Assets Quality and Profitability of Listed Deposit Money Banks in Nigeria

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Abstract
This study examined the effect of the asset quality (non-performing loans) on bank profitability (ROA) in the Nigerian banking sector. Feasible Generalised Least Squares (FGLS) Panel regression method is used to determine the relationship between ratio non-performing loans to total loans, ratio of non-performing loans to total customer deposits, ratio of loans loss provision to total loans and ratio of loans loss provision to total assets which are independent variables and ROA which is dependent variable. For purposes of data availability, 12 out of the 14 representing 85.7% of listed banks on the Nigerian Stock Exchange (NSE) as at 31st December, 2019 were selected as a sample for the study. Panel data were gathered from secondary sources, specifically from the audited and published annual reports of the deposit money banks understudy covering the period, 2007 to 2019. The data was analyzed using both descriptive and inferential statistics with the help of STATA version 14. The results of the FGLS analysis indicate that percentage of loans loss provision to total assets have a significant negative effect on ROA; percentage of non-performing loans to total loans have an insignificant negative effect on ROA. Both percentage of non-performing loans to total customer deposits and percentage of loans loss provision to total loans have an insignificant positive effect on ROA. Based on the findings of the study it was concluded that the challenge of loans loss provision can possibly increase liquidity risk given the turbulent business conditions where credit facilities are liquidated by unstable short-term deposits. The study recommended that loans loss provision should be reasonably reduced to achieve better performance of banks.
Keywords: Asset quality, non-performing loans, Return on Asset, Total Loans, Customer Deposits, Loans Loss Provision, Total Assets

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I.   Introduction

Asset quality with respect to banks connotes quality of loans provided by banks. The quality of loan is measured by the non-performing loan (NPL) where NPL consist of overdue loans and follow-up loans.Assetqualityisimportantforallcompanies; particularly the profitabilityofbanks. This is because banks arecrucialcomponentsoffinancialmarkets,financialsystemsandthe economy of nations.

In a bid to identify and curtail the challenges of asset quality, the United States Federal Reserve Board in 1995 formulated and implemented the "Standards for safety and soundness".The standard requests board of directors of banks to regularlypresent reports on asset quality. This is tobe done through asset quality supervision and evaluation (Eze&Ogbulu, 2016). This supervisory role of checkingthe NPL has made asset quality an important aspect of banking operation (Abata, 2014). Moreover, one of the reasons for the 2008 global financial crisis isNPL. The NPL decreasesoperatingprofitmargins, affectsthe profitabilityofbanksandthe financialstabilityofeconomies.NPL   mayleadtobank   bankruptciesandeconomicslowdown(Adhikary, 2006; ForKlein, 2013).

There is plethora of studies in extant literature that have related asset quality (NPL) to bank profitability (return on assets, return on equity)(Abata, 2014; Adebisi & Matthew, 2015;Afiriyie&Akotey, 2013; Bace, 2016; Bhattarai, 2016; Buchory, 2015; Etale et al.,2016;Güneş, 2015;Hashem, 2016).Specifically, while some results are negative (Ongore&Kusa, 2013;Ozgur&Gorus, 2016;Ozurumba 2016;Sarıtaş et al., 2016), others are positive (Adebisi &Matthew, 2015; Güneş, 2015;Samırkaş*et al.,*2014).More recently, a few results have depicted apositive relationship (Afiriyie&Akotey, 2013;Bhattarai, 2016;Buchory, 2015). These inconsistent results suggests that more studies are needed in this area.

Therefore, the current study seeks to investigate the effect of asset quality (NPL) on bank profitability (ROA) in the Nigerian banking sector. The rest part of the paper is divided thus; section two focuses on the literature review, section three centres on the methodology, section four captures the results and discussion, while the conclusion and recommendations are presented in section five.

II. Literature Review

This section deal with conceptual, theoretical and empirical review of the passed research works that related to this study.

2.1.1 Asset Quality

Conceptually, in the banking industry, asset quality refers to the review or an evaluation, which assesses the credit risk associated with any particular assets that normally requires the payments of interest like investment and loans portfolios. Ombaba (2013) defined asset quality as the general risk attached to various assets held by financial institution. It is commonly used by financial institution to determine how many of their assets are at financial risk and how much allowance for potential losses they must make. The most common assets of banks requiring a strict determination of asset quality are loans and advances. Increasing loan quality will increase the return of financial institution loans and reduce the costs of failure, but at the same time it will be attained at a cost that requires banks' attention to manage (Khalid, 2012). The support of asset quality is an essential feature of bank (Gulia 2014). Asset quality of the bank is one of the main issues whenever research on banks is conducted (Chisti 2012). How efficient and effective is the bank management in monitoring and controlling credit risk can also have an effect on the kind of credit rating given.

2.1.2 Profitability

Profitability connotes a situation where the income generated during a given period exceeds the expenses incurred over the same length of time for the sole purpose of generating income Banwo (1997), Sanni (2006). The fundamental requirements here are that the income and the expenses must occur during the same period of time (Matching Concept) and the income must be a direct consequence of the expenses. The period of time may be one week, three months, one year etc. Sabo (2007). It is not immaterial whether or not the income has been received in cash nor is it compulsory that the expenses must have been paid in cash. The term profit can take either its economic meaning or accounting concept which shows the excess of income over expenditure viewed during a specified period of time.

2.1.3 Listed Deposit Money Banks

Deposit money banks are resident depository companies and quasi-firms which have any liabilities in the form of deposits payable on demand, transferable by cheque or otherwise usable for making payments. These include; Access Bank Plc,Ecobank Transnational Incorporated,Fidelity Bank Plc, First City Monument Bank Limited, First Bank of Nigeria Limited, Guaranty Trust Bank Plc, Jaiz Bank Plc, StanbicIbtc Holdings Plc, Sterling Bank Plc, Union Bank of Nigeria Plc, United Bank for Africa Plc,Unity Bank Plc, Wema Bank Plc and Zenith Bank Plc.

2.2 Underpinning Theory

This section reviewed theories that underpinned this study.

2.2.1 Agency Theory

The agency problem was developed by Coase (1960), Jensen and Meckling (1976) and Fama and Jensen (1983). The theory states the relationship between principals such as a shareholder, and agents such as a firm's senior management. The principal delegates work to an agent. The theory attempts to deal with firstly, the agency problem where there is a conflict of interest between a company's management and the company's stockholders, and secondly, that the principal and agent settle for different risk tolerances. There are two main agency relationships in a firm that are normally in conflict; those between the company's management and stockholders and between the stockholders and the debt holders. These agency conflicts have implications on corporate governance and business ethics. Such relationships have expensive agency costs that are incurred so as to sustain an effective agency relationship. Incentive fees paid to agents to encourage behavior consistent with the principal's goals are common examples of agency costs Bowie and Edward (1992).

2.2.2 Market Power Theory

Market power theory emanated from Bain (1951). This theory stresses that an increase in market power results to a monopoly, profits (Athanasoglou, Brissimis& Delis, 2005). The theory is based on the premise that concentration of the market is a best measure for market power since more concentrated markets exhibit superior market imperfections facilitating various entities to set prices for their products and services at levels which is less favourable to their clients or customers (Punt and Rooij, 2001). The theory also affirms that companies with a large market share and sound differentiated products and services can easily earn monopolistic profits and succeed or win against their competitors (Nkegbe&Yazidu, 2015). The market power theory assumes that extra profits results from a higher market concentration which allows commercial banks to collude and earn

supernormal profits which arise due to the firm's portfolio of differentiated products that also increases the market share and market power in determining prices for products (Mirzaei, 2012).

2.2.3   Efficiency Theory

The efficiency theory was formulated by Demsetz (1973) as an alternative to the market power theory. The efficiency theory presupposes that better management and scale efficiency results to higher concentration thus greater and higher profits. Accordingly, the theory posits that management efficiency not only increases profits, but also results to larger market share gains and improved market concentration (Athanasoglou, Brissimis& Delis, 2005). The efficiency theory also states that a positive concentration profitability relation may be a sign of a positive connection relating to efficiency and size. The theory postulates that positive association between the concentration and profit arise from a lower cost which is mainly achieved through production efficient practices and increased managerial process (Birhanu, 2012).

2.3   Empirical Review

Lucky and Nwosi (2015) examined the relationship between asset quality and the profitability of the fifteen (15) quoted commercial banks in Nigeria from 1980 – 2013. They used secondary data sourced from annual reports of the quoted commercial banks. Return on Investment (ROI) was modeled as the function of percentage of non-performing loans to Total Loans (NPL/TL), percentage of Non-performing Loans to Total Customers' Deposit (NPL//TCD), percentage of Loan Loss Provision to Total Loans (LLP/TL) and percentage of Loan Loss Provision to Total Asset (LLP/TA). Multiple regressions with econometric view statistical package were used as data analysis method. The Ordinary Least Square properties of Augmented Dickey Fuller Test, Co-integration and Granger Causality test were employed to determine the short and long –run relationship between the dependent and the independent variables. Findings from the regression result proved that percentage of non-performing loans to Total Loans and percentage of non-performing Loans to Total Customers' Deposit have positive relationship with Return on Investment while percentage of Loan Loss Provision to Total Loans and percentage of Loan Loss Provision to Total Asset have negative relationship with Return on Investment of the commercial banks.

Mbatabbey (2019)carried out study to investigate the relationship between asset quality and deposit money banks performance in Nigeria forthe period of 30 years ranging from 1986 to 2016. The study utilized time series data collected from the Nigeria deposit insurance corporation annual reports and accounts, CBN financial stability report and CBN statistically bulletin for various years. The variables of study include return on asset (ROA) proxy for Deposit Money Bank performance in Nigeria, ratio of non-performing loan to total loan (NPL), ratio of liquid assets to total assets (LAT) and ratio of liquid assets to short term liabilities (LAS) as measures of asset quality. The study used both the descriptive and econometric techniques to analyze the time series data. The result revealed that there is a short run relationship between asset quality and deposit money bank performance in Nigeria. Also, the co-integration result revealed the presence of a long run relationship between asset quality and deposit money bank performance in Nigeria while the granger causality result shown evidence of causality between asset quality and deposit money bank performance in Nigeria. The study concluded that maintaining sound assets quality position is critical to the long-term performance, survival and sustainability of DMBs in Nigeria.

Abata (2014) examined assets quality and bank performance of six largest banks quoted in Nigeria stock exchange using secondary data sourced from the annual reports of the commercial banks for fifteen years (1999 – 2013). The study adopted the use of ratios as a measure of bank performance and asset quality since it is a verifiable means for gauging the firms level activities while the data were analyzed using the Pearson correlation and regression tool of the SPSS 17.0. The findings revealed that assets quality has a statistically relationship and influence on bank performance.

Vighneswara (2015) examined the determinants of bank asset quality and profitability in India usingpanel data techniques from the period from 1997 – 2009. The findings of the study reveal some interestinginference contrary to the established perception. Priority sector credit was found not to be significant in affectingthe non-performing assets contrary to the general perception and similar is the case with rural branches implyingthat aversion to rural credit is falsely founded perception. Bad debts are dependent more on the performance ofthe industry than other sectors of the economy. Furthermore, Capital adequacy and investment activitysignificantly affect the profitability of commercial banks apart from other accepted determinants of profitability;assets size has no significant impact on profitability.

Khalid (2012) examined the impact of asset quality on the profitability of private banks in India usingReturn on Asset as profitability variable for the period 2006 – 2011, operating performance of the sample banksis estimated with the help of financial ratios. Multiple regression models were employed to examine if banksasset quality and operating performance are positively correlated. The result showed that a bad asset ratio

isnegatively associated with banking operating performance after controlling for the effect of operating scale,traditional banking business concentration and the idle fund ratio.

Althoughthereareon-goingeffortsoncontrollingactivitiesofbankson loanproviding,non-performingloansconstitutesmainconcernofbothinternationalandnationalregulatoryauthorities.Asperthereportpublished byIMFon2007,theratiooftotalnon-performingloansdiffersradicallybetweencountriesespeciallybetweendevelopingcountriesanddevelopedcountries(Boudriga,BoulilaTaktak,&Jellouli,2009,p.287).WhilecountrieslikeEgypt,Nigeria,Philippines,Morocco,Algeria,a ndTunisia(morethan15%)havetroubleonlowqualityloans;therearenoimpressionsindicatingthatthecountrieslikeSw eden,Norway,Finland,Australia,andSpain(lessthan1%)havetroublearisingfromtheerosionofassetquality.Beside,in recentyears,significantnumberofstudiesconcentratedonkeyroleofassetqualityonestimationofbankfailure(Barr&Sie ms, 1994; Berger&DeYoung, 1997; Demirguc-Kunt, 1989; Whalen, 1991).

Besidesthestudiesregardingtheeffectofnon-performingloansonbankprofitability,therearenumerousstudiesconsideringnon-performingloansasexplanatoryvariableinaspectsdeterminingbankprofitabilityand stipulating therelationshipbetweenNPLandprofitability.UnderstudiesofAbata(2014),PasiourasandKosmidou(2007),Adebisia ndMatthew(2015),Bace(2016),Bhattarai(2016),KiranandJones(2016),Taşkın(2011),MillerandNoulas(1996),Dur ajandMoci(2015),Etaleetal.(2016),Hashem(2016),OngoreandKusa(2013),Ozurumba(2016),testingthecorrelation betweenNPLandprofitability,negativerelationshipisdeterminedbetweennon-performingloansdecreasingtheassetqualityandbankprofitability.Ontheotherhand,whereAdebisiandMatthew(2015),didnotcomeupwitharelationshipbetweenROEandNPL;AfiriyieandAkotey(2013),Bhattarai(2016)foundpositiver elationshipbetweenandNPLandBuchory(2015)foundpositiverelationshipbetweenROAandNPL. Tourbestknowledge,althoughthereisnostudyinvestigateddirectlyeffectofassetqualityonbankprofitabilityunderstu diesconductedwithregardsto Nigeria,therearestudies,acceptingnon-performingloansasoneoftheexplanatoryvariable,whichconductedoninvestigationoffactorsdeterminingbankprofita bility. UnderthestudyofTaşkın (2011)andAkbaş(2012),onfactorsdeterminingthebankprofitability,acceptedratioofloanlossprovisionstoassetasthe measureofnon-performingloanswhereSarıtaşetal.(2016)acceptedratioofnon-performingloanstoassetasthemeasureofit. Withinthescopeofallthesestudies,variablesofROAaretakenintoconsiderationasthemeasureofbankprofitabilityanda saresultnegativerelationshipisfoundbetweennon-performingloansandROA.OzgurandGorus(2016)acceptedtheratioofnon-performingloanstototalcashloansasthemeasureofnon-performingloansandfoundnegativerelationshipbetweenROAandNPL.WithinthescopeofstudyconductedbyGüneş(2015)andSamırkaşetal.(2014)norelationshipisfoundbetweennon-performingloansbesidetheotherfactorsandROA.

Empirical studies over the years have shown that asset quality of banks is a linear function of microand macro prudential environment. Lis, *et.al.* (2000) have found that Gross Domestic Productgrowth, bank size and Capital had negative effect on Non-Performing Assets while Loan growth, collateral, netinterest margin, debt-equity, market power and regulation regime had a positive impact on Non-PerformingAssets. Babihuga (2007) analyses the relationship between selected macroeconomic and Financial SoundnessIndicators (FSI) for 96 countries for the period 1998 -2005. The determinants of asset quality were modelfollowing an approach adopted by DemirgucKunt and Huizinga (1999), using a parsimonious model with theshare of non-performing loans in total loans as a function of macroeconomic variables. They find a collapse inbusiness credit worthiness and the subsequent deterioration in the value of collateral are the main mechanism ofa macroeconomic shock to bank's portfolio. Deposit insurance on Non-performing Loans (NPLs). They find thatunlimited Insurance scheme create moral hazard incentives that encourage banks to take excessive risk and italso caused a remarkable increase of Nonperforming Loans (NPLs).

Resti (2002) examined corporate bond recovery rate abducing to bond default rate, macroeconomicvariables such as Gross Domestic Product and growth rate, amount of bonds outstanding, amount of default,return on default bonds, and stock return wherein it was established that default rate, amount of bonds, defaultbonds, and economic recession had negative effect, while the Gross Domestic Product growth rate, and stockreturn had positive effect on corporate recovery rate. Lis, *et.al.* (2000) used a simultaneous equation model inwhich they explained bank loan losses in Spain using a host of indicators, which included Gross DomesticProduct growth rate, debt-equity ratios of firms, regulation regime, loan growth, bank branch growth rates, banksize, collateral loans, net interest margin, capital-asset ratio (CAR) and market power of default companies. Theyfound that Gross Domestic Product growth, bank size, and CAR, had negative effect

while loan growth,collateral, net-interest margin, debt equity, market power, regulation regime and lagged dependent variable hadpositive effect on problem loans.

Sergio (1996) in a study of non-performing loans in Italy found evidence that, an increase in theriskiness of loan assets is rooted in a bank's lending policy adducing to relatively unselective and inadequateassessment of sectorial prospects. Interestingly, this study refuted that business cycle could be a primary reasonfor banks' Non-Performing Assets. Das and Ghosh (2003) established relationship between Non PerformingLoans of India's public sector banks in terms of various indicators such as; asset size, credit growth andmacroeconomic condition and operating efficiency indicators. Bercoff, Giovanniz and Grimardx (2002) in theirstudy of Argentinean banks tried to measure Non-Performing Assets by using the various bank relatedparameters as well as macroeconomic parameters. Bank specific parameters in their study were Ratio of Networth to Net Assets, Banks exposure to peso loans, and type of banks such as foreign, private or public.Macroeconomic factors in this study were credit growth, reserves adequacy, foreign interest rate and monetaryexpansion. They have established that variables such as operating cost, exposure to peso loans, credit growth,and foreign interest rate had a negative effect on Non-Performing Assets. The macroeconomic variables such asmoney multiplier and reserve adequacy had a positive impact on Non-Performing Assets.

Berger and De Young (1995) mentioned that a management team with pooroperating capability is unable to correctly appraise the value of collateral, which means that it is difficult for it tofollow up on itssupervision of the borrower, its poor credit-rating technology will result in management beingunable to control and supervise the operating expenses efficiently, thus leading to a significant increase in Non-Performing Loans.

Bodla and Verma (2006) have emphasized that financial sector reforms have brought in greatercompetition among the banks and have brought their profitability under pressure. Singh (2005) argues that globalization of operations and development of new technologies are taking place at a rapid pace and this has ledto the increase in resource productivity, increasing level of deposits, credits and profitability and decrease inNon-Performing Assets.

Ranjan andDhal (2003) attempted an empirical analysis of the Non-Performing Assets of Public Sector banks in India andprobed the response of Non-Performing Assets to terms of credit, bank size, and macroeconomic condition andfound that terms of credit have significant effect on the banks' Non-Performing Assets in the presence of banksize and macroeconomic shocks. Kargi (2011) found in a study of Nigeria banks from 2004 to 2008 that there isa significant relationship between banks performance and credit risk management. He found that loans andadvances and non-performing loans are major variables that determine asset quality of a bank.

Ezeoha (2011) used panel data from 19 out of a total 25 banks operating in Nigeria; wherehe uses a multivariate constant coefficient regression model to test weather consolidation heighten incidence ofnon-performing credit in a fragile banking environment. He find that there is deterioration in asset quality andthe deterioration in asset quality and increased credit crisis between 2004 and 2008 was exacerbated by theviability of bank to optimally use their huge asset capacity to enhance their earnings profiles. This implies thatexcess liquidity syndrome and relatively huge capital bases fueled reckless lending by banks portfolio ironicallyhelped to mitigate the level of non-performing loans within the studied period.

Hu, Li and Chiu (2004) examined how ownership structure affects Non-Performing Loans (NPLs).Their findings revealed that an increase in the governments' shareholding facilitates political lobbying. On theother hand, private shareholding induces more Non -performing Loans (NPLs). Kolapo, Ayeni and Ojo (2012)using panel data regression for the period 2000 to 2010 found that the effect of credit risk on bank's performancemeasured by the Return on Asset (ROA) of banks is cross sectional invariant. They concluded that the nature andmanagerial pattern of individual firms do not determine the impact. Hosna, Manzura andJuanjuan (2009)reemphasized the effect of credit risk management on profitability level of banks. They concluded that highercapital requirement contributes positively to bank's profitability. Muhammed, Shahid, Munir and Ahad (2012)used descriptive, correlation and regression techniques to study whether credit risk affect banks performance inNigeria from 2004 to 2008. They also found that credit risk management has a significant impact on profitabilityof Nigerian banks.

Onaolapo (2012) whileanalyzing the credit risk management efficiency in Nigerian commercial banking sector from 2004 through 2009provides some further insight into credit risk as profit enhancing mechanism. They used regression analysis andfound rather an interesting result that there is a minimal causation between deposit exposure and bank'sperformance. Kithinji (2010) analyzed the effect of credit risk management (measured by the ratio of loans andadvances on total assets and the ratio of non-performing loans to total loans and advances on return on total assetin Kenyan banks between 2004 to 2008). The study found that the bulk of the profits of commercial banks arenot influenced by the amount of credit and non-performing loans. The implication is that other variables apartfrom credit and non-performing loans impact on banks' profit.

Poudel (2012) appraised the impact of credit management in bank's financial performance in Nepalusing time series data from 2001 – 2011. The result of the study indicates that credit risk management is animportant predictor of banks financial performance. Fredrick (2010) demonstrated that credit risk managementhas strong impact on bank's financialperformance in Kenya. Jackson (2011) used CAMEL indicators asindependent variables and Return on Equity as proxy for bank performance. He found that the variables impacton the financial performance of the commercial banks. None of the above findings really captured the CAMELScriteria for asset quality of commercial banks which this study intends to examine.

III.   Methodology

This section describes the population of the study, method and sources of data collection, how hypothesis was tested and the basis for which conclusion was drawn.This research work is on the Effects of Asset Quality on Profitability of DMB's in Nigeria.Panel data were gathered from secondary sources, specifically from the audited and published annual reports of the deposit money banks understudy covering the period, 2007 to 2019. The annual reports were extracted from the websites and the annual report publications of the banks. These data were used to compute key financial ratios of the selected banks for the mentioned period. For purposes of data availability, 12 out of the 14 representing 85.7% of listed banks on the Nigerian Stock Exchange (NSE) as at 31st December, 2019 were selected as a sample for the study.The variables used for the study are clearly defined with their measurement stated in table 1.

A panel regression model was employed where the dependent variable is profitability measure by Return on Asset (ROA). Stata version 12.0 was employed to analyze the data while panel Regression analysis was used to test the hypothesis formulated. The regression model for the study is thus:

$ROA_{it} = \beta_0 + \beta_1 NPL/TL_{it} + \beta_2 NPL/TCD + \beta_3 LLP/TL_{it} + \beta_4 LLP/TA_{it} + \varepsilon_{it}$

Where:

ROA_{it} represents Return on Asset for bank i at time t.

NPL/TL = Percentage of Non-Performing Loans to Total Loans

NPL/TCD = Percentage of Non-Performing Loans to Total Customer Deposits

LLP/TL = Percentage of Loans Loss Provision to Total Loans

LLP/TA = Percentage of Loans Loss Provision to Total Assets

β_0 = Intercept

B_1 to β_{3} = Coefficient Parameters

i = 1 to 12 banks.

t = 2007-2019.

ε_{it} = Error term.

Table 1
Variable Definition and Measurement

Type	Variable	Measurement	Definition	Author
Dependent	Return on Assets (ROA)	Profit after Tax to Total Assets	The higher ratio indicates good returns to the stakeholders of the banks on their interest invested	Eyup, Niyazi & Nurcan (2017)
Independent	Assets Quality	Percentage of Non-Performing Loans to Total Loans	Highest percentage indicates poor quality assets	Prudential Guidelines (2010) & Eyup, Niyazi & Nurcan (2017)
Independent	Assets Quality	Percentage of Non-Performing Loans to Total Customer Deposits	Highest percentage indicates weak quality assets	Lucky &Nwosi (2015)
Independent	Assets Quality	Percentage of Loans Loss Provision to Total Loans	Highest percentage indicates poor quality assets	Lucky &Nwosi (2015)
Independent	Assets Quality	Percentage of Loans Loss Provision to Total Assets	Highest percentage indicates weak quality assets	Prudential Guidelines (2010) & Eyup, Niyazi & Nurcan (2017)

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A panel multiple regression model is used to test the significance of the independent variable on the dependent variable. The study conducts a descriptive test to ascertain the nature of correlation between the independent variable and the dependent variable. Also, Multicollinearityis carried out using a correlation matrix. Multicollinearity occurs if two or more independent variables are highly correlated with one another (Dinah, 2016). Multicollinearity is said to exist between two variables if they have a Pearson correlation value greater than 0.9 (Tabachnick&Fidell, 1996). Variance inflation factor (VIF) test is tested to check how the independent variables have multicollinearity with each other thus, if the centered VIF or mean VIF is less than 10, it therefore means that they do not have multicollinearity problem but otherwise, they have multicollinearity problem. Furthermore, normality test is conducted using Shapiro-wilk normality test while panel fixed and random model is conducted to test the stated hypothesis. The selection between the fixed and random model is aided by Hausman specification Result. When Hausman specification p-value is less than 5% level of confidence, fixed effect model is more appropriate but where it is greater than 5% level of confidence Random model is more suitable. Pesaran's test of cross sectional independence is used to establish if there is serial correlation in the residuals and Wooldridge test for autocorrelation is used to check for autocorrelation in the residuals. If any of these tests is significant appropriate error corrected model will be used to correct for such.

In this manner, annual financial statements, prepared in accordance with International Financial Reporting Standards (IFRS) that belong to the period from 2007 to 2019, of 12 banks operating in Nigerian banking sector was observed. Panel regression method is used to determine the relationship between "the ratio of the follow-up loans to asset" and "ratio of provisions for overdue loans to total loans" which are independent variables and ROA which is dependent variable. Our study, under which the effect of non-performing loans to bank profitability is investigated, separates from the other studies made for Nigeria as it compromises of two different variables at the same time and a sit directly measures the effect of non-performing loans to bank profitability and it uses recent and annual data.

IV.   Results and Discussions

Table 2 presents the results of the descriptive statistical analyses of the raw data and their interpretations. The descriptive statistics used are the means, standard deviations minimum and maximum values.

Table 2

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	156	2.51	5.71	-9.53	44.79
NPLTL	156	12.36	16.63	0.48	104.76
NPLTCD	156	8.50	13.59	0.38	78.13
LLPTL	156	0.08	0.29	0.00	3.40
LLPTA	156	3.03	7.65	-54.70	36.59

Table 2 revealed that the ROA of the DMBs in Nigeria has an average of 2.51% ranged from a minimum return of -9.53%to a maximum of 44.79% with a standard deviation of 5.71%, which implies that for every Naira investment, the least for DMBs in Nigeria was a loss of N.53kobo and the highest earning was a maximum of N44.79kobo. The average value for NPLTL was 12.36% with standard deviation of 16.63%, as against minimum of 0.48% and maximum of 104.7%. The results therefore indicated that on the average, DMBs in Nigeria had 12.36% asset quality during the period under study, but with some financial institutions having not more than 0.48% while some had up to 104.7% asset quality. Furthermore, from Table 2, NPLTCD takes values between 0.38% and 78.13% with a Standard deviation of 13.59%. These show that the NPLTCD of the selected DMBs in Nigeria for the period of 13 years (2007–2019) considerably varied. Besides, the average values for all the industry is 8.50%. Additionally, on the average, LLPTL of the sampled firms during the study period (2007-2019) is about 0.08% with a minimum value of 0.00% and a maximum value of 3.40% and a standard deviation of 0.29%. Lastly, the mean LLPTA of DMBs included in the study was 3.03, with minimum and maximum being -54.70% and 36.59% respectively. As indicated by the mean (3.03), it clearly demonstrated that the DMBs high a low percentage of loans loss provision to total assets. This is further affirmed by the high standard deviation of 7.65%.

Table 3
Correlation between Variables

	ROA	NPLTL	NPLTCD	LLPTL	LLPTA
ROA	1.00	1.00			
NPLTL	0.08	1.00			
NPLTCD	0.12	0.85	1.00		
LLPTL	0.05	0.30	0.09	1.00	
LLPTA	-0.204	0.02	-0.04	0.09	1.00

As Table 3 illustrates, the correlations between the independent variables arenot high (range from -0.204 to 0.85) based on Tabachnick and Fidell (1996) recommendation that multicollinearity problem exists when thebivariate correlation between independent variables is 0.9 or above.

Table 4
Variance inflation factor (VIF)

Variable	VIF	1/VIF
NPLTL	4.51	0.22
NPLTCD	4.14	0.24
LLPTL	1.25	0.80
LLPTA	1.02	0.98
Mean VIF	2.73	

Table 4shows that the Mean VIFis less than 10, it therefore means that the variables do not have multicollinearity problem.

Table 5
Tests of Normality

Variable	Obs	W	V	Z	Prob>z
ROA	156	0.52489	57.174	9.192	0.000
NPLTL	156	0.6345	43.983	8.596	0.000
NPLTCD	156	0.54687	54.529	9.084	0.000
LLPTL	156	0.21918	93.962	10.32	0.000
LLPTA	156	0.50496	59.572	9.285	0.000

From table 5 above, ROA, NPLTL, NPLTCD, LLPTL and LLPTA were not normally distributed. This is because the p value of the Shapiro-Wilk Test was 0.000which is less than 0.05.Therefore, the solution to thenormality problem is to apply robust standard error intheregression analysis.

Table 6
Hausman fixed and random test

Variable	Fixed (b)	Random (B)	Difference (b-B)	sqrt(diag(V_b-V_B)) S.E.
NPLTL	-0.024	-0.034	0.011	0.015
NPLTCD	0.081	0.083	-0.003	0.013
LLPTL	2.298	1.970	0.328	0.394
LLPTA	-0.197	-0.169	-0.028	0.016

chi2(4)	4.11
Prob>chi2	0.3911

The results of the Hausman testpresented in Table 6 revealed thatHausman specification p-value is greater than 5% level of confidence, implying that Random effect model is more appropriate.

Table 7
Cross-sectionaldependence test

Pesaran's test of cross-sectional independence = 3.878	Pr = 0.0001
Average absolute value of the off-diagonal elements = 0.303	

The result of Pesaran's test of cross-sectional dependence, as shown in the Table 7 indicates that research model for this study was found to exhibit cross-sectional dependence thus violating the assumption of cross-sectional independence since the p-value of the chi-square is 0.0001 which is less than 0.05.Consequently, afeasiblegeneralized least squares(FGLS)model was adopted to correct this violation.

Table 8
Serial Correlation Tests

Serial Correlation Tests
Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
F (1,11) = 22.429
Prob > F = 0.0006

From the results in Table 8, the F statistic had a value of 22.429and a P value of 0.0006. Since the P value was less than 5% level of significance then, the F test was statistically significant. Accordingly, this study rejects the null hypothesis and concluded that there is problem of serial correlation. Consequently, afeasible generalized least squares(FGLS)model was adopted to correct this violation.

Having conducted diagnostic tests, this study adopted FeasibleGeneralised Least Squares (FGLS) panel data regressionmodeltoascertain the causal effect of asset quality (non-performing loans) on bank profitability (ROA) is investigated for Nigerian banking sector. The study adopted the FGLS as against thePanel Correlated Standard errors(PCSE) model because when T > n (T=13years and n=12 DMBs).

Table 9
Feasible Generalised Least Squares (FGLS) Result

Variable	Coeff	Std.Error	t-stat	Prob
NPLTL	-0.04	0.06	-0.72	0.47
NPLTCD	0.08	0.07	1.28	0.20
LLPTL	1.75	1.69	1.04	0.30
LLPTA	-0.15	0.06	-2.57	0.01
Constant	2.60	0.58	4.52	0.00
Wald chi2(4) = 10.07				
Prob > chi2 = 0.0392				

The result of the FGLS is presented in Table 9.The result reveals that the changes in NPLTCD and LLPTLhave positive effect on ROA while the changes in NPLTL and LLPTA have negative effect on ROA. However, only LLPTAis in addition statisticallysignificant at 5 percent level. Undoubtedly, on the average,

100% increase inNPLTCD and LLPTLwould lead to about 8% and 175% respectively boot in ROA. NPLTLrates (4%) negatively and insignificantly affects the ROA at 5 percent level. Furthermore, LLPTA rates (15%) negatively andsignificantly affects the ROA at 5 percent level.Thecoefficient of 0.15means that one percentage rise inLLPTAwould cause a reduction in ROA by 15%.The explanatory power of NPLTL, NPLTCD, LLPTL and LLPTAcombined,as reflected in the Wald test result means that the four asset quality variables significantly and jointly affect the ROA of theselectedDMBs in Nigeria. Theestimated model is presented in equation below as:ROA = 2.60-0.04NPLTL + 0.08NPLTCD + 1.75LLPTL-0.15LLPTA.

This study set out to assessthe importance of asset quality inprofitability (ROA)for Nigerian banking sector.Percentage of non-performing loans to total loans, percentage of non-performing loans to total customer deposits, percentage of loans loss provision to total loans and percentage of loans loss provision to total assets were used as indicators forasset quality, While ROA was employed as barometers for profitability.The results of the FGLS analysisindicate that percentage of loans loss provision to total assets have a significant negative effect on ROA; percentage of non-performing loans to total loans have an insignificant negative effect on ROA. Both percentage of non-performing loans to total customer deposits and percentage of loans loss provision to total loanshave an insignificant positive effect on ROA.This indicates that even though the percentage of non-performing loans to total customer deposits and percentage of loans loss provision to total loans is small or large, it does notensurean increase in ROA. Overall, the result revealed that fitted model. This result implies that only percentage of loans loss provision to total assets is significant in predicting ROA.The finding was consistent with the findings ofSarıtaş, Uyar, and Gökçe (2016) who found that lower asset quality or non-performing loans affecting profitability of banks negatively. In addition, Kingu,Macha and Gwahula(2018)found that occurrence of non-performing loans is negatively associated with the level ofprofitability in commercial banks. Similarly, Nugroho,Arif and Halik(2021)showed that thepartial allowance for credit losses did not significantly affect the bank's capital adequacy ratio and non-performing loans (NPL) and third-party funds (TPF) partially affected the bank'scapital adequacy ratio.

V.   Conclusion and Recommendations

This study examined the effect of asset quality on profitability (ROA) for Nigerian banking sector. Findings fromthis study revealed that only percentage of loans loss provision to total assets have a significant negative effect on ROA even though the overall model is significant.Based on the findings of the study it was concluded that the roles of asset quality in operation of a firm which is the integrated set of activities related to the quality of loans provided by the bank and the quality of loans can be measured with the non-performing loan (NPL) where NPL consist of overdue loans and follow-up loanscannot be overemphasized even with the non-significance of some related proxies.Thus, the results of the study support the notion that companies thatactively increase the quality of assets. Thus, how well the assetquality ofcompanies will become a competitive factor for performance improvement. The challenge of loans loss provisioncan possibly increase liquidity risk given the turbulent business conditions wherecredit facilities are liquidated by unstable short-term deposits.The study recommended thatloans loss provision should be reasonably reduced to achieve better performance ofbanks. Also, management of banks should ensure strict compliance with their respective bank's lending policy.For future studies, independent path relations between each dimension of asset quality and each proxies of financial performance need to be examined to capture more detailed and interactive phenomena in the financial institutions.

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