test are presented in Table 1.1. The ADF test results show inflation rate (INF) and growth of broad money supply (MS) to be stationary at levels, while Monetary Policy Rate (MPR), Credit to Private Sector as a percentage of GDP (CPS) and Exchange Rate (EXCH) are stationary at first difference. Thus at 0.05 level of significance, the variables are stationary.

Table 4.1: The Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variables	Degree of Freedom	ADF Critical values	ADF t-statistic	p-values	Order of Integration
INF	1%	4.18	3.54	0.0471	1(0)
	5%	3.51			
	10%	3.18			
MPR	1%	4.19	6.97	0.0009	1(1)
	5%	3.52			
	10%	3.19			
CPS	1%	4.19	5.91	0.0000	1(1)
	5%	3.52			
	10%	3.18			
EXCH	1%	4.18	6.22	0.0000	1(1)
	5%	3.51			
	10%	3.18			
MS	1%	4.18	4.07	0.0000	1(0)
	5%	3.51			
	10%	3.18			

Source: Computed by the authors using E-views 7.0

6.2 Test for Cointegration:

The results of the ADF unit root tests in section 4.1.1 indicated that all the variables used in the study were stationary at levels and first difference. Therefore, having established the stationarity of the variables, we proceeded to test for the co-integration among the variables. When co-integration is present, it means the variables share common trend and long run equilibrium (Onyeiwu, 2012). According to Ditimi et al. (2011), ensuring stationarity test is the examination of the long run (co-integration) relationship among the variables. However, variables are co-integrated if they have long-term or equilibrium relationship among them (Gujarati, 2009).

6.2.1 The Johansen Co-integration Test Analysis:

In testing for co-integration among the variables used in this study, the Johansen multivariate co-integration test was adopted instead of the Engle-Granger test which is suitable for testing co-integration between two variables (Ditimi et al, 2011; Jawaid et al, 2011). However, Johansen and Juselius (1990) have derived two tests namely; the Trace and Maximum Eigen value tests for the testing of co-integration among variables.

The results of the co-integration tests are shown in Table 4.2. The trace statistic revealed that there was one (1) co-integrating relationships at 5 percent level of significance, while the maximum eigenvalue statistic also revealed same at 5 percent level of significance. However, the trace statistic was recommended because it possesses more power than the maximum Eigen value statistic since it takes into account all of the smallest Eigenvalues (Serletis and King, 1997; Johansen and Juselius, 1990). Therefore, based on the co-integration test results, the null hypothesis of no co-integration at 5 percent level of significance was rejected and implying that the variables namely Inflation Rate (INF), Monetary Policy Rate (MPR), Credit to Private Sector as percentage of GDP (CPS), Exchange Rate (EXCH) and Growth Rate of Broad Money Supply (MS) have long-run or equilibrium relationship among them.

Table 4.2 Johanson Co-integration Test Result:

Sample (adjusted): 1972 2014
 Included observations: 43 after adjustments
 Trend assumption: Linear deterministic trend
 Series: INF MPR CPS EXCH MS
 Lags interval (in first differences): 1 to 1

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.552630	71.49599	69.81889	0.0365
At most 1	0.346728	36.90807	47.85613	0.3519
At most 2	0.271336	18.60035	29.79707	0.5219
At most 3	0.109360	4.989021	15.49471	0.8100
At most 4	0.000209	0.008990	3.841466	0.9241

Trace test indicates 1 co-integrating equation at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 4.3: Unrestricted Co-integration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.552630	34.58792	33.87687	0.0411
At most 1	0.346728	18.30772	27.58434	0.4697
At most 2	0.271336	13.61133	21.13162	0.3977
At most 3	0.109360	4.980031	14.26460	0.7444
At most 4	0.000209	0.008990	3.841466	0.9241

Max-Eigen value test indicates 1 co-integrating equations at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Computed by the authors using E-views 7.0

4.3 Analysis of Regression Results

The regression results as presented in Table 4.4 indicated that the coefficients of some of the variables were in consonance with our a priori expectations. Monetary policy variables such as Monetary Policy Rate (MPR) and Money Supply (MS) showed positive relationships with Inflation rate (INF). This indicated that these variables were actively employed in the management of monetary policy by the Central Bank of Nigeria for the period under review. This was confirmed by the significance of Money Supply at 5 percent level. The insignificance of Monetary Policy Rate at 5 percent indicated the indirect link between MPR and inflation rate. The MPR, however indirectly affects inflation through its direct impact on broad money supply. This is confirmed by the study of Emerenini and Eke (2014) Also, Credit to Private sector as a percentage of GDP,

(CPS/GDP) which is a monetary aggregate, showed positive but insignificant relationship with inflation Rate. The result further showed that Exchange Rate (EXCH) and Past Inflation Rate (INFt-1) were significant at 5 percent level. The negative relationship between exchange rate and inflation showed that high exchange rate discourages import and encourages domestic production which would reduce inflation in the domestic economy. The dummy variable which measured the effect of monetary policy on price stability during the period under review, indicated a positive but insignificant relationship with inflation rate, while the past inflation rate was positive and significant at 5 per cent level. The F-statistics which confirmed the goodness of fit of the model was significant at 5 per cent level while the Durbin Watson d- statistics showed the absence of autocorrelation.

Table 4.4: The Regression Result

Dependent Variable: INF

Method: Least Squares

Sample (adjusted): 1971 – 2014

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.495449	8.900006	-0.617466	0.5407
MPR	0.250085	0.711436	0.351521	0.7272
CPS	0.480109	0.403514	1.189819	0.2417
EXCH	-0.122137	0.056845	-2.148578	0.0383
MS	0.287431	0.139467	2.060924	0.0464
DUM	10.54210	8.931884	1.180277	0.2454
INF(-1)	0.406627	0.142822	2.847092	0.0072
R-squared	0.450345	Mean dependent var		19.35227
Adjusted R-squared	0.361212	S.D. dependent var		17.53050
S.E. of regression	14.01112	Akaike info criterion		8.262490
Sum squared resid	7263.523	Schwarz criterion		8.546338
Log likelihood	-174.7748	Hannan-Quinn criter.		8.367754
F-statistic	5.052488	Durbin-Watson stat		1.965073
Prob(F-statistic)	0.000714			

Source: Computed by the author using E-views 7.0

5.0 Conclusion and Recommendations

The evaluation of monetary policy and analysis of its effect on achieving price stability was carried out with a view to ascertaining the effectiveness of monetary policy on price stability for the period 1970 to 2014. The result of the regression analysis indicated that monetary policy had not been sufficiently effective in achieving price stability in Nigeria, as shown by the positive but insignificant coefficient of the dummy variable. This confirmed the works of Okwo et al (2012), Onyeiwu (2012) and Onayem I (2013) which showed the ineffectiveness of monetary policy in achieving price stability in Nigeria. The positive and significant coefficient of money supply confirmed the monetarist proposition that inflation is always and everywhere a monetary phenomenon.

The significant effect of exchange rate and past inflation rate indicate that inflation rate in Nigeria is affected by exchange rate fluctuations and past inflation respectively.

Based on the above findings, we recommend as follows;

- (i) Price stability oriented monetary policy measures should be instituted and current inflation rate should be well stabilized in order to reduce the effect of previous inflation pressure on current price level.
- (ii) The Central Bank of Nigeria (CBN) should keep the monetary policy variables at optimal level consistent with the achievement of price stability and other macroeconomic objectives.
- (iii) Monetary policy in Nigeria should lay emphasis on effective control of inflation rate, reduce the effect of fiscal dominance of government and align the objectives of fiscal and monetary policy of government.
- (iv) Monetary Policy Rate should be re-designed as a tool to effectively manage inflation in Nigeria.
- (v) To achieve all of the above, the Central Bank of Nigeria should as a matter of priority, take steps to adopt price level as the nominal anchor for monetary policy by introducing inflation targeting framework for Nigeria.

6.1 References

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