Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/11075
DOI URL: http://dx.doi.org/10.21474/IJAR01/11075

RESEARCH ARTICLE

DOES MONETARY POLICY CAUSE LIQUIDITY PROBLEM IN BANKS? EVIDENCE FROM NIGERIA

Dr. F.D Dare[1] and I.O. Okeya[2]

1. Senior Lecturer, Department of Banking and Finance, Adekunle Ajasin University, Akungba-Akoko. Ondo State, Nigeria.
2. Director of Research, Training and Quality, Polygon Research Network, Liverpool, UK. and Former Dean of Faculty of Management Sciences, College of Technology, Esa Oke, Nigeria.

Manuscript Info

Manuscript History
Received: 01 April 2020
Final Accepted: 05 May 2020
Published: June 2020

Key words:-
Monetary Policy, Vector Error Correction Mechanism, Central Bank of Nigeria, Gross Domestic Product

Abstract

This study examined the effect of monetary policy on Nigerian banking sector liquidity and if the former causes illiquidity in the latter. The study used descriptive statistics, vector error correction mechanism (VECM) and Granger causality to analyze the relationship between most of the monetary policy variables (exchange rate, maximum lending rate, average savings deposit rate, monetary policy rate, Treasury Bill rate, broad money and financial sector contribution to the gross domestic product) and banking sector liquidity (actual liquidity ratio of commercial banks) for the period 1981 – 2018.Findings show that there exists a positive and significant relationship between monetary policy and banking sector liquidity in Nigeria contrary to the argument of the financial repression hypothesis. The study concluded that monetary policy exerts positive effect on banking sector liquidity rather than impairing it, at least in the short-run and the study thus recommended that in order to contribute more to economic growth, the Central Bank of Nigeria (CBN) should encourage banks to advance more credits to the productive sectors of the economy, which in turn will improve their liquidity position through profits, dividends and other banks' incomes. Furthermore, savings should be encouraged through increased savings deposit rate as savers will save more as the rate is increased. This will also make the banking system more liquid.

Introduction:-

Financial regulatory authorities, financial institutions, the business environment as well as government agencies are keenly interested in the effects of the policies and directives that are rolled out by the financial regulators from time to time on the health of financial institutions. Banks in Nigeria (as in other economies), in particular, are the primary executors of monetary and credit policies that emanate from the Central Bank of Nigeria (CBN) periodically. Financial theorists such as Cameron (1972), McKinnon (1973) and Shaw (1973) argue that banks would fare better and contribute more to the national economy if most of the controls placed on them by the regulatory authorities are relaxed. In their theory the financial repression hypothesis, the authors posit that if the financial system and institutions are to contribute meaningfully to economic growth, regulatory authorities must reduce their controls over them. According to these authors, controls such as interest rate regulations, credit ceilings, prudential guidelines among others should be relaxed if banks are to be able to perform their intermediation role efficiently.

Corresponding Author:- Isaac Olaitan Okeya
Address:- Director of Research, Training and Quality, Polygon Research Network, Liverpool, UK.

The crucial nature of the intermediating role of banks as well as the sensitivity of their operations to the overall state of the economy make the banking system one of the most regulated industries.

Monetary policy consists of a set of policy instruments and statements issued by the Central Bank of a country from time to time to control the volume, cost and direction of credit in the economy. Udeh (2015) stated that monetary policy is very important in the determination of the survival or extinction of the banking system in any economy. This is because banks form the fulcrum of the implementation of the monetary policy made by the Central Bank. In terms of controlling the volume of money in circulation through interest rates on loans and advances, as well as interest rates on deposits, monetary policy and banks are unavoidably linked together. Jegede (2014) observes that in assessing the performance of the banking system, the benchmark of relative effectiveness of monetary policy tools can be used.

Usually, a necessary conflict arises when banks want to ensure liquidity on one hand and adhere strictly to monetary policy guidelines on the other. Chang and Li (2018) argue that banks usually retain some percentage of customers' deposits to provide liquidity buffers and that the higher the percentage of deposits retained for liquidity purposes, the lesser they have to advance as loans and advances. This does not preclude the banks from facing liquidity risks in their day-to-day operations. The financial repression hypothesis by Cameron (1972), McKinnon (1973) and Shaw (1973) promotes the notion that banks may face liquidity risk if they are subjected to too many stringent controls. Nonetheless, as noted by Ndukwe (2013), other factors such as poor quality and deterioration of assets, high percentage of asset portfolio that are illiquid, highly volatile cash flow structure, unfavourable market conditions (local and global), loss of confidence and other macroeconomic variables also adversely affect the liquidity of the banking system.

However, in Nigeria, as in other climes, the CBN is expected to be mindful of the prevailing economic situations and other on- going reforms in formulating its monetary policies. For example, Jegede (2014) states that before the Structural Adjustment Programme (SAP) in 1986, the CBN used selective credit controls, controlled interest rates, special deposit and cash requirements, controlled exchange rates and loan ceilings to regulate the banking industry in Nigeria .According to the author, the CBN deliberately fixed low rates of interest to promote investment and growth. The bank also used special deposit requirements to shrink the amount of reserves and credit capacity of the banking system. This is essentially because the stability of the financial sector is one of the key targets of monetary policies.

Previous research on the relationship between the banking system and monetary policy in Nigeria have concentrated on monetary policy versus the performance of the banks or their credit creation ability. If liquidity is however viewed as a performance indicator, studies such as Udeh (2015), Afolabi, Adeyemi, Salawudeen and Fagbemi (2018) and Uwazie and Aina (2015) find no significant link between monetary policy and banking system liquidity. Otalu, Aladesanmi and Mary (2014) find a positive link while Agbonkhese and Asekome (2013) and Ajayi and Atanda (2012) find mixed results. To the best of the researchers knowledge, there appears to be a dearth of literature on the relationship between liquidity of the banking system and monetary policy, especially when it is considered that the banking system is the channel through which monetary and credit policies are executed. Again, not much empirical studies capture almost all the direct monetary policy variables in analyzing its effect on banking system liquidity in Nigeria. These are the gaps this study seeks to address.

The primary objective of this study, therefore, is to examine the relationship that exists between the liquidity of the Nigerian banking system and monetary policy from 1981 to 2018 in general. Specifically, the study shall achieve two objectives:

1. an examination of the effect of monetary policy on the liquidity of the Nigerian banking system, and,
2. an examination of the causal relationship between monetary policy and the liquidity of the Nigerian banking system.

Literature Review:-

Monetary Policy:

Monetary policy refers to various techniques through which the Central Bank of a country controls the volume, cost and direction of credit (money) in the economy. In Nigeria, the Central Bank of Nigeria issues monetary policies from time to time to regulate the activities of financial institutions in the country. CBN (2018) posited that monetary policy measures perform the function of stability in the economic system by determining, regulating and controlling

the quantity, cost, availability, and direction of money in the economy. The aim of these policy measures is to achieve stated macroeconomic objectives such as growth in the gross domestic product (GDP), favourable balance of payments, improved employment rate, foreign exchange rate stability and general economic development. The mechanism of monetary policy is either to increase or decrease money in circulation such that conflicting goals can be achieved simultaneously to a reasonable extent. Monetary policy can be designed to have either an expansionary or a contractionary (restrictive) effect on the operations of financial institutions. Nuhu (2015) states that the CBN will embark on an expansionary monetary policy when it wants to increase the volume of money or reduce the cost of credit. It can do this in order to stimulate economic growth by making credit available to the productive sectors of the economy. However, the CBN will use contractionary or restrictive monetary policy when it wants to shrink the volume of money circulating in the economy. Usually, the CBN will increase the cost of credit in order to mop up excess liquidity in the economy and reduce inflation. Both expansionary and contractionary monetary policy measures are not without problems. For instance, Adegbola, Fadipe and Olajide (2015) argue that a contractionary stand by the CBN can reduce the inflation rate through a reduction in the general price level. But this same stand will mean that investment and employment will reduce while the Gross Domestic Product will be adversely affected. Again, an attempt to inject more money into the circulation through expansionary monetary policies may cause hyper-inflation.

Common monetary policy measures in Nigeria include cash ratio, which is the percentage of total deposits the banks are expected to keep with the Central Bank (Udeh, 2015 and Otalu, Aladesanmi & Mary, 2014); liquidity ratio, which refers to the portion of total deposits that banks are required to keep in liquid assets form (Olweny & Chiluwe, 2012); monetary policy rates (formerly referred to as the minimum rediscount rate) which is the minimum rate at which the CBN lends money to other banks (Otalu et al (2014); money supply, which is defined as the volume of money that the CBN wishes to allow in circulation at a particular time (Adegbola, Fadipe & Olajide, 2015); directives on lending and savings interest rates from time to time; Open market operation (OMO) which refers to the sale and purchase of Treasury bills by the CBN to regulate the volume of money in circulation. Indirectly also, the exchange rate can serve as a strategy to regulate the volume of money in circulation.

Banking System Liquidity:

Since the global economic meltdown of 2007/2008, much interest have been placed on the liquidity of the banking system of countries because illiquidity in the banking systems was identified as one of the major causes of the economic crisis (Mairafi, Hassan & Mohamed-Arshad, 2018). Ndukwe (2013) posits that the theory of financial intermediation is based on two factors, liquidity creation and risk transformation and that the banking system playkey functions by creating liquid to finance economic growth. This makes the liquidity of the banking system pivotal to real sector growth. Banks create liquidity on the balance sheet by financing less liquid assets with funds from relatively liquid liabilities. Banking system liquidity is also vital to the sustainability of the financial system.

The Basel Committee (2008) opined that bank liquidity is the ability of a bank to finance increases in assets and at the same time meet its obligations as they fall due. The importance of liquidity in the banking system cannot be over emphasized. According to Bonner, Van-Lelyveld and Zymek (2015), two types of liquidity can be distinguished: market liquidity and financing liquidity. By financing liquidity, the authors mean the ability of a bank to raise fund to financ0e certain and contingent obligations with minimum cost. On the other hand, market liquidity refers to a bank's ability to source fund through liquidating its assets as against borrowing from external sources. When viewed as a system, the banking industry's liquidity is determined, to a great extent, by the balance sheet of the CBN and how monetary policy is implemented. This is so because changes in monetary policy rates and the demand for money from the CBN by other banks determine the cost, volume and direction of money. Ndukwe (2013) reiterated that the liquidity of the banking system is calculated as total liquid assets divided by total current liabilities multiplied by 100. The banking system can maintain liquidity either through assets management or liabilities management. Liquidity through assets management can come from sale of assets, securitization, loan and investment portfolios while it can also come from liabilities management from customers' deposits, public sector funds, inter-bank borrowing, funds from the Central Bank, repurchase deals and international funds.

Theoretical Underpinning:

This research is based on the Financial Repression Hypothesis (FRH) by Cameron (1972), McKinnon (1973) and Shaw (1973). The FRH argues that if the regulations on financial institutions, especially banks, are reduced, they will not only contribute more to economic development, they will also fare better. The proponents of the FRH believe that the regulatory authorities should minimize their controls on banks in order to allow banks perform better

in their financing role. According to the hypothesis, controls such as interest rate regulation, ceilings on interest rate, prudential guidelines among others, should be relaxed. By extension, controls by the regulatory authorities can cause illiquidity in banks.

Empirical Studies:

There is dearth of literature on the relationship between bank liquidity and monetary policy in Nigeria. Most of the studies earlier conducted have dealt with the relationship between monetary policy and bank credit and performance. Afolabi, Adeyemi, Salawudeen and Fagbemi (2018) studied the relationship between monetary policy and Nigerian banks credit between 1981 and 2016 using the Toda-Yamamoto ranger non-causality approach. They found out that there exists bidirectional causality between monetary policy rates and credits of Nigerian deposit money banks but other variables such as cash reserve ratio, money supply, liquidity ratio and rate of inflation have no causal relationship with deposit money banks' credits in Nigeria.

Udeh (2015) looks into the relationship between monetary policy variables and the performance of Zenith International Bank (Nigeria) Plc. Using the Pearson Product Moment Correlation technique to analyze the data collected for the years 2005 to 2012, the author finds that while monetary policy variables such as cash reserve ratio, liquidity ratio and interest rate have no statistically significant effect on the performance of the bank, another monetary variable: the minimum rediscount rate has significant effect on the performance of the bank.

Uwazie and Aina (2015) analyze the causal relationship between monetary policy and the credit of Nigerian commercial banks from 1980 to 2013 on Commercial Banks credit in Nigeria for the period 1980-2013 using Granger causality. They discovered that apart from the existence of linear relationship between monetary policy variables such as money supply, exchange rate, inflation rate, monetary policy rate and bank credit, a causal effect exists between monetary policy and bank credit. The causality between them runs from monetary policy rate to bank credits.

Otalu, Aladesanmi and Mary (2014) examined the effect of monetary policy on the performance of deposit money banks in Nigeria. They discovered that monetary policy variables such as interest rate, money supply, liquidity ratio and cash reserve ratio affect the performance of deposit money banks and that the effect of money supply and cash reserve ratio were particularly significant. Jegede (2014) used the Vector Error Correction Mechanism to study the effect of monetary policy on commercial bank lending in Nigeria for the period 1998-2008.The results of the study shows that monetary policy has a long-run relationship with bank lending and that exchange and interest rates have statistically significant and positive effect on bank lending. However, liquidity ratio and money supply have inverse relationship with bank lending. A study conducted by Agbonkhese and Asekome (2013) shows that Treasury Bill rate is positively linked with bank credit while reserve requirement and lending rate are negatively related to bank credit creation in Nigeria.

Ajayi and Atanda (2012) understudied the effect of monetary policy variables on the performance of Nigerian banks between 1980 and 2008 using Engle-granger (two-step) co-integration approach. The researchers found out that, inflation and exchange rates have positive effects on banks' credit performance while liquidity and cash reserves ratios have negative effects on it

In other economies, Ayub and Seyed (2016) examined the relationship between monetary policy and bank lending behavior in Iran using 8 firms listed on the Tehran Stock Exchange. The study adopted Vector Error Correction Mechanism (VECM) for its analysis. They found out that a bidirectional causality exists between money supply and bank lending in Iran. Bunda and Desquilbet (2008) analyze the data of 1107commercialbanks selected from36emergingeconomies.The results of the study shows that liquidity ratios are negatively impaired by the global financial crisis of the year 2000s. They concluded that banks are susceptible to liquidity problem during financial crises.

Moore (2010) identifies interest rates, cash deposit ratio and business cycles as exerting negative effects on bank liquidity in Latin America and the Caribbean. Earlier, Aspachs, Nier, and Tiesset (2005) studied the determinants of bank liquidity in the United Kingdom by examining some marco-economic variables and bank regulations between 1985 and 2003. The result of the study shows that the rate of loan growth, short-term interest rate, bank size, its profitability, central bank's lending and the gross domestic product are the major determinants of bank liquidity in the United Kingdom.

Research Method:-

Theoretical Framework:

This research is premised on the financial repression hypothesis (FRH). The FRH which was developed by Mckinnon (1973) and Shaw (1973), posits that the financial system, particularly banks will greatly aid economic development if financial authorities lessen their grips and relax controls on the financial institutions. In essence, the hypothesis advocates a laissez faire kind of atmosphere for financial institutions to operate.

Model Specification:

The research model for this study is a linear function describing the relationship between the liquidity of the Nigerian banking system and monetary policy variables. All the data used in the research were obtained from the Central Bank Statistical Bulletin for each of the year 1981 – 2018. The choice of years is determined by available data. The general linear model is expressed as:

BSL = f(MP; FSGDP) …….. (3.1)

Where MP = monetary policy variables which is further decomposed as:

MP = EXR, LDR, MPR, SDR, TBR, MSS, …….. (3.2)

Stated in econometric form and linearized, equation (3.1) becomes:

$\ln BSL_t = \upsilon 0 + \upsilon 1 \ln EXR_t + \upsilon 2 \ln LDR_t + \upsilon 3 \ln MPR_t + \upsilon 4 \ln SDR_t + \upsilon 5 \ln TBR_t + \upsilon 6 MSS_t + \upsilon 7 FSGDP_t + \mu t$ …… (3.3)

Where:

BSL	=	Actual liquidity ratio of the banking system for each year
EXR_t	=	Actual average exchange rate of Naira to the U.S Dollar for each year
LDR_t	=	Prime lending rate (maximum) for each year
MPR_t	=	Prescribed monetary policy rate for each year
SDR_t	=	Prescribed savings deposit rate for each year
TBR_t	=	Average Treasury bills rate for each year
MSS_t	=	Broad money supply
$FSGDP_t$	=	Financial sector contribution to the Gross Domestic Product (control variable)
μ	=	Stochastic error term
υ_0	=	Constant/Intercept
υ_1….. υ_5	=	Regression coefficients
t	=	Period (year)

Pre-Estimation Tests:

The pre-estimation tests used in this study include descriptive statistics which establishes whether the variables under study are normally distributed or not, the nature of skewness of the variables and their kurtosis. Furthermore, a correlation matrix is calculated to test whether the variables are correlated and the degree of such correlations. The Philip-Perron test of unit root was done to determine the order of stationarity of each of the variables. Finally, in order to determine the relationship between the dependent and independent variables, the Johansen co-integration test was conducted.

Estimation Techniques:

Objective i: Short-run relationship:

The study employs the Vector Error Correction Mechanism (VECM) to examine the short-run relationship between the actual (annual) liquidity ratio of the Nigerian banking industry and monetary policy variables, namely; annual average Treasury bill rate, monetary policy rate, deposit rate, lending rate, broad money supply and exchange rate for the period 1981-2018. Also, the study employed the Granger causality test to establish the presence (or otherwise) of causality between bank liquidity and monetary policy variables.

Hence, the model used in this study is a modification of Adeyefa and Obamuyi (2018) and it is specified in its short-run form as follows:

$\Delta BSL_{t-1} = \upsilon_0 + \upsilon_1 \Delta(EXR)_{t-1} + \upsilon_2 \Delta(LDR)_{t-1} + \upsilon_3 \Delta(MPR)_{t-1} + \upsilon_4 \Delta(SDR)_{t-1} + \upsilon_5 \Delta(TBR)_{t-1} + \upsilon 6 \Delta(MSS)_{t-1} + \upsilon_7 \Delta(FSGDP)_{t-1} + \Delta\mu_{t-1} + \mu$ ……..… (3.3)

Objective ii: Test of Causal relationship:

This study tested for the presence of causality between monetary policy and bank liquidity variables with the use of Granger causality test. The test follows the ascertains if previous changes in a variable A_t can predict present

changes in Y_t, a second variable more than what the previous changes $Y_t$itself can explain. If this is not feasible, then the variable A_t does not "Granger cause" Y_t. (Granger, 1969).
The Granger causality model for this study is expressed as:

$$Y_t = \sum_{i=1}^{k} a_i A_{t-i} + \sum_{j=1}^{k} b_j Y_{t-j} + u_{1,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (3.4)$$

$$A_t = \sum_{i=1}^{k} c_i Y_{t-i} + \sum_{j=1}^{k} d_j A_{t-j} + u_{2,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(3.5)$$

AandY in (3.4) and (3.5) are stationary time series.

The standard Granger causality test:
The test of causality carried out in this study is to establish whether monetary policy variables Granger causes bank liquidity variables.

Post-Estimation Test:
Residual Diagnostic Tests:
The main post-estimation tests carried out to validate the results of this research include the JarqueBera test of normal distribution of residuals, the Breusch-Godfrey (LM) test of serial correlation, the Breusch-Pagan-Godfrey test of homo/heteroscedasticity and the cumulative sum of the recursive residuals tests (CUSUM). While the first two are residual diagnostics, the CUSUM is a test of stability in the samples selected over the study time.

A-priori Expectation:
Table 1 contains the summary of thea-priori relationships that are theoretically expected between monetary policy and banking system liquidity.

Table 1:- A-Priori Expectation.

S/N	Variable	Type	A-Priori Expectation	Remark
1	BSL	Dependent	-	-
2	EXR	Independent	+/-	Positive/Negative
3	LDR	Independent	+	Positive
4	MPR	Independent	-	Negative
5	SDR	Independent	+/-	Positive/Negative
6	TBR	Independent	+/-	Positive
7	MSS	Independent	+	Positive
8	FSGDP	Independent	+/-	Positive/Negative

Source: Author's Compilation (2020)

Research Findingsand Discussions:
Pre-estimation Tests:
Descriptive Statistics:
Table 2 contains the summary of the relevant pre-estimation descriptive statistics of monetary policy and banking sector variables.

Table 2:-Summary of Descriptive Statistics

	BSL	EXR	LDR	SDR	MPR	TBR	MSS	FSGDP
Skewness	-0.690566	0.856823	-0.069289	0.759888	0.611329	0.795016	1.465400	1.382867
Kurtosis	2.821231	3.239411	2.877445	2.196473	3.874361	4.179852	3.848232	3.683998
Jarque-Bera	2.990042	4.615597	0.052761	4.556203	3.483241	6.043722	14.35151	12.51392
Probability	0.224244	0.099480	0.973964	0.102479	0.175236	0.048710	0.000765	0.001917

Observation	37	37	37	37	37	37	37	37

Source: Author's Computation via E-Views 8 (2020)

From Table 2, it is shown from the skewness coefficients that while BSL and LDR are skewed to the left with coefficients -0.690566 and -0.069289 respectively. EXR, SDR, MPR, TBR, MSS and FSGDP are all skewed to the right with coefficients 0.856823, 0.759888, 0.611329, 0.795016, 1.456400 and 1.382867 respectively. In addition, the coefficient of kurtosis for the variables BSL, EXR and LDR are 2.821231, 3.239411 and 2.877445 (approximately 3) respectively, implying that these variables are normally distributed. MPR, TBR, MSS and FSGDP are leptkurtic with kurtosis of 3.874361,4.179852, 3.848232 and 3.683998 respectively (above 3) whereas SDR is platykurtic with kurtosis coefficient 2.196473 (less than 3).

Moreover, the Jarque-Bera (J-B) probabilities of the variables are 0.224244, 0.099480, 0.973964, 0.102479, 0.175236, 0.048710, 0.000765 and 0.001917 for BSL, EXR, LDR, SDR, MPR, TBR, MSS and FSGDP respectively. The decision rule on the normality or otherwise under the J-B statistics is not to reject the null hypothesis that a variable is normally distributed if the J-B probability is greater than the 5% level of significance. This implies that BSL, EXR, LDR, SDR, and MPR are all normally distributed whereas TBR, MSS and FSGDP are not.

Correlation Matrix:

Table contains the summary of correlations between banking system liquidity and monetary policy variables in coefficients and direction.

Table 3:- Correlation matrix of bank liquidity and monetary policy.

	BSL	EXR	LDR	SDR	MPR	TBR	MSS	FSGDP
BSL	1.000000	-0.149258	-0.475380	0.030114	-0.462686	-0.526371	-0.107101	-0.071612
EXR	-0.149258	1.000000	0.470092	-0.697166	-0.022454	-0.049232	0.883510	0.891402
LDR	-0.475380	0.470092	1.000000	0.047962	0.684667	0.748292	0.409999	0.401643
SDR	0.030114	-0.697166	0.047962	1.000000	0.426481	0.479228	-0.558796	-0.574934
MPR	-0.462686	-0.022454	0.684667	0.426481	1.000000	0.877718	-0.123406	-0.151783
TBR	-0.526371	-0.049232	0.748292	0.479228	0.877718	1.000000	-0.101210	-0.140216
MSS	-0.107101	0.883510	0.409999	-0.558796	-0.123406	-0.101210	1.000000	0.991773
FSGDP	-0.071612	0.891402	0.401643	-0.574934	-0.151783	-0.140216	0.991773	1.000000

Source: Author's Computation via E-Views (2020)

Table 3 reveals that the correlation between BSL and EXR, LDR, SDR, MPR, TBR, MSS and FSGPD are -0.149258 (-15%); -0.475380 (-48%); 0.030114 (3%); -0.462686 (-46%); -0.526371 (-53%); -0.107101 (-11%) and -0.071612 (-7.2%) respectively. Six out of the seven monetary policy variables (EXR, LDR, MPR, TRB, MSS and FSGDP are inversely correlated with banks' liquidity while only one (SDR), is positively (but weakly) correlated with BSL. There are strong correlations between BSL and LDR, MPR and TBR. The correlations between BSL and EXR, MSS and FSGDP are also weak.

Test of Unit Root (Stationarity):

This study used Phillips-Perron (PP) to test for the presence of unit root (absence of stationarity) for the banks' liquidity variable and each of the monetary policy variables examined. The Phillips-Perron unit root test is preferred due to its potency in correcting correlated error through the estimation of the long run variance of the error process (Bakang 2015).

The decision in unit root test is to compare the critical values with the Phillips-Perron t-statistics at 1%, 5% and 10% levels of significance. The null hypothesis of the presence of unit root cannot be accepted if the P-P t-statistics estimated is more than its critical value. The reverse is the case if the P-P statistics is lesser. Table 4.3 shows the summary of the results of the unit root test at levels and at first difference for each of the variables in the study.

Table 4:- Summary of Phillps-Perron Unit Root Test Results

	At level			At first difference			At second difference			
Variable	P-P Stat	Critical. Value at 5%	Prob.	P-P Stat	Critical. Value at 5%	Prob.	P-P Stat	Critical. Value at 5%	Prob.	Order
BSL	-2.715546	-2.943427	0.08	-6.841704	-2.945842	0.0000	-	-	-	1(1)
EXR	1.471300	-2.943427	0.999	-5.130799	-2.945842	0.0002	-	-	-	1(1)
LDR	-2.556721	-2.943427	0.111	-8.393113	-2.945842	0.0000	-	-	-	1(1)
SDR	-1.280721	-2.943427	0.628	-6.314244	-2.945842	0.0000	-	-	-	1(1)
MPR	-3.458080	-2.943427	0.015	-	-	-	-	-	-	1(0)
TBR	-3.020104	-2.943427	0.042	-	-	-	-	-	-	1(0)
MSS	7.545103	-2.943427	1.000	-2.208101	-2.945842	0.2070	-17.10629	-2.948404	0.0001	1(2)
FSGDP	4.646191	-2.945842	1.000	-4.428644	-2.948404	0.0012	-	-	-	1(1)

Source: Author's Computation via E-Views (2020).

Sample (adjusted): 1983 2017				
Included observations: 35 after adjustments				
Trend assumption: Linear deterministic trend				
Series: BSL EXR FSGDP LDR MPR MSS SDR TBR				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.936859	281.2007	159.5297	0.0000
At most 1 *	0.844555	184.5173	125.6154	0.0000
At most 2 *	0.727276	119.3661	95.75366	0.0005
At most 3 *	0.633887	73.89077	69.81889	0.0228
At most 4	0.449570	38.72235	47.85613	0.2715
At most 5	0.293297	17.82541	29.79707	0.5790
At most 6	0.142866	5.675333	15.49471	0.7335
At most 7	0.007959	0.279694	3.841466	0.5969
Trace test indicates 4 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**

None *	0.936859	96.68344	52.36261	0.0000
At most 1 *	0.844555	65.15119	46.23142	0.0002
At most 2 *	0.727276	45.47530	40.07757	0.0112
At most 3 *	0.633887	35.16842	33.87687	0.0349
At most 4	0.449570	20.89694	27.58434	0.2825
At most 5	0.293297	12.15008	21.13162	0.5329
At most 6	0.142866	5.395639	14.26460	0.6913
At most 7	0.007959	0.279694	3.841466	0.5969
Max-eigenvalue test indicates 4 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Author's Computation via E-Views (2020)

From the results in Table 4, it is evident that there are at least four (4) co-integrating equations at 5% significance level among the variables used for the analysis. These results provide the basis for further analysis to ascertain the relationships between monetary policy and bank liquidity variables.

Estimation Techniques:
Estimation of Short-run Relationship: ECM

Tables 5-11: contain the results of the short run estimates from the error correction model used in this study.
Table 5:- ECM results for BSL and EXR.

Variable	Coefficients	Std Error	t-Statistics	Prob
C	-0.335388	1.935450	-0.173287	0.8636
D(BSL(-1)	0.380344	0.175704	2.164685	0.0388
D(EXR(-1))	-0.009752	0.080662	-0.120899	0.9046
ECT1 (-1)	-0.745646	0.188990	-3.945416	0.0005
R^2 = 0.372226 DW = 2.140015; Prob.(F) =0.0146				

Source: Authors' Computation via E-Views (2020).

Table 6:- ECM results for BSL and LDR

Variable	Coefficients	Std Error	t-Statistics	Prob
C	-1.207029	1.374109	-0.878409	0.3869
D(BSL(-1)	0.623304	0.161784	3.852685	0.0006
D(LDR(-2))	0.976813	0.334371	2.921345	0.0067
ECT2 (-1)	-1.161687	0.191546	-6.064799	0.0000
R^2 = 0.607772 DW = 2.259519, Prob.(F) =0.000030				

Source: Authors' Computation via E-Views (2020)

Table 7:- ECM results for BSL and SDR

Variable	Coefficients	Std Error	t-Statistics	Prob
C	-0.505750	1.487185	-0.340072	0.7363
D(BSL(-1)	0.410792	0.151739	2.707236	0.0113
D(SDR(-2))	2.408688	0.780585	3.085749	0.0044
ECT3 (-1)	-0.728972	0.159537	-4.569295	0.0001
R^2 = 0.522633 DW = 1.855207, Prob(F)= 0.000427				

Source: Authors' Computation via E-Views (2020)

Table 8:- ECM results for BSL and MPR

Variable	Coefficients	Std Error	t-Statistics	Prob
C	-0.632086	1.670561	-0.378367	0.7079
D(BSL(-1)	0.400162	0.179894	2.224425	0.0341
D(MPR(-1))	-0.188126	0.482870	-0.389600	0.6997
ECT4 (-1)	-0.766228	0.197851	-3.872757	0.0006

R^2 =0.400211 DW = 2.060233, Prob.(F) = 0.008275

Source: Authors' Computation via E-Views (2020)

Table 9:- ECM results for BSL and TBR

Variable	Coefficients	Std Error	t-Statistics	Prob
C	-0.649865	1.616846	-0.401934	0.6907
D(BSL(-1)	0.348838	0.194690	1.791765	0.0836
D(TBR(-1))	-0.417879	0.477714	-0.874747	0.3889
ECT5 (-1)	-0.819932	0.195304	-4.198237	0.0002
R^2 = 0.437749 DW = 2.044995 Prob(F) = 0.003636				

Source: Authors' Computation via E-Views (2020)

Table 10:- ECM results for BSL and MSS

Variable	Coefficients	Std Error	t-Statistics	Prob
C	-4.486546	2.316121	-1.937094	0.0625
D(BSL(-1)	0.381459	0.181985	2.096097	0.0449
D(MSS(-1))	0.002867	0.002665	1.075870	0.2909
ECT6 (-1)	-0.803000	0.192672	-4.167707	0.0003
R^2 = 0.400057 DW = 2.036892 Prob.(F) = 0.00830				

Source: Authors' Computation via E-Views (2020)

Table 11:- ECM results for BSL and FSGDP

Variable	Coefficients	Std Error	t-Statistics	Prob
C	-5.238800	1.998961	-2.620761	0.0138
D(BSL(-1)	0.242490	0.154229	1.572270	0.1267
D(FSGDP(-2))	0.033176	0.009501	3.491705	0.0016
ECT7 (-1)	-0.641713	0.137729	-4.659226	0.0001
R^2 = 0.484798 DW = 2.222185 Prob.(F) = 0.001169				

Source: Authors' Computation via E-Views (2020)

Tables 5 – 11 contain the summary of the estimated short run relationship between monetary policy and bank liquidity variables. It is shown that in the short run, a unit increase in EXR, MPR and TBR will lead to a decrease of 0.009752, 0.188126 and 0.417879 in BSL respectively. However, none of these effects is statistically significant given their respective probabilities of 0.9066, 0.6997 and 0.3889. A unit increase in LDR, SDR, MSS and FSGDP will bring about increases of 0.976813, 2.408688, 0.002867 and 0.033176 in BSL respectively. While the positive relationships of LDR, SDR and FSGDP are statistically significant with probabilities of 0.0067, 0.0044 and 0.0016 respectively, the positive relationship of MSS is not statistically significant with a probability of 0.2909.

The coefficients of determination (R^2) for the variables show that EXR, LDR, SDR, MPR, TBR, MSS and FSGDP explain about 37.226%, 60.772%, 52.263%, 40.021, 43.775, 40.037 and 48.48 of changes in BSL respectively. The probability of F-distribution for these variables are0.0146, 0.00030, 0.000427, 0.008275, 0.003636, 0.00830 and 0.001169 respectively. These all imply that the ECM for each of the short run relationship is statistically reliable. The Durbin Watson (DW) statistics, which test the presence (or otherwise) of autocorrelation problem, reveal that none of the variables analyzed have such problem as the DW statistic for each of the ECM is around the benchmark of 2, that is BSL/EXR (2.140015); BSL/LDR (2.259519); BSL/SDR (1.855207); BSL/MPR (2.060233); BSL/TBR (2.044995); BSL/MSS (2.036892) and BSL/FSGDP (2.222185).

Finally, the error correction terms (ECTs), indicate the speed at which each of the dependent variables returns to equilibrium after deviations. The ECTs for EXR, LDR, SDR, MPR, TBR, MSS and FSGDPshows that about 74.5646%, 116.1687%, 72.8972%, 76.6623%, 81.9932%, 80.310% and 64.1713% of previous year's dispersion from the mean are corrected (returned) to the mean during the new year. All the ECTs are statistically significant since their probabilities are lesser than the 5% significance level.

These relationships are all in agreement with the expecteda-priori relationships between the dependent and independent variables under study.

Objective iii:
Test of causality between monetary policy variables and banking system liquidity
Table 12 shows the extract from the results of pairwise Granger causality test to ascertain whether banking system liquidity has causal relationship with any of the monetary policy variables.

Table 12:- Extract from Result of Causality Test.

Pairwise Granger Causality Tests			
Sample: 1981 2018			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
EXR does not Granger Cause BSL	36	0.30551	0.7389
BSL does not Granger Cause EXR		0.26547	0.7686
LDR does not Granger Cause BSL	36	1.97689	0.1556
BSL does not Granger Cause LDR		1.08531	0.3503
SDR does not Granger Cause BSL	36	0.15577	0.8564
BSL does not Granger Cause SDR		0.40579	0.6699
MPR does not Granger Cause BSL	36	0.91243	0.4121
BSL does not Granger Cause MPR		0.84003	0.4413
TBR does not Granger Cause BSL	36	1.16242	0.3260
BSL does not Granger Cause TBR		0.23447	0.7924
MSS does not Granger Cause BSL	36	0.57204	0.5702
BSL does not Granger Cause MSS		0.31580	0.7315
FSGDP does not Granger Cause BSL	35	0.10951	0.8966
BSL does not Granger Cause FSGDP		2.36697	0.1110

Source: Authors' Computation via E-Views (2020).

The results of causality tests carried out show that none of the monetary policy variables has causal relationship with the liquidity of the Nigerian banking system as the probabilities of the F-Statistics are all greater than the 5% level of significance. This implies that the previous changes in monetary policy variables cannot predict present changes in banking system liquidity (BSL) than what the previous changes in BSLitself can explain. In essence, monetary policy does not cause liquidity problem for Nigerian banks. If anything, this study established that monetary policy has positive effect on banking system liquidity in Nigeria.

Post-Estimation Tests:
The post diagnostic tests carried out on the residuals in this study include the Jaruqe-Bera (J-B) test of normality, the Breusch-Godfrey (LM) test of serial correlation, the Breusch-Godfrey-Pagan (B-G-P) test of heteroscedasticity and the cumulative sum of recursive residuals. Table 13 and Figure 1 present the summary of these tests of residuals.

Table 13:- Tests of Residuals

S/N	Type of test	Statistics	Probability	Conclusion
1	Normality test (Jarque-Bera)	0.708016	0. 681126	Normally distributed
2	B – G (LM) test of serial correlation	F-Stat 2.015449 Chi-Stat 16.40057	0.0893 0.0590	No serial correlation
3	B-G-P heteroscedasticity test	F- Stat 2.502630 Chi-Stat 13.93387	0.0385 0.0524	Homoscedastic

Source: Authors' Computation via E-Views (2020).

From Table 13, the probability of J-B statistics is 0.708016 is greater than the 5% significance level implying that the null hypothesis of normal distribution for the residuals cannot be rejected. Hence, the residuals are normally distributed. Also, the null hypothesis of no serial correlation among the residuals cannot be rejected since the probabilities of F and Chi statistics are greater than the 5% significance level. Furthermore, the probabilities of the B-G-P test of the presence of heteroskedasticity of 0.0385 and 0.0524 which are both lesser or equal to the 5% significance level, thereby rejecting the null hypothesis of no heteroskedasticity (or the presence of homoscedasticity) in the regression result.

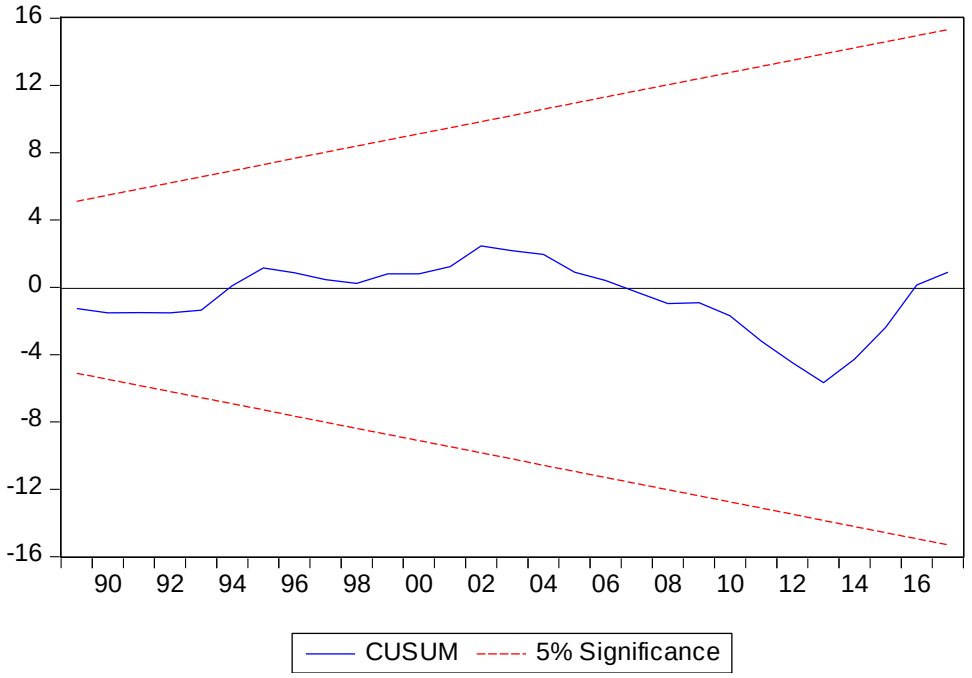

Fig1:- CUSUM Test.
Source: Author's Design via E-Views (2020).

Figure 1 depicts the position of the sample used and the model adopted in the course of the study. As shown above, the equation line (blue) falls in-between the critical bounds lines of 5% (red), hence the residuals are stable all through the study.

Discussion of Findings:-

The general objective of this study is to ascertain whether monetary policy cause liquidity problem for quoted banks in Nigeria. This is to affirm or refute the Financial Repression Hypothesis which advocates a freer banking system where regulatory authorities will relax controls if the banking system were to positively affect the economy. If this hypothesis were to be true, then there must be a negative and statistically significant relationship between bank liquidity and monetary policy variables. However, the results of the short-run ECM does not reflect a negative and significant effect of monetary policy on banking sector liquidity, two monetary policy variables (lending rate, LDR) and savings deposit rate SDR) actually have positive and significant effect on banking sector liquidity. Therefore, on the overall, the null hypothesis that monetary policy does not cause liquidity problem in the Nigerian banking system cannot be rejected because monetary policy variables that have negative effect on banking sector liquidity are not statistically significant to constitute liquidity problem for banks. This position is further buttressed by the absence of causal relationship between banking sector liquidity and monetary policy variables.

The findings of this research contradict the position of the Financial Repression Hypothesis by Shaw (1973) but in agreement with findings of Otalu et al (2014); Agbonikhese et al (2013) and Ajayi & Atanda (2012). Despite that monetary policy can have effects on the liquidity position of the banking system, such effects may not necessarily impair their liquidity position. Actually, as revealed in this study, monetary policy, if well-articulated, can cause improved liquidity position for the banks rather than impairing it.

The positive and significant effect of lending rate on bank liquidity may be due to borrowers continuous borrowing and repaying despite rising high interest rates on such loans. Since interest on loans constitute the major source of income for banks, our findings suggest that rising interest rates do not reduce the number of potential borrowers who, in turn, repay such interests and loans. In addition, the positive and significant effect of savings deposit rate on bank liquidity can be explained as the result of effect of rising savings rate attracting more savers thereby making the banks more liquid.

Conclusions:-

This study set out to examine the relationship between monetary policy and liquidity of the Nigerian banking system for the period 1981 – 2018. More specifically, the study examined the short -run effect of most of themonetary policy variables (exchange rate, maximum lending rate, average savings deposit rate, monetary policy rate, Treasury Bill rate, broad money and financial sector contribution to the gross domestic product) on banking sector liquidity (actual liquidity ratio of commercial banks) for the period 1981 – 2018. The pre-estimation tests carried out to determine the suitability of estimation techniques include descriptive statistics, correlations, Philip-Perron unit root test and co-integration test. Vector error correction mechanism (VECM) was used to examine the effect of monetary policy on banking sector liquidity in Nigeria. Also, a test of causality between monetary policy and banking sector liquidity was carried out using Granger causality.

The results ofthe analysis show that there exists a positive and significant relationship between monetary policy and banking sector liquidity in Nigeria. Specifically, it was revealed that contrary to the financial repression hypothesis, lending and savings deposit rate have positive effect on banking sector liquidity. Also, there is no causal relationship between monetary policy and banking sector liquidity that would warrant monetary policies making banks illiquid.

Based on these results, we conclude that monetary policy exerts positive effect on banking sector liquidity rather than impairing it, at least in the short-run. We also recommended that in order to contribute more to the economic growth of the country, the Central Bank of Nigeria should encourage banks to advance more credits to the productive sectors of the economy, which in turn will improve their liquidity position through profits, dividends and other bankable incomes. Also, savings should be encouraged through increased savings deposit rate as savers will save more as the rate is increased. This will also make the banking system more liquid.

References:-

1. Adegbola, E.A., Fadipe, T.G. & Olajide, A.T. (2015). *Monetary theory and policy*. Department of Banking and Finance. Lagos. National Open University of Nigeria.
2. Adeyefa, F.A. (2018). Financial deepening and the performance of manufacturing firms in Nigeria. *Canadian Social Science*, 14(6), 87-96.
3. Afolabi, M.A, Adeyemi, K.K., Salawudeen, O.S. & Fagbemi, T.O. (2018). Monetary policy and bank creditin Nigeria: A Toda-Yamamoto approach, *ACTAUNIVERSITATISDANUBIUS* 14(5), 717-735
4. Agbonkhese, A.O. & Asekome, M.O. (2013). The impact of monetary policy on bank credit creation in Nigeria. *International Journal of Business and Social Science*, 4(15),160-165.
5. Ajayi, F. & Atanda, A. (2012). Monetary policy and bank performance in Nigeria: A two-step co-integration approach. *African Journal of Scientific Research*, 9(1),34-47.
6. Aspachs, O., Nier, E. & Tiesset, M. (2005). Liquidity, banking regulation and the macro-economy. Evidence on bank liquidity holdings from a panel of UK-resident banks. Unpublished manuscript. BIS.
7. Ayub, G. & Seyed, A.M. (2016). The relationship between monetary policy and bank lending behavior and the influence of bank specific features on this relationship in the banks listed on The Tehran Stock Exchange. *International Journal of Advanced Biotechnology and Research*, 7(2).105-114.
8. Bakang, M. L. (2015). Effects of financial deepening on economic growth in Kenya. *International Journal of Business and Commerce*, 4(7), 41-50.
9. Basel Committee (2008). Principles for sound liquidity risk management and supervision, BIS, Basel.
10. Bonner, C., Van-Lelyveld, I. & Zymek, R. (2015). Banks' liquidity buffers and the role of liquidity regulation. *Journal of FinancialServices Research*, 48(3), 215-234.
11. Bunda, I. & Desquilbet, J.B. (2008). The bank liquidity smile across exchange rate regimes. *International Economic Journal*, 22(3),361-386.
12. Cameron, R. (1972). *Banking and economic development - Some lessons of history*. New York, Oxford University Press.
13. Central Bank of Nigeria (2018). Monetary policy, surveillance activities and operations, CBN Annual Reports, Available https://www.cbn.gov.ng
14. Chang, T. & Li, Y. (2018). Banking liquidity effects and monetary policy, Macroeconomics Dynamics, *Cambridge University Press*, 22(5), 1267 – 1297. DOI: 10.1017/S13651005106000705
15. Jegede, C.A. (2014). Impacts of monetary policy on commercial banks' lending in Nigeria. *Review of Public Administration and Management*, 3(5),134– 146.

16. Mairafi, S. L., Hassan, S. & Mohamed-Arshad, S. B. (2018). Systematic review of literature on effect of liquidity on bank. *Academy of Accounting and Financial Studies Journal*, 22(4), 1-7.
17. McKinnon, R. I. (1973). *Money and capital in economic development.* Washington, The Brookings Institution.
18. Moore, W. (2010). How do financial crises affect commercial bank liquidity? Evidence from Latin America and the Caribbean. *MPRA paper*, 21473.
19. Ndukwe, C. O. (2013). Banking system liquidity, Understanding Monetary Policy Series 34, Central Bank of Nigeria, Available: www.cbn.gov.ng
20. Nuhu, K. M. (2015). Ananalysis of the impacts of monetary policy on Nigerian economy. *Journal of Economics and Sustainable Development*, 6(20),129-133.
21. Olweny, T. & Chiluwe, M. (2012). The impact of monetary policy on private sector investment in Kenya. *Journal of Applied Finance & Banking*, 2(2),239-287.
22. Otalu, J.A., Aladesanmi, K.A. & Mary, B.O. (2014). Monetary policy and commercial banks performance in Nigeria: An assessment of credit creation role. *The International Journal of Business and Management*, 2(7),45-51.
23. Shaw, E.S. (1973). *Financial deepening in economic development.* New York: Oxford University Press.
24. Udeh, S.N. (2015). Impact of monetary policy instruments on profitability of commercial banks in Nigeria: Zenith bank experience. *Research Journal of Finance and Accounting*, 6(10),190-206.
25. Uwazie, I.U. & Aina, T.H. (2015). Monetary policy variables and commercial banks' loans: A causality approach. *Research Journal of Finance and Accounting*, 6(18),35-42.