EVALUATING THE RELATIONSHIP BETWEEN LIQUIDITY, PROFITABILITY AND EFFICIENCY OF THE NIGERIAN DEPOSIT MONEY BANKS: A PANEL EVIDENCE

Tajudeen T. Lawal ✉

Federal Polytechnic, Faculty of Business Studies,

Department of Banking & Finance, Ede, Nigeria

deenlaw13@gmail.com

Onwuliri Okechukwu

National Board for Technical Education, Kaduna, Nigeria

Bejamin A. Amola

Federal Polytechnic, School of Applied Sciences,

Department of Statistics, Ede, Osun state of Nigeria

Olayimika A. Ajala

Faculty of Management Sciences, Department of Accounting,

Ladoke Akintola University of Technology, Ogbomosho, Nigeria

Moses Adebayo

Faculty of Management Sciences, Department of Accounting,

Ladoke Akintola University of Technology, Ogbomosho, Nigeria

Abstract

The Nigerian banking system is dynamically evolutionary, strong and competitive due to globalization, environmental variables and regulatory reforms. Banking business entails both production and financial intermediation processes that usually culminate in profitability and productivity if efficiency is carefully achieved. This study examines the relationship that subsists

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among three fundamental performance measures: bank liquidity, profitability and efficiency. The philosophical base of the research was both positivistic and interpretative paradigm. The research methodology adopted is cross sectional survey, employing both descriptive and inferential statistical analysis so as to ensure reliability and validity of the results. Data was sourced from the financial statements and CBN statistical bulletins for 15 banks for a period of 10 years (2007-2016). Employing the panel least square regression model on the study, the findings showed that bank profitability significantly and statistically impacted on operational efficiency of banks in Nigeria. The result is indicative of the strong relationship between liquidity and profitability as it was further confirmed by the descriptive statistics of the study. This study agrees with previous studies that confirmed the statistical significance of the empirical relationship between profitability and efficiency. It was recommended that, the regulatory functions of Central Bank need to be reinvigorated and strengthened in line with the operational levels of the banking system and globalization. Banks need to constantly embark on how to reduce operational expenditure to minimize overhead costs and wastages so as to improve daily operational efficiency and profitability.

Keywords: Profitability, Productivity, Efficiency, Banking Business, Financial Intermediation, Relationship, Nigerian Deposit Money Banks, Banking System

INTRODUCTION

Banking system remains the critical central engine that drives any economy all over the world. It is the fundamental compass on which other sectors of the economy revolve. The role is performed through the statutory function of financial intermediation that oils the general economy. Hence, the financial system enjoys strict regulation from the Central bank with the aim of achieving governmental objectives of robust economy targeted at the pursuit of macro-economic objectives. According to Emefiele (2019), a resilient and stable financial system is imperative for continued growth of the Nigerian economy, given the intermediation role that financial institutions play to satisfy the needs of individuals and corporate bodies. Banks are not charitable organizations but commercial venture that are expected to earn reward in form of profits and give returns to the capital resource providers and investors of the banks (Lawal, 2018). According to Obafemi et al. (2013), financial sector could be a catalyst for economic growth and development if banks are efficiently managed. The Nigerian economy is projected to strongly grow in 2019/2020 in the areas of trade, manufacturing, agriculture, information & communications since these areas offer significant growth opportunities for firms (Wema Quarterly Economic Review, 2019).

There are strong empirical evidence to show that there are inefficiencies and wastages that permeates the Nigerian financial system. Examining the current growing inefficiencies in the Nigerian banking industry which has led to withdrawal of operational licenses of banks and shoddy financial performance of other financial institutions, this research is timely and will add to the existing literature in corporate finance. It will also serve as guide to managers and regulators of the industry for corrective action and guide in line with the CBN 5 years policy thrust starting from 2019-2024 (Emefiele, 2019). Efficiency indicates a measurable level of performance that describes a process where the lowest amount of inputs is employed to create the greatest amount of outputs (Lawal et al., 2019). It relates to the use of all inputs (resources) in producing any given output which may include personal time and energy.

The concept of efficiency can be measured by determining the ratio of output to total input with an overall aim of reducing waste of resources (physical materials, energy, money and time), and increasing revenue so as to achieve the desired output that will eventually result to superior profitability for the business (Lawal, 2018). Efficiency as an attribute of organizational performance is important because all inputs/resources are scarce (time, money and raw materials) and limited, so it makes economic sense to try to conserve them while maintaining an acceptable level of output or level. Operational efficiency can be defined as the ratio between the input to run a business operation and the output gained from the business. There is the need to minimize redundancy and waste so that the reduced internal costs that results from operational efficiency will enable the firm to achieve higher profit margins or be more successful in highly competitive market like Nigeria (Olarewaju, 2016). Consequently, there has been a clarion call and greater emphasis of research interest on the importance of improved efficiency for the financial system especially the banking sector worldwide (ECB, 2010). Ifeacho and Ngalawa (2014) posited that due to the intangible nature of banking products and services, it becomes somehow difficult to measure effectively banking efficiency generally.

Bank liquidity remains the principal factor in the day to day running of bank all over the world. Kariuki et al. (2016), stated that the immediate reason that can be adduced to corporate failure may be inefficient or poor allocation of corporate resources especially as regards liquidity management by banks. Bank liquidity remain a key factor in the day to day running of bank all over the world, hence necessitating the need for its various empirical attention. In an empirical quest to examine the effect and relevance of bank financial soundness on the operating efficiency of banks in Ethiopia, Berihun-Engida (2015), investigated the determinants of bank liquidity and its impact on profitability. The study drew its empirical evidence from eight (8) commercial banks in Ethiopia. Secondary data was collected and used for the period under review from 2002/2003 to 2013/2014. Panel regression analysis was employed to analyze the

panel data collected for the study. The result indicate that bank size and loan growth had negative and significant impact statistically on bank liquidity as measured by liquid asset to total asset while the impact of bank liquidity on commercial banks profitability was non-linear. The study suggested that banks need to identify their optimal level of liquid asset holdings by weighting marginal costs and marginal benefits of holding the asset.

Profitability refer to situation where the income generated exceed the expenses incurred over a given period, a week, three months or in a year. It is expected that the income and the expenses must occur at the same period of time for a matching concept to hold. Profitability and efficiency are expected to be closely monitored by the bank's management because the more efficient the bank, the higher the profitability. Bank managers must therefore engage in strategies that optimizes corporate resources with a close watch on its expenses especially the overheads, which empirical evidence have confirmed to be the highest expenditure in banking business in Nigeria (Olarewaju et al., 2015). Lawal (2018), documented that bank liquidity is the ability of financial institution to make cash or other liquid assets which are near money/ instruments available on demand to meet the dual purposes of customer's withdrawal and statutory compliance. According to Berihun-Engida (2015), bank liquidity indicate the ability of a bank to finance its transactions efficiently and if otherwise liquidity risk will be experienced by such bank. The role played by bank liquidity cannot be underestimated since the stock in trade of banks is money (liquid asset), hence the need to constantly plan and monitor liquidity risk is germane for them to make a superior profitability for the bank.

Objective of the study

The objective of the study is to evaluate the relationship between efficiency, liquidity and profitability of the Nigerian deposit money banks. The study specifically investigated the relational effect of liquidity and profitability on operational efficiency of the sampled banks in Nigeria.

LITERATURE REVIEW

Efficiency Structure (ES) Hypothesis

This hypothesis was formulated by Domsetz (1973) as an alternative to the market power theory. It is premised on the efficiency of the firm that arises from the relationship between market structure in the industry and the firm's performance. It postulates that firms or banks with superior resource management or production technologies have lower costs hence they enjoy higher profitability. Athanasoglou et. al. (2006), documented empirically that two distinct approaches are known in the ES hypothesis, they are: the X-efficiency and Scale-efficiency approaches. The X-efficiency approach states that more efficient firms are more profitable

because of the lower costs to be incurred by them operationally. The Scale efficiency approach also emphasizes economies of scale as against differences in resource planning and allocation and production technology. The theory states that larger firms can obtain lower unit cost and higher profits that can enable them acquire market shares through economies of scale (Athanasoglou, 2006). This may again bring higher market concentration resulting into superior profitability and efficiency. Efficiency Theory requires quality and effective management with scale efficiency resulting into higher concentration of assets that can bring about greater and higher profits for the firm. Operational efficiency could be achieved at a level of output where all economies of scale available are being employed in an efficient manner. The theory is equally based on the principle that banks attain higher profitability if they operate efficiently than their competitors in the industry with lower operating costs strategically and operationally. The ES generally assumes that profitability is influenced by the efficiencies achieved through internal factors present in the firm. The hypothesis is limited by the quantity and quality of the resources available in the firm (asset, capital, strategic options) as well the strategic focus and policies of the firm in terms of its management. The existing literature have submitted that, ROA as a measure of profitability was expected to have positive relationship with efficiency since profitable bank are assumed to be more efficient (Alrafadi et al., 2014). The relevance of this theory to this research revolves on the postulation of the theory that efficiency structure brings better competition and economies of scale leading to higher profitability.

The Market Power Theory

Extant literature revealed that there are two competing theories that can explain the relationship between market share and performance (Berger, 1995). These theories are the market power theory and efficient-structure theory. He further reinstates that the market power theory is based on two hypotheses which are: the traditional structure-conduct-performance (SCP) hypothesis and the relative market power hypothesis (RMP). The structure-conduct-performance hypothesis states that since the markets are more concentrated, this may lead to higher loan rates and lower deposit rates as a result lower or reduced competition in the entire industry. The relative market power hypothesis, however postulates that only large banks with unique and distinctive branding can influence pricing and raise profits, thereby enjoying their relative strength power of economies of scale. According to Eriki and Osifo (2015), the relative-market power hypothesis was to be of significance where larger and older banks were found to be more efficient than their smaller and newer counterparts' banks. This can be attested to by the influence of market size and economies of scale which they tend to exhibit over the smaller and newer competitors in the financial industry.

Empirical Literature review

In a related development in Africa, the study conducted by Mohamed (2015) on the determinants of bank liquidity for the Tunisian economy was reviewed. The purpose of the study was to show the importance of liquidity for the bank and the Tunisian banking system. The study reported that financial performance of banks have significant impact on bank liquidity. The study further confirmed that bank size, total loans / total assets, total deposits/ total assets does not have significant impact on bank liquidity. Similarly, from a research conducted by Lartey et al. (2013), it was revealed by the study that the relationship between liquidity and profitability of listed 7 out 9 banks in Ghana have a very weak positive relationship. In consistency with previous studies.

Furthermore and in an attempt to unravel the principal effect of profitability in banking business, Sheaba-Rani (2017) again documented that earnings ratio reflects the quality of bank's profitability and its ability to earn and maintain it consistently over a period of time is important. The earnings performance can be assessed using the Net Interest Margin or Net Margin, ROA or ROE of a bank, all these variables can be used as proxy for profitability. Following empirical evidence from the following studies: (Hallunovi et al., 2016; Shyu et al., 2014), stated that banks' principal income and source of profitability come from interest income/earnings which can be transformed to higher profitability, hence ROA is commonly used by researchers and popular amongst social science studies as a good measure of bank profitability. Its adoption by the present study is therefore justified.

Research Gap

The relationship between efficiency, liquidity and profitability recorded few empirical literature in Nigeria. Most Nigerian researchers and indeed Africa have concentrated on bank profitability with few studies on bank liquidity and no empirical evidence on the relational impact between these variables (Efficiency, Liquidity and Profitability). To fulfil the existence of both geographical and time gap noticed in prior researches, the need to evaluate the relationship between these variables become necessary and, therefore requires more empirical validation. Again, the available studies have submitted confounding results. The recent recession (2016), credit risk/liquidity crisis (2011), recapitalization (2005), foreign exchange market rumbles (2020) as occasioned by Covid 19 pandemic globally and current banking crisis can partly be adduced to the banking system inefficiencies, low liquidity ratio which may lead to low profitability and great systemic problem in the entire financial system if not curtailed or nipped in the bud by the regulatory authorities (Lamido, 2009; Emefiele, 2019 & 2020).

Based on the above inconsistencies and lack of clarity on the relational influence or impact between efficiency, liquidity and profitability, there is the need to explore and evaluate

the relationship between them for the Nigerian banking system especially as it affects the deposit money banks. This academic effort will guide and assist in improving the managerial capabilities of the Nigerian bank managers as well as expanding the horizon in the existing body of knowledge of corporate finance.

MATERIALS AND METHODS

Quantitative non-judgmental research design method was employed by this study, thus making it a positivistic research philosophy. Secondary data collected from the financial statements and annual accounts of 15 banks for 10 years from 2007-2016. The population was based on purposive sampling technique due to the limited/ unavailable data and its nature of time series. Findings obtained from the panel least regression were subjected to diagnostic tests so as to ensure that the model represents best linear unbiased estimation. Specifically, Jarque-Bera was used to test for normality, unit root and stationary test conducted, as well as multicollinearity and autocorrelation tests conducted in line with the OLS Gauious Markov assumption (BLUE). Pearson's correlation coefficients was used to evaluate the relational effect of the model output. Test for heteroscedasticity was equally conducted on the panel data. These basic econometric tests as employed confirmed that the model is fit for the study as there was no outliers, hence the data is not spurious.

Table 1 Study Variables and their Ratio computation

Variable (Predictors)	Proxy/Ratio	Definition of Variable	Justification
Liquidity	Liquid Asset/Total Asset (LATA, LATDB)	The ratio looks at the amount of liquid assets available to depositors who are placers of funds. It measures how liquid the bank is which can be divided by borrowings too.	Ratio adopted by this study since it measures the actual amount of liquid funds available for the bank's use.
	Interbank Ratio (IBR)	It measures money lent to other banks divided by money borrowed from other banks through interbank dealings. If this ratio is > 100, then the bank is a net-placer rather than net-borrower of funds in the market place, hence more liquid.	
	Net Loans/Total Assets (LR)	Ratio indicates what % of the assets is tied up in loans. The higher the ratio, the less liquid the bank will be. It's referred to as Loan Loss ratio.	

Profitability	Return on Asset or Average Assets (ROA, ROAA)	It is defined as the ratio of net-income to average total assets	Adopted by this study since it measures profit after tax or net profit to average assets
	Return on Average Equity (ROAE)	The ratio of net profit to average Tier one capital plus average revaluation reserves. The higher the ratio, the more stable the bank.	
	Net Interest Margin (NIM)	It is the ratio of net-interest income (interest received minus interest paid) expressed as a % of earning assets (loans plus other earning assets minus fixed assets).The higher the ratio, the cheaper the funding or higher the margin for the bank. Higher margins & profitability are desirable as long as the asset quality is being maintained.	
Dependent **Operating Efficiency Ratio** (TOITOE)	Total operating income to total operating expenses	This ratio is used as a measure of operating efficiency. It is the interest income +non-interest income+ securities gains (or loses) to interest expenses + non-interest + provisions for loan losses + taxes. Since the interest income constitutes larger % of the total income, it's prudent that loan loss provision and tax payable be taken care of to know the actual income generated.	This is adopted here since it is the ratio that considers the provision for loan losses and tax as provided for in the prudential guidelines of the CBN.

Adapted from Amer et al., (2011); Lawal, (2018).

Study variables

The study variables as specified in Table 1 comprise of the dependent variable which return on asset (ROA) is serving as the proxy for efficiency and the independent variables are: bank liquidity proxy as liquid assets to total asset and profitability proxy as return on asset.

Independent variables

The study variables comprise of the independent and dependent variables. The independent variables are bank liquidity and profitability known as the predictor variables. Bank profitability

can be used to serve the dual purpose of both independent and dependent variable in different models depending on how it is constructed in the general model. Based on this, it is constructed as a predictor variable for this model.

Dependent variable

Efficiency serves as the dependent variable for the study which is proxy as total income to total expenses. Empirical evidence from the literature indicate that the following researchers used different approaches, ratios and methods used to evaluate efficiency of banks worldwide: (Pancheva 2012; Olarewaju et al., 2015; Obafemi et al., 2013; Ezike et al., 2013). According to Amer et al. (2011), there are two broad approaches to measure operating efficiency (OER): income/expense approach is defined as the ratio of interest income plus non- interest income plus securities gains (or losses) over interest expense plus non- interest expense plus provisions for loan losses and taxes. In contrast, Pancheva (2012) submitted that operating efficiency is measured by operating cost/ income approach (ratio of non-interest costs excluding bad loans and cost of doubtful exposures) and the sum of the interest and non-interest incomes.

Operating Efficiency (Financial ratio) as a measure has the following reasons as stated by prior studies from (Amer et al., 2011; Olarewaju et al., 2015). As stated earlier, it is the ratio of interest income plus non- interest income plus securities gains (or losses) over interest expense plus non- interest expense plus provisions for loan losses and taxes. The study adopted it as dependent variable, based on the following: firstly, operational efficiency is defined as the ratio of output over input of the resources of the bank. This implies that total income generated as income make the output for the bank while the input is represented by expenses incurred on deposits and others by the bank. Again, interest income constitute the most important source of profits for the bank with the loanable funds of the bank as products (output), therefore the product's unit price is the interest rate charged on loans (input), thereby justifying the inclusion of interest income as a parameter for banking efficiency. Also, deposits are regarded as "material" coming from the production stage to be applied in the intermediation stage before generating interest income which principally serve as a major source of income for the bank (Shyu et al., 2014).

Model Specification

To establish the statistical relationship between banking efficiency proxy by total income to total expenses and the independent variable of liquidity and profitability, a panel least regression model was adopted. It was adopted to ascertain and establish the relational impact

or influence between one continuous dependent variable and many independent variables (Pallant, 2005 as cited in Boateng, 2019). Therefore, the functional form for the model using the formula:

Y = F(x)

Where;

Y is the dependent variable (Operating Efficiency Ratio)

X is the independent variables (Liquidity and Profitability)

A general panel data regression model is stated as:

$Y_{it} = \beta_o + \beta_1 it + \beta_2 it + \varepsilon it$…………………… (1)

Taking the implicit model from (Amer et al., 2011) to evaluate the relationship between efficiency, bank liquidity and profitability, it can be written in the following functional form as:

OER (TI/TE) = f (LA/TA, ROA)……………. (2)

In an explicit form, the equation can be modelled and written as:

$Y_{it} = \beta_o + \beta_1 LR_{it} + \beta_2 PR_{it} + \varepsilon it$……………. (3)

Where:

Y_{it} = Operating Efficiency Ratio

LR_{it} = Liquidity Ratio

PR_{it} = Profitability Ratio

β_o = Constant term or Intercept of the model

ε = Stochastic or disturbance term

i = the individual banks of the study (15)

t = Time dimension of the variables

$\beta_1, \beta_2 =$ Coefficients of the dependent variable to be estimated.

The expected signs of the coefficients (a prior expectations) are such that they should be positive = $\beta_1, \beta_2 > 0$

RESULTS AND DISCUSSION

Both descriptive and inferential statistical analyses have been employed to unlock the statistical significance of the variables of the balanced panel data using Stata Package Version 13. For the independent variables of the study, liquid asset to total asset was used as proxy for bank liquidity while return on asset was used as proxy for profitability. The dependent variable has the ratio of total income to total expenses which was used as proxy for operational efficiency ratio. For the time series study, panel least regression model was employed as the analytical tool.

Descriptive statistics

Table 2 Descriptive Statistics of the Variable Output

Variable	Obs	Mean	Std. Dev.	Min value	Max value	Cov.
Oer	150	0.248669	0.110114	0.119964	0.457404	0.442811
bl	150	23.84643	21.84643	5.31180	68.8604	0.916863
pr	150	0.004913	0.001444	0.001922	0.008028	0.293944

Note: Obs =No of Observations and Cov =Coefficients of Variation

Comments and discussion: The Skewness and Kurtosis test for normality of the data indicate wider dispersion and greater covariance. It shows a high degree of variability for the predictor variables employed by this study (bl and pr) indicating that they are properly skewed. It equally show that the sampled banks engaged in little or low utilization of the corporate resource of the banks as shown by the level of profit declared by them. The result may affect making use of the investment opportunities available within the financial system in the economy. The mean and standard deviation for profitability suggests that returns are low or inadequate for the level of investment the banks undertook during the period of study. As for bank liquidity, the coefficient of variation of 0.92 indicate that banks maintain high liquidity holding than required. This may mean that, the high holding of liquidity impacts negatively on the level of profitability, as such cash of investible funds (idle money) could have been invested in assets and investments within the study period.

Correlation analysis

Table 3 Pearson's Correlation Coefficients Analysis of the Variables

Variable	N	Oer	Bl	Pr
oer	15	1.0000		
		0.000		
bl	15		1.0000	
			0.2470	
pr	15			1.0000
				0.0482

Correlation coefficients is significant at 0.05 (2 Tailed).

P-value = 0.000<0.05 (95% confidence level)

Comments and discussion: The independent variables are significantly and relatively correlated in the positive direction. This indicate that the higher the variables, the higher the efficiency attainable by the banks sampled by the study since they are positive and statistically significant.

Model Fit Evaluation of the Variable

The R^2, which is referred to as the coefficient of determination, is used to assess the performance of the regression model. It indicates the variation in the depended variable attributable to the independent variables.

Table 4 Overall Model Fit Evaluation

Variable	Bl	Pr
R squared	0.815	0.837

From Table 3 above, the coefficients of determination revealed the degree of association of the variables which can further be confirmed by R^2 of 82% for bank liquidity leaving out 18% unaccounted for as disturbance in the model. It means that the independent variable jointly predict 82% variations in the operational efficiency of the deposit money banks in Nigeria. The relative relational strength or degree of association of profitability, jointly predict and confirmed by the R^2 of 84% meaning that only 16% is left as unaccounted for by this model as error term. This mean that even when adjusted for bias for any increase in the number of variables in the model, there will still be strong relationship. The model is statistically significant at 5% significance level showing that the model is fit and desirable.

CONCLUSION

The data analysis and the model output revealed some impressive results. Three variables: efficiency, bank liquidity and profitability have produced very impressive predictions about the Nigerian banking system for the period under review. The implication of this finding is that, for the banks to increase their profitability, management should diversify their income base and expand other non-interest generating avenues. It means that they should not rely on interest income as the sole source of revenue. It could be inferred that the credit risk management of the banks call for questioning because there may be high non-performing loans/credit impairing their credit portfolio. As reported by this study and in confirmation of the empirical assertion made by previous studies, management should ensure a reduction in operational expenditure through minimization of wastages, and that will lead to improved efficiency.

RECOMMENDATIONS

Based on the results analysis from the study, following recommendations can be generated which can bring major policy shift and economic fortunes for the Nigerian banking system. They are itemized below:

❖ Banks should endeavor to diversify the revenue/income base and not to rely on single source of revenue which is mainly on interest income, and need to abide by the Basle Accord guidelines on recognition of non-performing loans and improve on the credit risk policies as stipulated by the CBN. There is the need to improve on their recovery efforts so as to increase the profitability level in the industry.

❖ Management of Nigerian banks need to work on how to maintain optimal liquidity ratio. This no doubt requires proper asset and liabilities management by the banks.

❖ Wastages and inefficiencies must be brought to the barest manageable level since an increase in operating expenses affects profitability significantly. Bank management should invest appropriately on the ICT and deploy functional ATM machines in strategic places to reduce staffing and other costs. Regular training should be organized at intervals for staff on IT to save costs but increase productivity and profitability in order to catch up with digital banking world.

❖ The regulatory functions of CBN and NDIC needs to be strengthened especially as regards off-site supervision of Nigerian banks for close monitoring of the lending activities so as to improve financial intermediation process and assist the Nigerian economy substantially.

LIMITATIONS AND FURTHER RESEARCH

The study experienced following limitations and constraints which could further be researched into by future scholars in other to expand its empirical base and enhance corporate finance literature: Future scholars/researchers can extend the study horizon and period of study for a relatively longer time than 10 years covered in this study. Researchers can even extend its coverage to include the entire financial system for both financial/banking and non-financial sectors of the Nigerian economy such as microfinance, mortgage, and bureau de change among others.

This study further suggests and advocates that, future study concentrates on the qualitative aspect for gauging the 3 performance measures adopted as against the quantitative method employed by this study. It could be on the managerial competence/quality, emotional influences of staff on productivity and efficiency of banks as well as the human capital development for the banking system. Lastly, future study can be engaged on the impact of

regulatory control or influence on the measuring metrics used by the Central Bank of Nigeria to gauge liquidity, profitability and efficiency of banks in Nigeria

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