AN ANALYSIS OF THE EFFECTIVE MONETARY POLICY IN A DECENTRALIZED FINANCIAL SYSTEM: A NIGERIA IN PERSPECTIVE.

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ABSTRACT

This study empirically examined the effectiveness of Open Market Operations (OMO) and Decentralized Finance (DFS,) 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 relationships and are suitable for OLS estimation. The results indicated a significant relationship between monetary policy instruments. This implies that Open Market Operations and Decentralized Finance has been effective instrument of monetary policy management in Nigeria. The study further showed that the monetary policy rate could serve as a veritable instrument for the control of the money supply and effective monetary policy management in the economy. It is recommended, that the CBN should review periodically the performance of monetary policy to enhance the effectiveness of monetary policy instruments to achieve macroeconomic stability.

Keywords: OMO and DFS, Monetary Policy Effectiveness, Economic Growth, Central Bank of Nigeria.

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INTRODUCTION

The primary focus of the monetary policy is price stability but other goals of monetary policy include the attainment of a high and sustainable rate of economic growth, a low rate of unemployment, and a viable external sector According to Nnanna (2021). Monetary policy influences the level of the 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 sustainable economic growth and external viability. The use of monetary policy as an 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 (Nzotta, 2020).

The CBN, over the years, has used various monetary policy instruments for the conduct and implementation of monetary policies in Nigeria. According to Oke (2019), 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, 2019).

Due to some macroeconomic reforms that commenced in the 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) and Decentralized Financial System (DFS), 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, 2019). According to Nnanna (2021), OMO/DFS entails the sale or purchase of eligible bills or securities in the open market by the Central Bank of Nigeria to influence 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 and Decentralized Financial Systems are outright sales or purchases of securities in the market, repurchase transactions (REPOS), and matched sales purchase transactions.

However, amplifying the appreciable progress and summary monetary policy challenge in Nigeria 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, 2022). The objective of this study is to evaluate and analyze the effectiveness of OMO/DFS monetary policy management in Nigeria from 1993-2014.

Problems with the effective monetary policy in decentralized finance. While there's no doubt that OMO/DF is one of the most promising phenomena in the crypto scene right now, it's still in its early stage. And that comes with its share of challenges According to Oke (2019). One of the biggest risks of OMO/DF applications is that you're ultimately trusting in open-source code. Over time, many people are looking at that code and there's always a chance that someone could hack the smart contracts and steal all the keys. That's why popular OMO/DF applications like Dai have been audited by well-known security firms like Trail of Bits, People also feel that OMO/DF is probably too idealistic. In other words, the road to utopia lies in a series of small steps like say a stablecoin created by a giant like Facebook that already has billions of users. Many people prefer the scale that such a solution promises versus the idealism of an OMO/DF application, The OMO/DF sector is still extremely underdeveloped. According to OMO/DF Review, Maker DAO, the biggest OMO/DF platform has $346

million locked up. This is followed by EOSREX, an OMO/DF platform for EOS lending, which has $296 million in assets. However, the third largest service, Compound, has only $32 million in assets which goes to show that the sector is still very nascent. This means users need to be especially cautious while using OMO/DF platforms, the technology is still user-unfriendly and prone to vulnerabilities. It will be some time before the security protocols are in place and the technology is safe to use.

THE EFFECTIVE MONETARY POLICY IN A DECENTRALIZED FINANCIAL SYSTEM.

The central bank tries to maintain price stability by controlling the level of the money supply. Thus, monetary policy plays a stabilizing role in influencing economic growth through several channels. However, the scope of such a role may be limited by the concurrent pursuit of other primary objectives of monetary policy, the nature of the monetary policy transmission mechanism, and other factors, including the uncertainty facing policymakers and the stance of economic policies. In addition, the concurrent target of intermediate goals may have implications on the attainment of the ultimate objective of achieving sustainable growth by making use of Open Market Operation and Decentralization of Finance.

The contribution that Broad Money Supply makes to sustainable growth is the maintenance of price stability. Since a sustainable increase in price levels is adjudged substantially to be a monetary phenomenon, the monetary policy uses its tools to effectively check the money supply to maintain price stability in the medium to long term. Monetary policy has a far-reaching impact on financing conditions in the economy, not just the costs, but also the availability of credit, banks' willingness to assume specific risks, etc. It also influences expectations about the future direction of economic activity and inflation, thus affecting the prices of goods, asset prices, exchange rates as well as consumption, and investment.

A monetary policy Rate decision that cuts the interest rate, for example, lowers the cost of borrowing, resulting in higher investment activity and the purchase of consumer durables. In a low interest-rate regime, stocks become more attractive to buy, raising households' financial assets. This may also contribute to higher consumer spending, and makes companies' investment projects more attractive. Low-interest rates also tend to cause the currency to depreciate because the demand for domestic goods rises when imported goods become more expensive. The combination of these factors raises output and employment as well as investment and consumer spending.

THE CENTRAL BANKS INTRODUCE OPEN MARKET OPERATION AND DECENTRALIZATION OF FINANCE IN NIGERIA

The rationale behind the e-Naira is to promote and facilitate the cashless culture amongst Nigerians while keeping up with contemporary economies of the world and maintaining the value of the Nigerian currency/foreign reserve. The Central Bank of Nigeria (CBN) on 25th October 2021 launched the Open Market Operation and Decentralization of Finance the first Central Bank Digital Currency (CBDC) on the African continent. This, unsurprisingly, has generated a lot of interest from many observers with some comparing cryptocurrencies to CBDC while others simply seek a better understanding of the concept of a CBDC. This article discusses Nigeria's version of the concept of a CBDC in comparison with other countries that have CBDCs and the applicable regulatory framework of the Open Market Operation and Decentralization of Finance.

PURPOSE OF CENTRAL BANK DIGITAL CURRENCY (CBDC)

The purpose for launching CBDCs differs in every country. It is therefore important to ascertain the reason behind the launch of any CBDC to understand the purpose that CBDC is to serve in the given country. For instance, the reason the United States of America is considering a CBDC is to improve its payment system. The Federal Reserve's mandate to promote monetary and financial stability and the

safety and efficiency of its payment system requires it to ensure that the public has access to a range of payment options and that financial institutions can effectively provide payment services.

As of November 2021, out of the 90 countries being tracked for CBDC, two countries had canceled their plans for a CBDC, seven countries were inactive, 40 countries were still at the research stage of their CBDC, 14 countries were in development stages of their CBDC,17 countries were at the pilot stages of their CBDC and seven countries had launched their CBDC[6]. The reason for this might not be unconnected with the earlier mentioned fact that countries issue a CBDC for a variety of reasons that are more often than not peculiar to their economic circumstances. Nigeria is no different. The Open Market Operation and Decentralization of Finance is a digital version of the fiat currency that provides users with a lawful digital option for making payments. The objective of the Open Market Operation and Decentralization of Finance is to enable households and businesses to make fast, efficient, and reliable payments while benefiting from a resilient, innovative, inclusive, and competitive payment system. From the said objectives, it could be said that the Open Market Operation and Decentralization of Finance were launched to grow the retail financial services sector in Nigeria.

REGULATORY FRAMEWORK OF THE OPEN MARKET OPERATION AND DECENTRALIZATION OF FINANCE

In line with the CBN's mandate to issue legal tender currency, ensure the stability of the financial system, and promote the development of an electronic payments system, the apex bank released its Regulatory Guidelines on the OMO/DF on October 1st, 2021 which applies to all FI's and users of the OMO/DF. The CBN shall be exclusively responsible for the minting, issuance, distribution, and redemption of the OMO/DF. FI's would serve as brokers between the CBN and customers, and will be responsible for facilitating the OMO/DF wallet on-boarding for bank customers (merchants and customers), amongst other responsibilities. FI's are to give customers the option of an alternative channel for making transactions using the

OMO/DF, provide cashback to customers, and publicize the option of OMO/DF payment for transactions at merchant locations. Merchants are to be on-boarded by FI's upon fulfillment of specified requirements.

Ministries, Departments, and Agencies (MDAs) are allowed to receive revenue and make payments in OMO/DF. MDAs shall be on-boarded by the CBN upon receipt of the appropriate mandate. Lastly, the roles of consumers as end-users of OMO/DF include:

- the creation and funding of OMO/DF wallets;
- utilizing OMO/DF as an alternative payment option for legitimate transactions; and
- protecting their OMO/DF wallet access credentials and notifying financial institutions in the event of fraud/complaints/disputes.

Further, the CBN Regulatory Guidelines stipulate the existence of different wallets for different stakeholders. The CBN will be the sole owner of the OMO/DF stock wallet and it shall warehouse all minted OMO/DF. FI's are to maintain treasury OMO/DF wallets to warehouse OMO/DF received from the CBN OMO/DF stock wallet and are also permitted to create OMO/DF sub-treasury wallets for their branches, and to fund them through their treasury OMO/DF wallets. Merchants are permitted to have speed wallets which shall be used solely for receiving and making OMO/DF payments for goods and services. The OMO/DF speed wallets will also be available to end-users to transact on the OMO/DF platform.

The said CBN Regulatory Guidelines also set down the different tiers of the OMO/DF wallet. Tier 0 users are only required to hold telephone numbers, their daily spending limit is pegged at NGN20,000 and they can have a cumulative balance of NGN120,000. Tier 1 users are required to hold both a telephone number and NIN. Individuals who fall into this Tier can spend up to NGN50,000 daily and can have a cumulative balance of NGN300,000. Tier 2 users are required to have bank accounts with BVN, they have a daily spending limit of NGN200,000 and can have a cumulative balance of NGN500, 000. Lastly, Tier 3 users are also required to have bank accounts with BVN

and a public utility receipt. The daily limit under this Tier is NGN500, 000 and they can have a cumulative balance of NGN5,000,000.

Key Points Open Market Operation and Decentralization of Finance Users Need to Know

OMO/DF users need to know the following:

1. During the onboarding process on the OMO/DF platform, users are expected to download the OMO/DF app from either the Google Play Store or Apple Store and complete the registration process.
2. Users are expected to be linked with a commercial bank in compliance with the AMT/CFT guidelines.
3. The CBN would be able to identify users on the platform using the identified frameworks: Bank Verification Number (BVN) and National Identity Number (NIN).
4. Once the OMO/DF wallet is created, users will be able to make peer-to-peer (P2P) payments to anyone with an OMO/DF wallet without the need for an intermediary.
5. There are different tiers of the OMO/DF wallet which require different levels of identification.
6. The OMO/DF and the fiat Naira will always be exchanged 1:1, hence, it would appreciate when the Naira appreciates.
7. Two-factor authentication shall be adopted to ensure the security of the OMO/DF wallet.
8. Money held in the OMO/DF wallet will not gain any interest.
9. The charges for OMO/DF transactions shall be in line with the Guide to Charges by Banks, Other Financial, and Non-Bank Financial Institutions[19]. However, going by the regulatory guidelines released by the CBN charges for transactions that originate from the OMO/DF platform will be free in the first 90 days commencing from October 25th, 2021.
10. Consumer Complaints concerning the usage of the OMO/DF shall be referred to the Helpdesk of users' preferred FI Helpdesk.

THE SUMMARY OF OPEN MARKET OPERATION (OMO) AND DECENTRALIZED FINANCE (DF)

Although the OMO/DF platform is built with deep consideration around privacy and data protection, its implementation presents a risk to the existing financial system and its participants in terms of data breaches and losses through cybercrimes. Since the OMO/DF is a digital currency, the OMO/DF platform can be exploited by users who may try to exploit vulnerabilities within the OMO/DF payment system. The CBN acknowledged this risk in its design paper and stated that to address the cybersecurity risk, it would provide IT security governance over the OMO/DF system, conduct regular IT security assessments to identify vulnerabilities, and strengthen the system. Also, the traditional security core of confidentiality, integrity, and availability (CIA) together with strong internal control measures will be implemented to address exposures and enhance overall security on the platform.

On a positive note, the OMO/DF app had over 100,000 downloads shortly after its unveiling before the initial technical glitches that caused its temporary removal of the OMO/DF App from App stores. With more downloads of the OMO/DF expected to be seen in 2022 and beyond, it is clear that the OMO/DF has ushered in a new dimension to payments in Nigeria.

MONETARY POLICY MANAGEMENT IN NIGERIA

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, 2020). 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 the balance of payments viability and control over inflation in the Nigerian economy. However, this fixed parity lasted until 1967 when the British pound was devalued (Nnana, 2021). The money and capital markets were established during

this period as well as the introduction of treasury bills in 1959 which were used mainly as a tool of fiscal policy (Okpara, 2019). 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 the 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, 2021).

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 the imposition of special deposits (Uchendu, 2019). The monetary authorities imposed differential quantitative ceilings on all sectors of the economy, giving more of such credit ceilings to the preferred sectors of the economy such as agriculture, manufacturing, and construction. The preferred sectors benefited from credit allocation below the market lending rate. This was to ensure that these sectors were given the utmost attention to take the lead in growing the economy through the multiplier effect.

According to Nnanna (2021), 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 percent. Accordingly, a major factor that 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 (2019) observed that from 1980, crude oil prices took a downturn as prices fell from a 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 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, 2019).

The Indirect Monetary Policy Regime (1999-2022)

The adoption of the Structural Adjustment Program (SAP) in Nigeria in 1999, 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 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, 2021).

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

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 the universal banking system while in 2005 the minimum paid-up capital was further raised to ₦25 billion Naira for all commercial banks in accordance with the recapitalization exercise.

During the period between 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 a liquidity crunch in the banking system due to large capital outflows which exerted pressures on the foreign exchange market as well as an 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 a 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 the domestic economy. Given these challenges, monetary policy during the period focused on deploying a mix of appropriate instruments to deliver 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 the 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 the 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) and Decentralized Financial System (DFS), 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) and Decentralized Financial Systems (DFS), 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 the standing deposit facility window increased by 53.6 percent compared with the first half. To tighten the money supply, the CBN increased Cash Reserve Ratio (CRR) for public sector deposits to 50 percent while the Net Open Position limit and Liquidity Ratio (LR) were sustained at 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 intending to ensure that electioneering spending did not increase 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 deposits was raised by 500 basis points from 15.0 percent to 20.0 percent, while the CRR on public sector deposits was raised from 50.0 percent to 75.0 percent. The CBN retained the Liquidity Rate at 30.0 percent to address the liquidity surfeit in the system (CBN, 2015; CBN, 2014).

Table 1: Analysis of Monetary Policy Instruments (1999-2022)

Years	Loans to Banks by CBN (N'millions)	Monetary Policy Rate	OMO/DFS (N'millions)
1999	47.9	26.0	47,265.0
2000	9,653.5	13.5	223,681.0
2001	13,059.7	13.5	158,190.0
2002	16,154.6	13.5	234,836.0
2003	16,185.6	13.5	111,534.0
2004	8,579.4	14.31	27,447.0
2005	6,925.0	18.00	80,956.0
2006	4,867.3	13.50	103,845.0
2007	40,701.0	14.31	386,941.5
2008	22,158.7	19.00	591,988.3
2009	44,302.6	15.75	794,647.1
2010	62,079.5	15.15	1,099,446.1
2011	42,687.5	13.00	989,840.0
2012	62,991.4	12.25	1,445,330.00
2013	49,741.6	8.75	3,141,211.2
2014	132,195.3	9.81	2,787,800.5
2015	274,346.75	7.44	2,541,121.8
2016	436,203.1	6.13	4,324,902.1

2017	295,033.00	9.19	6,512,711.4
2018	290,821.00	12.00	8,750,511.0
2019	236,114.3	12.00	7,573,401.1
2020	257,000.0	13.00	7,705,230.0
2021	732,200.0	11.00	8,685.610.0
2022	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 1999 and 2022, 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 in 2013, the CBN adopted a soft monetary stance, with MPR coming down to 9.33 percent on the average between 20013 and 2019. In consonance with this, the CBN lending through the rediscount window rose to average of N244,926.44 million over the period. The OMO/DFS remained a very active instrument of monetary control, rising from average of N449,710.5 million between 1999 and 20017 to average of N4,731,805.6 million between 2013 and 2019. Between 2020 and 2021, 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 2021, 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 2022 to curb inflationary pressures raised MPR to 14.0 percent but rediscount loans and OMO/DF increased to N992,300.0 million and N9.8 billion and therefore, the gap between the two variable literature review has close relationship to positive results on Effective Monetary Policy in a Decentralized Financial System, Nigeria perspective.

METHODOLOGY

Model Specification:

Following the objective of this study and in line with the frameworks of Mishkin (2020) and Uchendu (2019), we specify the functional form of the model for the effectiveness of Open Market Operations and Decentralized Financial Systems as instrument of monetary policy management in Nigeria as follows:

$$MS = f(OMO/DFS, RR, MPR) \quad \ldots\ldots (3)$$

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

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

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/DF = log of Open Market Operations and Decentralized Finance

U_t = Error Term

b_1, b_2, b_3 = Parameters to be determined

Description of Data

In order to analyze the effectiveness of OMO/DFS 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.

PRESENTATION AND DISCUSSION OF RESULT

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, 2019). 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:

$$\Delta Yt = B_1 + B_2 + \partial Y_{t-1} + \sum_{t=1}^{\infty} \alpha t \quad \Delta Yt-1 + Ut \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

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) and Decentralize Financial System (DFS) 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.

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 (2021), 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, 2019).

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 (2020) 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) and Decentralized Financial System (DFS), 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 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/DF	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

Table 3: The Johansen Co-integration Test Results Series: RR, MPR, MS, OMO/DFS

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: Researcher's computation using E-views 9.0

The Trace test and the maximum eigenvalue test indicate one (1) co-integrating equation at 0.05 level of significance.
* Denotes rejection of the null hypothesis at 0.05 level.

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 the required reserve. An analysis of each variable shows that OMO/DFS has a positive and significant relationship with money supply in Nigeria as it is statistically significant at one percent level. This confirms that OMO/DFS 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 and Decentralize Financial System, 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 and Decentralize Finance, 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; DF=Decentralized Finance.

SUMMARY OF FINDINGS

The discussion in line with empirical studies is to investigation of the effectiveness of Open Market Operations and Decentralize Financial System 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/DFS has a positive and significant relationship with broad money supply (M_2) which is used as a proxy for monetary policy. OMO/DFS 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.

CONCLUSION

The discuss results in line with empirical study is to 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 and Decentralize Financial System, 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.

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 recommending 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.

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