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An Assessment of the Effectiveness of Open Market Operations Instrument of Monetary Policy Management in Nigeria

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Abstract
This study empirically examined the effectiveness of Open Market Operations (OMO) instrument of monetary policy management in Nigeria. In doing this, the study adopted the monetarist theory as the basis for measuring the effectiveness of OMO instrument of monetary policy management in Nigeria. The investigation was carried out using the Ordinary Least Squares (OLS) method of estimation. Unit Root and Co-integration tests were performed on all the variables and the results revealed that the variables have long run relationship and are suitable for OLS estimation. The empirical results indicated a significant relationship between monetary policy instruments such as open market operations, required reserve and monetary policy rate with broad money supply which is the proximate target for monetary policy management. This implies that Open Market Operations has been an effective instrument of monetary policy management in Nigeria. The study further showed that monetary policy rate could serve as a veritable instrument for the control of money supply and effective monetary policy management in the economy. It is recommended, among others, that the CBN should review periodically the performance of monetary policy with a view to enhancing the effectiveness of monetary policy instruments in order to achieve macroeconomic stability.
Keywords: OMO, Monetary policy effectiveness, Macroeconomic stability, Nigeria.

1.0 INTRODUCTION

The primary focus of monetary policy is price stability but other goals of monetary policy include attainment of high and sustainable rate of economic growth, low rate of unemployment and viable external sector. Monetary policy influences the level of money stock and/or interest rate, the value and cost of credit in consonance with the level of economic activity. It is known to be a vital instrument that a country can deploy for the maintenance of domestic price and exchange rate stability as a critical condition for the achievement of a sustainable economic growth and external viability. Its role in ensuring an overall macroeconomic stability cannot be over-emphasized. The use of monetary policy as instrument of monetary control dates back to the Central Bank Act of 1958 which saddled the Central Bank of Nigeria (CBN) with the responsibility of formulating and implementing monetary policy.

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 in the domestic economy with a view to achieving macroeconomic balance. The Research Department of the Central Bank also defined monetary policy as "the combination of measures designed to regulate the value, supply and cost of money in the economy in tandem with the expected level of economic activity" (CBN Report, 2002).

The CBN, over the years, has 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. Monetary policy instruments can be either direct or indirect. Until 1993 when Open Market Operations (OMO) was introduced, the CBN relied almost exclusively on varying combinations of direct instruments of monetary control. These instruments were credit ceilings, sectoral credit allocation, interest rate controls, imposition of special deposits, moral suasion, stabilization securities and exchange rate control. During that 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).

Due to some macroeconomic reforms that commenced in mid 1980s, the 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 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) OMO entails 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 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. However, despite the appreciable progress made since the introduction of various financial sector reforms in the 1980s, monetary policy management in Nigeria is still faced with severe challenges as the expected stabilization and growth benefits fail to materialize (Onyeiwu, 2012). The objective of this study is to evaluate and analyze the effectiveness of OMO monetary policy management in Nigeria from 1993-2014.

Following this introduction, the rest of the paper is organized as follows: Section 2 presents a review of related literature, theoretical framework and the monetary policy management regimes in Nigeria. Section 3 presents the methodology of this study while section 4 presents and analyzes the regression results. In section 5, the paper concludes and makes recommendations for effective monetary policy management in Nigeria.

2.0 LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Monetary Policy and Open Market Operations: Conceptual Issues

The effect of Open Market Operations in particular and monetary policy in general on economic activities as well as the degree and relative potency of the policy has been the subject of debates and controversies among prominent schools of thought in economics. Theoretically, monetary policy got its root from the works of Irving Fisher who laid the foundation in the Quantity Theory of Money using the famous 'Equation of Exchange', and posited that money has no effect on the economic aggregates except price level (Diamond, 2003). According to Iniodu (1996), the quantity theory of money was based on the argument that there was a relationship between the average level of prices and the quantity of money in circulation to the extent that a change in the quantity of money would lead to a proportionate change in price level in the same direction. This view was first held by 16th century French Economist-Jean Bodin-who believed that if the quantity of money in circulation doubles, the price would double too. The idea of direct relationship between money supply and price passed into the 18th century economics of David Hume and Adam Smith. The role of money in an economy got further elucidation from other economists such as the Keynesians and the monetarists, among others.

In contemporary economies, the central bank has the authority to implement monetary policy, through the use of monetary policy instruments, in order to achieve the desired macroeconomic objectives which include; the attainment of price stability with respect to both domestic and external prices. In the views of Sanusi (2002), the primary goal of monetary policy in Nigeria has been the maintenance of domestic price and exchange rate stability which are critical factors for the attainment of sustainable economic growth and external sector viability. 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 Domestic Product (GDP). The Central Bank uses inflation rate to track movement in the domestic prices while exchange rate is used as a tool for ensuring external stability.

According to Mishkin (2010), the discovery of open market operations in the early 1920s in United States was accidental. This was because, when the Federal Reserve Bank of United States (Fed) was created, the discount rate was the primary tool of monetary policy and the revenue that came was exclusively from the interest it received on the discount loans that it made to member banks. During the 1920-1921 recessions, the volume of discount loans shrank dramatically and the Fed was hard pressed for income. In order to solve this problem, the Fed purchased income-earning securities and the effect was that the reserves in the banking system grew and there was a multiple expansion of bank loans and deposits. To the Fed at that time, a new monetary policy tool known as open market operation has been discovered and by the end of 1920s it was the most important weapon in the Fed's arsenal. In Nigeria, Open Market Operations was introduced into the money market in June, 1993.

Open Market Operations (OMO) can be defined as the sale or purchase of government or other eligible securities thereby altering the reserve base of banks and their credit creating capacities, aggregate demand and the general level of economic activity (Nzotta,1999). According to Black (2003), OMO is the purchase or sale of securities by the Central Bank as a means of changing interest rate and money supply. To Nnanna (2001) OMO

is 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. OMO constitutes a major instrument of monetary policy under the market based system of monetary management. Essentially, it is used by the monetary authorities to regulate the cost and availability of credit in the banking system and thus influence the level of money supply. It is based on the discretionary power of the Central Bank to buy from or sell government securities or instruments in the money market, to the bank and non – bank public, in order to achieve macroeconomic objectives. These eligible instruments include treasury bills, treasury certificates and development stocks of not more than three years maturity period. OMO is mainly conducted in the secondary market for government securities. Banks subscribing to the offer draw on their reserves balances at the CBN thereby reducing the overall liquidity level of the banking system.

Nzotta (1999) explained that OMO ensures that monetary expansion or contraction is carried out by altering the reserve base of banks, thereby enhancing or limiting their credit creation capabilities. Thus, if an expansionary monetary policy is being pursued, the Central Bank purchases government securities from the deposit money banks, which causes their reserves to rise and hence increase their credit creation ability. Similarly, in conducting a contractionary monetary policy, the Central Bank sells government securities to commercial banks. This will cause their reserves to fall thereby limiting their credit creation abilities.

Three types of transactions are carried out in open market operations, namely;

- Outright sales or purchase of securities in the market,
- Repurchase transactions (REPOS) involving the purchase or sales of securities with the obligation to reverse the transaction on an agreed date, and
- Matched sales purchase transaction, which as the name implies, is a simultaneous sales and purchase of securities for delivery at a future date.

The outright sale is applied if the reserve situation is expected to last for several weeks, while the latter is suitable for the management of transient reserve situation (Okafor, 2009).

In conducting OMO, the Research Department of Central Bank of Nigeria (CBN) advises the trading desk of the Banking Operations Department also of the CBN, on the level of excess or shortfall in bank reserves. Thereafter, the trading desk decides on the type, rate and tenor of the securities to be offered and notifies the discount houses 48 hours ahead of the bid date. The highest bid price (lowest discount rate quoted) for sales and the lowest price offered (highest discount offer) for purchases, with the desired size or volume, is then accepted by the CBN (Nnanna, 2001).

The other instruments of monetary policy used by the Central Bank of Nigeria under the market based approach are: reserve requirements, discount window operations and moral suasion (Nnanna, 2001). The reserve requirement is an instrument for liquidity management and for prudential regulation. The reserve requirements are Cash Reserve Ratio (CRR) and Liquidity Ratio (LR).While the former is the proportion of the total demand, savings and time deposit which banks are expected to keep as deposits with the CBN, the latter is the proportion of banks liquid assets to their total deposit liabilities.

The discount window, on the other hand, was established strictly in line with the 'lender of last resort' role that the CBN is expected to play. Accordingly, it provides funds (loans) of a short term basis (overnight) to banks in need of liquidity. The facilities are collateralized by the borrowing institution's holding of government debt instruments and any other instrument approved by the CBN and subject to a maximum quota. The Monetary Policy Rate (MPR) is the nominal anchor which influences the level and direction of other interest rates in the domestic money market and shows the monetary policy stance of the CBN.

In terms of moral suasion, the CBN adopts this approach as a means of establishing a two- way communication with the banks, thereby creating a better environment for the effectiveness of monetary policy. The main avenue of contact is the Bankers' Committee, which meets regularly with objective of enhancing the transparency of the CBN monetary policy making process.

2.1.1 Monetary Policy Tools, Targets and Goals

Figure 1: The linkage between Central Bank tools, policy instruments, intermediate targets and goals of monetary policy.

Tools of the Central Bank		**Policy Instrument**	**Intermediate Target**		**Goals**
Open Market Operations, Discount Rates and Reserve Requirement	→	Reserve Aggregates (monetary base, reserves, non borrowed reserves, non borrowed base) Interest rate (Monetary Policy Rate)	Monetary Aggregate(M_1,M_2 etc) interest rates(short and long term) Aggregate Demand	→	Price Stability, High employment, Economic Growth,, Financial market stability, Interest Rate Stability and Foreign Exchange Market Stability

Source: Mishkin (2010)

Figure 1 shows the linkage between Central Bank tools, policy instruments, intermediate targets and goals of monetary policy. The Central bank directly controls the tools of monetary policy (open market operations, discount rate and reserve requirement) but knowing the tools and the strategies for implementing a monetary policy does not tell us whether policy is easy or tight. According to Mishkin (2010), the policy instrument (also called an operating instrument) is a variable that responds to the Central Bank's tools and indicates the stance (easy or tight) of monetary policy. The policy instrument might be linked to an intermediate target, such as a monetary aggregate like M_1 and M_2 or long-term interest rate. Intermediate targets stand between the policy instrument and the goals of monetary policy such as price stability and output growth. They are not as directly affected by the tools of monetary policy but might be more closely linked to the goals of monetary policy.

2.2 THEORETICAL LITERATURE

2.2.1 The Classical Theory of Monetary Policy

The classical school evolved through concerted efforts and contribution of economists like Jean Baptist Say, Adam Smith, David Ricardo, Pigou and others who shared the same beliefs. The classical model attempts to explain the determination of savings and investment with respect to money. Thus classical economists believe that the economy automatically tends towards full employment level by laying emphasis on price level and on how best to eliminate inflation (Udude, 2014) .

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. The theory which is associated with Fisher and Newcomb, 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). In the cash balances version – associated with Walras, Marshall, Wicksell and Pigou, the neoclassical school (Cambridge school)- changed the focus of the quantity theory of money without changing its underlying assumptions. This version focuses on the fraction (K) of income, held as money balances. The Cambridge version can be expressed as: M= KPY Where K= Fraction of income held as money balances, M =Quantity of money, P= price level, Y=value of goods and services. The K in the Cambridge equation is merely inversion of V, the income Velocity of money balances, in the original formulation of quantity theory. This version directs attention to the determinants of demand for money, rather than the effects of changes in the supply of money (Anyanwu, 1993).

2.2.2 The Keynesian Theory of Monetary Policy

In the Keynesian analysis, monetary policy plays a crucial role in affecting economic activity but did 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 goods usually increases causing real GDP to rise. The increased investment will raise effective demand through the multiplier effect thereby increasing income, output and employment (Jhingan, 2010).

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).

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).

2.2.3 The Monetarist Theory

The monetarist essentially adopted Fisher's equation of exchange to illustrate their theory, as a theory of demand for money and not a theory of output price and money income by making the quantities of real balances demanded a function of a limited number of variables. 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; ↑OMO→↑Ms→↑SPENDING→↑ 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.

Just like the Keynesians, 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.

2.3 EMPIRICAL LITERATURE

The concept of inflation which models money supply as an exogenous variable with causality running from money supply to prices characterized the works of Fakiyesi (1996), Neaime (2008), among others. Accordingly, Fakiyesi (1996) argued that inflation depends on growth in broad money, the rate of exchange of the Naira vis-a-vis the Dollar, the growth of real income, the level of rainfall and the level of anticipated inflation which is based on the previous year's level of inflation. Kogar (1995) examined the relationship between financial innovations and monetary control in Nigeria, and concluded that in a changing financial structure, the CBN cannot realize efficient monetary policy without setting new procedures and instruments in the long run, because profit seeking financial institutions change or create new instruments in order to evade regulations or respond to the economic conditions in the economy.

Nnanna (2001) while examining the evolution of monetary policy management in Nigeria in the past four decades, explained that though the monetary management in Nigeria has been relatively more successful during the period of financial sector reform which is characterized by the use of indirect rather than direct monetary policy tools, yet the monetary policy has been undermined by the effects of fiscal dominance, political interference and legal environment in which the Central Bank operates.

Okafor (2009) stressed that in a deregulated financial environment, Central Bank regulates economic activities indirectly through the use of monetary policy instruments and market channels. The choice of instrument is a major issue in monetary policy design. The ability of a Central Bank to influence economic activity and make a success of monetary policy depends on the instrument available and how they can be quickly applied to alter monetary conditions.

In an attempt to link monetary policy to economic growth, studies in the economic growth literature have considered the role of financial structure which presupposes that the level of money stock drives economic growth. Montiel (1995) and Emenuga (1996) agreed that the possible effect of financial depth (money in circulation) on economic growth can manifest in three channels namely; improved efficiency of financial intermediation, improved efficiency of capital stock and improved national savings rate. Also, macroeconomic theories of monetary policy and economic development seem to agree that there exist a systematic relationship between monetary policy and economic development (Bernanke and Blinder, 1992; Ghatak, 1995). However, other empirical studies have largely focused on addressing two issues, firstly, to examine if money could forecast

output given the predictive power of past values of output, and to examine whether such relationship is stable over time or not. Some studies (Becketti and Morris, 1992; Krol and Chanian, 1993) have found evidence of the predictive ability of monetary aggregates, though they argued that such relationship seems to have changed over time. Similar studies that have found a strong support for a positive relationship between monetary policy and economic growth include; Greenwood and Jovanovic (1990), Wachtel and Rousseau (1995), Neusser and Kinger (1996) and Mansor (2005).

In Nigeria, Ogunmuyiwa and Ekone (2010), evaluated the effect of money supply on economic growth and found that aggregate money supply is positively related to economic growth and development, even though money supply does not have a significant predictive power in explaining the growth of real GDP. Onyeiwu (2012) examined the impact of monetary policy on macroeconomic variables in Nigeria and concluded that monetary policy has significant impacts on economic growth and balance of payments with no significant impact on inflation. He suggested that the problem of inflation in Nigeria is not a monetary phenomenon but rather attributable to structural rigidity in the country. Also, the empirical result of Ditimi et al (2011) showed a positive effect of monetary policy on economic growth but insignificant effect of the policy on inflation rate in Nigeria. Other studies that have confirmed a strong relationship between money supply and growth in Nigeria include; Ojo (1993); Okedokun (1998); Ajisafe and Folunso (2002); Saidu (2007); and Owoye and Onafowora (2007).

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 relationship among money supply, economic growth and price level in Nigeria during the period 1970-2011. 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.

Amassoma, Nwosa and Olaiya (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 found 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.

The study of Udude(2014), examined the impact of monetary policy on the growth of Nigeria economy between the period of 1981 and 2012, using Vector Error Correction Method, with the objective of finding out the impact of various monetary policy instruments (money supply, interest rate, exchange rate and liquidity ratio) in enhancing economic growth of the country within the period considered. The empirical result revealed that monetary policy did not impact significantly on economic growth of Nigeria within the period under review and that the inability of monetary policies to effectively maximize its policy objective most times is as a result of the shortcomings of the policy instruments used in Nigeria as such limits its contribution to growth.

2.4 MONETARY POLICY MANAGEMENT IN NIGERIA

2.4.1 The Exchange Rate Targeting Regime (1959-1973)

The Exchange Rate Targeting period was 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 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 (Nnana, 2001). 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).

2.4.2 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).

2.4.3 The indirect monetary policy Regime (1986-2016)

The adoption of Structural Adjustment Program (SAP) in Nigeria in 1986, 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 sto ₦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-digit inflation 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).

Table 1: Analysis of Monetary Policy Instruments (1993-2016)

Years	Loans to Banks by CBN (N'millions)	Monetary Policy Rate	Open Market Operations(N'millions)
1993	47.9	26.0	47,265.0
1994	9,653.5	13.5	223,681.0
1995	13,059.7	13.5	158,190.0
1996	16,154.6	13.5	234,836.0
1997	16,185.6	13.5	111,534.0
1998	8,579.4	14.31	27,447.0
1999	6,925.0	18.00	80,956.0
2000	4,867.3	13.50	103,845.0
2001	40,701.0	14.31	386,941.5
2002	22,158.7	19.00	591,988.3
2003	44,302.6	15.75	794,647.1
2004	62,079.5	15.15	1,099,446.1
2005	42,687.5	13.00	989,840.0
2006	62,991.4	12.25	1,445,330.00
2007	49,741.6	8.75	3,141,211.2
2008	132,195.3	9.81	2,787,800.5
2009	274,346.75	7.44	2,541,121.8
2010	436,203.1	6.13	4,324,902.1
2011	295,033.00	9.19	6,512,711.4
2012	290,821.00	12.00	8,750,511.0
2013	236,114.3	12.00	7,573,401.1
2014	257,000.0	13.00	7,705,230.0
2015	732,200.0	11.00	8,685.610.0
2016	992,300.0	14.00	9,803.200.0

Source: CBN Statistical Bulletin (various issues)

Table 1 depicts the trend in the three key monetary policy variables –rediscount loans, monetary policy rates and open market operations. Going by the trend, between 1993 and 2006, MPR remained high at 15.36 percent on the average, reflecting a tight monetary stance. Accordingly, rediscount loans to banks by the CBN remained low, averaging N16,729.98 million over the period. Following the financial crises that rocked the global economy from 2007, the CBN adopted a soft monetary stance, with MPR coming down to 9.33 percent on the average between 2007 and 2013. In consonance with this, the CBN lending through the rediscount window rose to average of N244,926.44 million over the period. The OMO remained a very active instrument of monetary control, rising from average of N449,710.5 million between 1993 and 2006 to average of N4,731,805.6 million between 2007 and 2013. Between 2014 and 2015, MPR dropped from 13.0 percent to 11.00 percent forcing rediscount loan to increase from N257,000.0 million to N732,200.0 million in 2015, an increase of 184.9 percent. As a consequence, open market operations increased from N7.7 billion to N8.6 billion over the period. A tight monetary stance adopted in 2016 to curb inflationary pressures raised MPR to 14.0 percent but rediscount loans and OMO increased to N992,300.0 million and N9.8 billion respectively.

3.0 METHODOLOGY

3.1 Model Specification:

Following the objective of this study and in line with the frameworks of Mishkin (2010) and Uchendu (2009), we specify the functional form of the model for the effectiveness of Open Market Operations as instrument of monetary policy management in Nigeria
as follows;

$MS = f(OMO, RR, MPR)$……...…….(3)

Since the variables enter the model in the log linear form, equation (3) is stated as;

$\log MS = b_0 + b_1 \log OMO + b_2 \log RR + b_3 MPR + U_t$……(5)

a priori expectation ($b_1 > 0$, b_2 ,$b_3 < 0$)

where;

logMS = Broad Money Supply proxy for monetary policy
logRR = log of Required Reserve
MPR = Monetary Policy Rate
logOMO = log of Open Market Operations
U_t = Error Term
b_1, b_2, b_3 = Parameters to be determined

3.2 Description of Data

In order to analyze the effectiveness of OMO instruments of monetary policy management in Nigeria, this study employs time series data on monetary policy variables such as open market operations, money supply, required reserve and monetary policy rate. The data were sourced from the CBN publications, among others.

4.0 PRESENTATION AND DISCUSSION OF RESULT

4.1 Unit Root Tests for Stationarity

A test of stationarity that has become widely popular over the past several years is the unit root test. A time series is said to be stationary if it's 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) is applied to test for stationarity. The general specification of the unit root model is given as follows;

$$\Delta Y_t = B_1 + B_2 + \partial Y_{t-1} + \sum_{t=1}^{\infty} \alpha_t \Delta Y_{t-1} + U_t \quad \ldots\ldots(5)$$

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

The results of the ADF test are presented in Table 2. The ADF test results show Required Reserve (RR) and Open Market Operations (OMO) to be stationary at levels, while Monetary Policy Rate (MPR) is stationary at first difference. Broad money supply (MS) shows stationarity at second difference. Therefore, since the computed t (tau) statistic is greater than the critical value at 0.05 level of significance for all the variables, we reject the null hypothesis of non-stationarity of the variables used in this study and conclude that the variables are stationary. However, since all the variables are difference stationary, the Ordinary Least Squares (OLS) regression of these variables may not produce spurious results.

Table 2: The Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variables	Degree of Freedom	ADF Critical values	ADF t-statistic	p-values	Order of Integration
MPR	1% 5% 10%	4.49 3.65 3.26	6.60	0.002	1(1)
MS	1% 5% 10%	4.53 3.67 3.27	6.86	0.0001	1(2)
OMO	1% 5% 10%	4.61 3.71 3.28	6.86	0.0001	1(0)
RR	1% 5% 10%	4.46 3.64 3.26	4.62	0.0001	1(0)

Source: Computed by the Researchers using E-views 9.0

4.2 Test for Co-integration

Having established the stationarity of the variables, we proceed 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. 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).

In testing for co-integration among the variables used in this study, the Johansen co-integration test is adopted instead of the Engle-Granger test which is suitable for testing co-integration between two variables. 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 test presented in Table 3 reveal the existence of long-run or equilibrium relationship between monetary policy proxied by broad money supply (MS) and monetary policy instruments such as Open Market Operations (OMO), Required Reserve (RR) and Monetary Policy Rate (MPR).This is because the trace and the maximum Eigen value statistics indicate two (2) co-integrating equations. Therefore, the null hypothesis of no co-integration among the variables is rejected at 5 percent level of significance and accepted that the variables are co-integrated.

Consequently, based on the Johansen co-integration test results in Tables 3, we conclude that the variables used in this study are co-integrated and our regression results depict long run relationship among the variables even though there might be disequilibrium in the short run.

Table 3: The Johansen Cointegration Test Results

Series: RR, MPR, MS, OMO

Hypothesized No of CE(S)	Trace Statistic	0.05 critical value	Hypothesized No of CE(s)	Max-Eigen value statistic	0.05 Critical value
None*	84.96	47.86	None*	27.58	27.58
At Most 1*	40.85	29.80	At Most 1*	21.13	21.13
At Most 2	12.53	15.49	At Most 2	14.26	14.26
At Most 3	0.11	3.84	At Most 3	3.84	3.84

Source: Reseacher's computation using E-views 9.0

The Trace test and the maximum eigen value test indicate one (1) co-integrating equation at 0.05 level of significance.

*Denotes rejection of the null hypothesis at 0.05 level.

4.3 Presentation and Analysis of Estimated Results:

The regression result as presented in Table 4 shows that all the variables meet our a priori expectations except required reserve. An analysis of each variable shows that OMO has a positive and significant relationship with money supply in Nigeria as it is statistically significant at one percent level. This confirms that OMO is an effective monetary instrument for expansionary or contractionary purposes. The Required Reserve (RR) which was introduced by the Central Bank of Nigeria (CBN) to complement Open Market Operations, also indicates positive and significant relationship with broad money supply at one percent level of significance. This positive relationship could be attributed to the influence of fiscal dominance of the government during the period and the effect of government funds in the vault of the banking sector. However, Monetary Policy Rate (MPR), which is the nominal anchor for transactions in the money market and deposit money banks, shows a negative but statistically significant relationship with money supply. This indicates that an increase in MPR by one percent, reduces money supply by 1.39 percent. This is because an increased in MPR affects borrowing negatively in the banking sector due to its effect on commercial bank's lending rate.

The statistical evidence emanating from this study as presented in Table 4 shows the coefficient of determination (R^2) to be 0.96. This indicates that 96 percent variations in the dependent variable (Broad Money Supply) can be jointly explained by the independent variables. The joint significance of the estimated parameters as indicated by the F-statistic is statistically significant at 1 percent level of significance. This result confirms the effectiveness of Open Market Operations, required reserve and monetary policy rate as instruments of monetary policy management in Nigeria.

Table 4: Estimated Regression Results for Model 2

Dependent Variable: LOG(MS)
Method: Least Squares
Sample: 1993 2014
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.274364	1.724265	3.058905	0.0068*
LOG(OMO)	0.265228	0.097630	2.716658	0.0141*
LOG(RR)	0.497513	0.085688	5.806082	0.0000*
LOG(MPR)	-1.394391	0.334871	-4.163963	0.0006*

R-squared	0.960028	Mean dependent var	7.621100
Adjusted R-squared	0.953366	S.D. dependent var	1.527004
S.E. of regression	0.329756	Akaike info criterion	0.782038
Sum squared resid	1.957302	Schwarz criterion	0.980409
Log likelihood	-4.602416	Hannan-Quinn criter.	0.828768
F-statistic	144.1043	Durbin-Watson stat	1.410101
Prob(F-statistic)	0.000000		

Source: Researcher's computation using E-views 9.0

Note: * denotes significance at 0.01 level

MS=Broad Money Supply; RR=Required Reserve; MPR=Monetary Policy Rate; OMO=Open Market Operations

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

An empirical investigation of the effectiveness of Open Market Operations as instrument of monetary policy

management in Nigeria was conducted and the major findings are summarized as follows:

(i) The regression result shows that OMO has a positive and significant relationship with broad money supply (M_2) which is used as a proxy for monetary policy. OMO is statistically significant at 1 percent level.

(ii) The study further shows that required reserve has a positive and significant relationships with money supply which could be due to the fiscal dominance of government and the influence of government funds in the banking sector.

(iii) Monetary policy rate which is an indicative rate for transactions in the money market and deposit money banks reveals a negative and significant relationship with money supply. This implies that monetary policy rate could serve as a veritable tool for the control of money supply and effective monetary policy management in the economy.

5.2 Conclusion

The empirical result of this study reveals that monetary policy instruments have significantly impacted on money supply (used in this study as a proxy for monetary policy) in Nigeria within the period under review. Also, the effectiveness of Open Market Operations, required reserve and monetary policy rate as instruments of monetary policy management is confirmed by the joint significance of the parameters (F-Statistic) which is significant at 1 percent level. Similarly, the coefficient of determination (R^2) which measures the goodness of fit of the model is over 96 percent.

3.3 Recommendations

Monetary policy is undoubtedly one of the tools of economic stabilization and its role in any economy cannot be over-emphasized. Based on the major findings of this study, it is recommend that;

(i) Monetary policy in Nigeria should lay emphasis on controlling money supply in order to stabilize the price level, reduce the effect of fiscal dominance of government and align the objectives of fiscal and monetary policy of government.

(ii) The government should endeavour to make the financial sector less volatile and more viable for smooth execution of the Central Bank monetary policies.

(iii) The Central Bank of Nigeria (CBN) should ensure that laws relating to the operation of financial institutions in the country are made to be less stringent and more favourable for the operators to have room to operate more freely.

(iv) The Central Bank should ensure effective and efficient monitoring of the activities of financial institutions and their performance to ensure credibility in the financial sector. The CBN should review periodically the performance of monetary policy with a view to enhancing the effectiveness of monetary policy instruments and achieving macroeconomic objectives.

(v) In order to strengthen the financial sector, the Central Bank of Nigeria (CBN) should encourage the introduction of more financial instruments that are flexible enough to meet the risk preferences and sophistication of operations in the financial sector.

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