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Effect of monetary policies on liquidity management of financial institutions in Nigeria

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Abstract
The study focused on impact of monetary policies on liquidity management employed by financial institutions in Nigeria. The study sought to determine the impact of minimum rediscount rate and Treasury bill on liquidity management employed by financial institutions.The study adopted Expo- factor research design. The study used secondary data and multiple regressions were deployed in testing the hypothesis. The findings indicated that minimum rediscount rate and Treasury bill have a positive impact on liquidity management employed by financial institutions(r = 0.82).The study concluded that Banks' liquidity management is central to the transmission and implementation of regulatory authorities. By affecting the trade-off between lending and holding liquid assets, central banks affect the supply of loanable funds, and through this channel they affect the real economy. The study recommended that all financial institutions should adhere to policies and regulations mapped out by the central bank of Nigeria in order to avoid banks distress.

Keywords: regulatory authorities, liquidity management, minimum rediscount rate and treasury bill

1. Introduction

During the recent financial crisis (later on referred to as the world financial crisis) banks have understandably been the focus of much debate. The economic turbulence of the world financial crisis once again revealed the instability and contagion inherent in the global banking sector and led to large losses in many banks and societies. Hence, several countries were forced to set up elaborate rescue packages in order to keep the financial sector afloat. In the aftermath of the world financial crisis much focus has therefore been put on how to regulate banks in the future in order to decrease the risk on as elaborate crisis reoccurring and decrease the harmful impact of such.

A financial and banking regulation usually becomes high on the agendas for policy makers, public opinion and researchers in times of financial distress. And financial crises in history were usually also the breeding ground for various politically appointed committees on the financial and banking system aiming to propose regulations meant to solve the presence of financial distress through regulatory schemes (Beck, 2010). Today, even on the global scale, the Basel I and II agreements can be seen as direct effects of prior financial crises. Regulation acts as an external force in the capital optimization process as banks set simultaneously the level of capital and the amount of risky assets to hold in order to comply with the minimum capital ratio. However, given the moral hazard and asymmetries of information characterizing the banking activity, banks might have perverse incentives that induce them to raise risk when called to respond to stricter capital requirements, in order to keep their desired leverage

According to Aurangzeb (2012) [3], it is crystal clear that nations that have good banking system have a tendency to develop their economic growth more quickly. The sector plays fundamental role in the economy through development activities and gives resources in form of loans and advances to general public, as well as to other development organizations (government, firms and households). This forms an integral part of the intermediation role of banks in an economy. The intermediary functions of banks cannot be attained in the absence of liquidity.

Liquidity is basic for efficient operations of a bank. A bank is said to be liquid when there is enough liquid assets and cash coupled with the ability to raise funds quickly from other sources, to meet its financial obligations on daily basis (Nzotta, 2004) [20]. Management of bank liquidity is of utmost importance for survival and profitable operations of the system. It helps sustain depositors confidence and keeps the industry as a going concern. Andrew and Osuji (2013) [2] observed that liquidity management involves the strategic supply or withdrawal from the market or circulation the amount of liquidity consistent with a desired level of short-term reserve money without distorting the profit making ability and operations of the bank

According to Ebhodagbe (2015) liquidity management involves bank's programmes or strategies to be able to meet deposit and loan demands. Such strategies include holding of short-term financial assets (treasury bill and treasury certificate) which are highly marketable, maintaining avenues for short-term accommodation from the Central Bank or other banks and by bidding for a greater volume of deposits. Liquidity management, must of necessity involve liquidity planning. He further noted that adequate liquidity planning is lacking in many Nigerian banks and that few banks are able to plan for short, medium and long-term liquidity needs. To plan well, a bank must be able to forecast future demand and deposit supplies. Liquidity management programmes enable banks compensate for expected and unexpected balance sheet fluctuations and to

provide funds for growth, accommodate the redemption of deposits and other liabilities and to cover funding increases in the loan and investment portfolio (Grueving and Bratanovic, 2003). A minimum operating liquidity level is essential to maintain a comfortable cushion beyond the minimum statutory requirement, in order to meet cash needs. A desired target maximum for operating liquidity also needs to be established to reflect the fact that too much liquidity is detrimental to earnings.

According to Charumathi (2008) [6], banks are always aiming at maximizing profitability while at the same time trying to ensure sufficient liquidity. In order to achieve these contradictory objectives, it is essential that banks have to monitor, maintain and manage their assets and liabilities portfolios in a systematic manner taking into account the various risk involved in these areas like the interest rate risk, operation risk and gap analysis.

Statement of the problem

As stated in the introduction, banks suffered severely during the world financial crisis. The crisis once again unveiled the weaknesses inherent in the financial sector and highlighted the extended interconnectedness that international banking has created. This hence led to a severe degree of contagion between banks, which by some has been pronounced to be a major reason why the crisis developed as severely as it did. Hence, understandably much focus has during the last years yet again been on how to regulate the banking industry in order to maximize banking sector stability. However, it is a well-known fact that several regulatory initiatives also have unintended consequences, as they may increase moral hazard incentives and bank risk taking. However the study seeks to access the impact of regulatory authorities on liquidity management employed by financial institutions management to avoid bank distress

Objective of the study

The broad objective of this study is to examine the impact of monetary policies on liquidity management employed by financial institutions management in Nigeria. The specific objectives are:

1. To identify the effect of minimum discount rate on liquidity management of financial institution in Nigeria.
2. To assess the effect of Treasury bill on the liquidity management of financial institution in Nigeria.
3. To examine the effect of inflation rate on the liquidity management of financial institution in Nigeria.

Scope of the Study

The study covers the task of the apex bank(regulatory body) of Nigeria as it relates to the banking industry in time past, which is thirty-six years through the accounts of Nigeria general strike of may 1981 on the struggle between Nigeria military regime and organized labour, would be limited to the period of 1981-2017;however, in the past decades, according to Muyiwa (2005) [19], this period was characterized by a more severe overhaul in banking by the regulatory bodies which was occasioned by the perceptive link between finance and development and the appetite to fully harness the banking industry's contribution to the development of the economy in Nigeria

Conceptual Framework

The Effectiveness of the Basel Regulatory Framework

Bank activity is characterized by asymmetric information. Depositors cannot monitor the quality of banks' assets and doubts on the solvency of banks might lead to panic and 'bank runs' (Llewellyn, 1999). If this should occur, depositors will be induced to withdraw their savings, causing a liquidity crisis for the bank that can potentially lead to the failure of the intermediary. Moreover, doubts regarding the solvency of one bank can create worries about the solvency of other banks, leading to a generalized panic. Bank runs are considered as extreme events that are potentially highly disruptive. This was demonstrated during the latest financial crisis, when banks faced the threat of a bank run, not only by depositors, but also by institutional investors. In fact, following the 2007–2008 crisis, the interbank market almost dried up, suggesting that bank runs may move from the retail to the wholesale market. To prevent bank runs and their effects, governments usually create implicit or explicit guarantees to protect depositors (for a concise review see Allen et al., 2009) [1]. Deposit insurance schemes however might produce unwanted effects and increase moral hazard because they can induce banks to take higher risks.[1]

Prudential authorities enforce capital regulation in order to limit bank riskiness in relation to the stability of the system, to ensure the soundness of banks in normal and in turbulent times and to minimize their probability of default regulation enters the bank capital optimization problem, setting a minimum level of capital that banks must hold (Kahane, 1977) [14]. Although capital regulation might induce banks to behave as desired by the authorities, the objectives of the two groups may not be completely aligned (Estrella, 2004) [11] and therefore capital regulation might generate distortions in banks' behavior (Kim and Santomero, 1988; Blum, 1999; Calem and Rob, 1999) [15, 5].

If banks have a desired level of leverage, they will adjust capital and risk accordingly; when there is an increase in capital requirements, banks might have the incentive to increase risk as well, in order to comply with the new regulation and, at the same time, keep their optimal leverage (Kohen and Santomero, 1980) [16]. This behavior can be corrected if regulators impose measures to limit bank riskiness and increase their supervision and monitoring (Kahane, 1977; Kohen and Santomero, 1980) [16]

Liquidity Management

Liquidity refers to the ability of the bank to fulfill its obligations, mainly of depositors. According to Dang (2011) [7] adequate level of liquidity is positively related with bank profitability. Thus banks that maintain adequate levels of liquidity tend to be more profitable. The most common financial ratios that reflect the liquidity position of a bank are customer deposit to total asset and total loan to customer deposits. Others are cash to deposit ratio, (Ongore and Kusa (2013) [21].

Theoretical Framework

Liquidity Preference Theory

Bibow (2005) [4] Keynes describes liquidity preference theory saying that people value money for both "the transaction of

current business and its use as a store of wealth. Thus, they will sacrifice the ability to earn interest on money that they want to spend in the present, and that they want to have it on hand as a precaution. On the other hand, when interest rates increase, they become willing to hold less money for these purposes in order to secure a profit. Elgar (1999) [9] One needs money because one has expenditure plans to finance, or is speculating on the future path of the interest rate, or, finally, because one is uncertain about what the future may have in store so it is advisable to hold some fraction of one's resources in the form of pure purchasing power. These motives became known as transactions-, speculative and precautionary motives to demand money. The banks" liquidity preference approach suggests that banks pursue active balance sheet policies instead of passively accommodating the demand for credit

Empirical Review

Mahshid, Tehran and Nasim (2011) [18] did a study on the impact of Regulation on Soundness Banking.This paper studies whether regulation of banking improves bank soundness. We find a significant and positive relationship between bank soundness and regulation of banking. Specifically, countries which require banks to report regularly and accurately their financial data to regulators and market participants have sounder banks. The dependent variable is the bank's financial soundness as measured by its Z-score. These findings emphasize the importance of transparency in making supervisory processes effective and strengthening market discipline. Countries aiming to upgrade banking regulation and supervision should consider giving priority to information provision over other elements of the Core Principles.

Sami and Mohammed (2010) examine the influence of bank regulation, concentration, and financial and institutional development on commercial bank margins and profitability across a broad selection of Middle East and North Africa (MENA) countries. We cover the 1989-2005 period and control for a wide array of macroeconomic, financial, and bank characteristics. The empirical results suggest that bank-specific characteristics, in particular bank capitalization and credit risk, have a positive and significant impact on banks' net interest margin, cost efficiency, and profitability. As for the impact macroeconomic and financial development indicators bear on bank performance, we conclude that these variables have no significant impact on net interest margins, except for inflation. However, inflation shocks seem to be passed mainly through the deposit rates and this type of transmission means that banks bear the entire negative cost of inflation. Also, the results suggest that banks lower their operating costs in a well-developed banking sector environment (as confirmed by the negative and statistically significant coefficient of the bank development variable in the cost efficient regression models). Furthermore, the stock market development variable is always positive and significant in all specifications, suggesting that banks operating in a well-developed stock market environment tend to have greater profit opportunities. Regulatory and institutional variables seem to have an impact on bank performance as the results suggest that corruption increases the cost-efficiency and net-interest margins while an improvement of the law and order variable decreases the cost of efficiency without affecting performance.

Elijah and Jaya (2007) [10] Effect of liquidity management on financial performance of commercial banks In Rwanda.A Study On Selected Banks In Rwanda. This study determined the effects of liquidity management on the performance of commercial banks. To achieve this the study was guided by the following specific objectives; to explore the effect of cash management to financial performance of commercial banks; to examine the effect of Loan Repayment on financial performance of commercial banks; to assess the effect of investment in non-core business on financial performance of the commercial banks; to establish effect of liquidity decisions on financial performance of commercial banks; to evaluate the effect of management competency on financial performance of commercial banks. Firm performance was measured using Return on Equity (ROE). This study adopted a descriptive research design in soliciting information on effects of liquidity management on financial performance of commercial banks. The target population was 14 commercial banks in Rwanda. The sampling technique employed was simple random sampling and the sample size was 42 respondents. Primary quantitative data was collected by use of self-administered structured questionnaires. The researcher also used secondary data derived from the audited financial statement of the commercial banks for the period 2014 to 2016. The data collected was analyzed, with respect to the study objectives, using both descriptive and inferential statistics. The data was analyzed using descriptive statistics such as mode, median, mean, standard deviation. Multiple regression analysis was employed to determine relationship between liquidity management and financial performance of commercial banks in Rwanda. Data was presented in tables, charts, figures and mathematical expressions. The findings revealed that holding Liquidity decisions, Cash management, Non-core investment, and Loan repayment.to a constant zero, financial performance would be at 0.347. A unit increase on Liquidity decisions would lead to increase in financial performance by a factor of 0.162, a unit increase in Cash management would lead to increase in financial performance by a factor of 0.282, a unit increase in Non-core investment would lead to increase in financial performance by a factor of 0.194 and unit increase in Loan repayment would lead to increase in financial performance by a factor of 0.211. The study concludes that liquidity risk management has a significant negative relationship with financial performance of commercial banks. The study also concludes that holding more liquid assets as compared to total assets will lead to lower returns to commercial banks in Rwanda but the effect is not significant at 5%. Holding more liquid assets as compared to total deposits will lead to lower returns to commercial banks in Rwanda and the effect is significant at 5%.

Francis. Edu and Raymond (2016) [12] examines liquidity management and the performance of banks in Nigeria within the period 2000-2010. It investigates the relationship between the variables of bank performance and those of liquidity management using bank deposit, cash reserve requirement, bank investment, and cash ratio as indicators. Data were mainly collected from CBN's statistical bulletin. Data were analyzed using simple percentages and simple regression model. Findings indicate that a strong relationship exists between bank deposit and bank reserve requirement, and bank investment and cash ratio. Thus, these findings which have re-echoed results from similar

studies re-emphasize the fact that successful operations and survival of banks anchored on efficient and effective liquidity management. Therefore, it is recommended that banks should not concentrate purely on deposits but rather other measures be adopted to reduce illiquidity in this sector.

Methodology

Research Design

The research design adopted in this study is the *ex-post facto* (after the event) and analytical design. Onwumere (2009), research design is a format which the researcher employs in order to systematically apply the scientific method in investigation of problems. Asika (2009) maintains that the choice of the design is advisable only when the event being studied has already taken place. This study involves already existing data as no attempt is made to control or manipulate relevant independent variable.

Nature and Sources of Data

This study used secondary data and justification for the use of secondary data is absolutely based on the conviction that relevant data so gathered will be reliable, free from bias,sentiment,and verifiable. We used time series data of 1981-2017 as a result of limited access to available data.The use of secondary data sourced from Central Bank of Nigeria (CBN-bulletin of 2005-2014), International and local publications (articles), downloaded from internet, other materials sourced from Nigeria Deposit Insurance Corporation (NDIC), and National Bureau of Statistics are relevant to our study.

Model Specification

The model is based on the modification of the empirical models of Fadare (2010), Rehman (2011). And Koutsoyiannis (2003) which statistically demonstrate that least squares estimates are the most reliable regression estimates because of their general quality of minimized bias and variance. The choice of this approach is premised on the Gaus-Markov theorem, which portends that the least squares technique is the best linear unbiased estimator, with which straight line trend equations could be estimated.

The econometric equation (models of fadare-2010) is specified as;

GDP = F (IRM, CPS, SAV, INF)

$GDP = \beta_o + \beta 1IRMt + \beta 2CPSt + \beta 3SAVt + \beta 4INFt + \varepsilon t$……. (1)

Where β_o = Intercept/Constant

β1-β4 = Coefficient of Parameters

εt = Stochastic/Error term

Model Formulation

Multiple regression model

$LQR = \alpha_{\epsilon} + \beta_1 MRR_1 + \beta_2 TB_2 + \beta 3INFR + \mu$

MRR = Minimum Rediscount rate,

LQR =Liquidity Ratio,

TB = Treasury bill,

INFR = Inflation Rate

.α = Constant

Techniques of Data Analysis.

In order to achieve the objective of determining the regulatory authorities on liquidity management employed by financial institutions in Nigeria, Ord. Least Squares using multiple regression method of statistical analysis is considered more relevant. This is because regression method explains the variation in an outcome (dependent variable) 'Y' as it depends on a predator (independent or explanatory) variable, X.. Preliminary test for stationarity and, Breusch-Pegan-Godfrey test for heteroskedasticity.

MRR = Minimum Rediscount rate, LQR =Liquidity Ratio, TB = Treasury Bill, INFR = Inflation Rate

Ord. Least Squares using multiple regression.

Preliminary Test

The study carried out these tests so as to ensure that the variables conform to classical linear model assumptions by testing for homoscedasity, stationarity and autocorrelation.

Homoscedastic Table

Table 2: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	**0.732657**	**Prob. F(3,28)**	**0.5413**
Obs*R-squared	2.329133	Prob. Chi-Square(3)	0.5070
Scaled explained SS	1.253949	Prob. Chi-Square(3)	0.7401

***Source*:** Researchers Computation.

A test of heteroscedasticity with Breusch-Pegan Godfrey which shows that there is no evidence of heteroscedasticity, using F-statistic, Obs*R^2 and Scaled explained Sum of Squares which has a corresponding p-values greater than the critical value of 0.05 at 0.5413, 0.5070, and0.7401 respectively. Since the p-values are considerably in excess of (0.05). These show that the variance of error terms are constant.

Stationarity Table

Null Hypothesis: MRR has a unit root

Exogenous: Constant

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

Table 3

		Adj. t-Stat	**Prob.***
Phillips-Perron test statistic		-3.075806	0.0375
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

*MacKinnon (1996) one-sided p-values.

From the table 3, the empirical result of the unit root test for stationary of time series property of liquidity is shown.As revealed, there was a presence of stationarity since the ADF Statistic is less than the critical value at 5% and at levels, using a maximum lag of nine (9) period. We therefore, reject the null hypothesis (H_0) in favor of the alternative (H_1) that the time series data are stationary.

Test of hypothesis

Decision Rule

Accept the null hypothesis if the coefficient of t-statistic is negatively signed, otherwise reject the null hypothesis

Statement of Hypothesis

Ho: Minimum rediscount rate and treasury bill have no positive impact on liquidity management employed by financial institutions.

H_1: Minimum rediscount rate and treasury bill have a positive impact on liquidity management employed by financial institutions.

Multiple Regression Table
Dependent Variable: LIQ
Method: Least Squares
Date: 09/11/18 Time: 14:40
Sample (adjusted): 1986 2017
Included observations: 32 after adjustments

Table 4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28.40424	9.136242	3.108964	0.0043
MRR	0.822936	0.420684	1.956185	0.0605
LNTB	1.410780	0.966122	1.460250	0.1554
INFR	-0.138334	0.079669	-1.736372	0.0935
R-squared	0.515266	Mean dependent var		44.83216
Adjusted R-squared	0.431188	S.D. dependent var		8.928203
S.E. of regression	8.321986	Akaike info criterion		7.192148
Sum squared resid	1939.153	Schwarz criterion		7.375365
Log likelihood	-111.0744	Hannan-Quinn criter.		7.252879
F-statistic	2.560300	Durbin-Watson stat		2.265987
Prob(F-statistic)	0.035005			

From the table 5, The value of t- coefficient is 0.8229 which is positive while the probability value of t- statistic is 0.0605. The p-value is greater than the critical value at 0.05 therefore, the alternate hypothesis which states that there is a positive effect of minimum rediscount rate and treasury billon liquidity management employed by financial institutions is not rejected.

R-squared of 51% means that variation caused by the explanatory variables (MRR and LNTB) on the dependent variable (LIQ) was explained by 51% using multiple regression model. The remaining 49% variation unexplained as a result of variables not included in the model.

The overall regression is statistically significant as evidenced by p-value of f-statistic which is 0.035005, and less than 5% level of significant.

There is evidence of negative serial autocorrelation, since the DW statistic shows 2.26.

Summary of finding

The finding at the end of this study is:

Minimum rediscount rate and treasury bill have a positive impact on liquidity management employed by financial institutions (r = 0.82)

Conclusion

Banks' liquidity management is central to the transmission and implementation of regulatory authorizes. By affecting the trade-off between lending and holding liquid assets, central banks affect the supply of loanable funds, and through this channel they affect the real economy. Understanding how banks manage liquidity is, thereby, paramount to understanding the transmission and implementation of regulatory authorizes. However, macroeconomic models, especially those used for regulatory authorizes, largely abstract from how banks manage liquidity.

Recommendation

Based on the finding, the recommendation was made:

The study recommended that all financial institutions should adhere to policies and regulations mapped out by central bank of Nigeria in order to avoid banks distress

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