CREDIT RISK MANAGEMENT AND DEPOSIT MONEY BANKS' PERFORMANCE IN NIGERIA

Ozioko, Joyce Nneka[1] and Enya, Alphonsus Azubuike[2]
[1&2]Department of Banking and Finance
Michael Okpara University of Agriculture, P.M.B 7267, Umudike, Abia state, Nigeria
ozioko.joyce@mouau.edu.ng, Tel no: 08035257027
Correspondent author's email: enya_alphonsus@yahoo.com, Tel no: 07067434989

ABSTRACT
This study examines the impact of credit risk management on the performance of commercial banks in Nigeria. This is necessitated by the growing concern on how loans have exposed banks to the greatest level of risk. The scope of this study covers the period of 2012 – 2019; and is limited to the following credit risk management variables such as; non-performing loans, loan loss provision and liquidity ratio. The study used secondary sources of data obtained from published annual reports of selected commercial banks and adopted panel data regression analytical model in the analysis of collected data. The results of the analysis show that credit risk management has a significant impact on the performance of commercial banks in Nigeria. Therefore, based on the findings of the study it is pertinent that management of deposit money banks carefully assess the risks inherent in the loan applications before approval. The study recommends that banks should maintain minimum level of non-performing loans; maintain stable liquidity rate; and maintain an appropriate level of loan loss provision that would enhance return on assets and strengthen their financial performance.

Keywords: Credit, Risk, Management, Non performing loans, Liquidity
JEL: F65, G32

1. INTRODUCTION
Risk is the element of uncertainty or possibility of loss that prevail in any business transaction in any place, in any mode and at any time (Soyemi, Ogunleye & Ashogbon, 2014). In the financial arena, enterprise risks can be broadly categorized as credit risk, operational risk, market risk and other risk. Credit risk is the possibility that a borrower or counterparty will fail to meet agreed obligations. Credit risk management on the other hand is the practice of mitigating the losses by understanding the adequacy of both bank's capital and loan loss reserves at any given time (Lall, 2014). Though banks try so much in mitigating the losses that arise due to default of their customers in repaying loans and advances collected, this has long been a challenge for banks to manage.

However, the credit functions of banks enhance the ability of investors to exploit desired profitable ventures. Credit creation is the main income generating activity of banks (Kargi, 2011). The Basel Committee on Banking Supervision (2001) defined credit risk as the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). The higher the exposure of a bank to credit risk the higher the tendency of the banks to experience financial crisis and vice-versa. The extents to which banks manage their credit risk have an impact on their entire financial performance or survival.

Globally, more than 50% of total risk elements in the banks and financial institutions are mainly credit risk alone. Thus, managing credit risk for efficient management of financial institutions has gradually turned into one of the central assignments of banks (Kattel, 2016). Credit risk causes economic downturn as banks fail due to default risk from clients, which has had adverse effect on the economic development of many nations around the world (Reinhart & Rogiff, 2008). Credit risk management encompasses identification, measurement, matching mitigations, monitoring and control of the credit risk exposure (Raad, 2015).

The health of the financial sector is a major concern of policy, especially in developing economies where failure in financial intermediation can disturb the economic growth and retards development processes (Das & Ghosh, 2007). In Nigeria, commercial banks play an important role in mobilizing scarce financial resources for investment by extending credit to various businesses and investors. The economic development and financial growth of a country is critically dependent on the financial performance and strength of its banking sector (Shukla, 2015). The banking sector serves as the backbone for the economic development of any country (Ahsan, 2016). Sound financial health of the banks is a guarantee not only to their depositors but is equally significant for the shareholders, employees and the economy as a whole (Mohiuddin, 2014). However, the banking sector is yet to attain the stability and financial soundness expected of her, which is as a result of several challenges related to credit risk management of banks which is the hallmark of its responsibility.

Hence, this study seeks to empirically assess the influence of credit risk management of commercial banks in Nigeria, and to also assess whether proper management of credit risk would avert the incidence of bank crisis as experienced in earlier years.

2. LITERATURE REVIEW

2.1 Conceptual Literature

According to Raghavan (2005) Credit risk consists of primarily two components, viz. Quantity of risk, which is nothing but the outstanding loan balance as on the date of default and the Quality of risk, which is the severity of loss defined by Probability of Default as reduced by the recoveries that could be made in the event of default. Thus credit risk is a combined outcome of Default Risk and Exposure Risk. The elements of Credit Risk are Portfolio risk comprising Concentration Risk as well as Intrinsic Risk and Transaction Risk comprising migration/down gradation risk as well as Default Risk. Al-Khouri, R. (2011) defines credit risk as the chance that a debtor or issuer of a financial instrument whether an individual, a corporation, or a nation will not refund principal and other investment related cash flows according to the terms specified in a credit contract or agreement, credit risk means that payment may be delayed or destroyed, which can result to cash flow difficulties and influence a bank's liquidity. Demirguc-Kunt and Huzinga (1999) opined that credit risk management is in two-fold which includes, the realization that after losses have occurred, the losses becomes unbearable and the developments in the field of financing commercial paper, securitization, and other non-bank competition which pushed banks to find viable loan borrowers. Credit risk according to Basel Committee of Banking Supervision Basel Committee on Banking Supervision (2001) and Gostineau (1992) is the possibility of losing the outstanding loan partially or totally, due to credit events, failure to pay a due obligation, repudiation/moratorium or credit rating change and restructure. Heffernan (1996), observed that credit risk as the risk that an asset or a loan becomes irrecoverable in the case of outright default, or the risk of delay in the servicing of the loan. Thus, when this occurs or becomes persistent, the performance, profitability, or net interest income of banks is affected. An increase in bank credit risk gradually leads to liquidity and solvency problems. Credit risk may increase if the bank lends to borrowers it does not have adequate knowledge about. Owojori, Akintoye and Adidu (2011) highlighted that available statistics from the liquidated banks clearly showed that inability to collect loans and advances extended to customers and directors or companies related to directors/managers was a major contributor to the distress of the liquidated banks. The goal of credit risk management is to maximize a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters (as per entity`s risk appetite) which is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organization. Due to the increasing spate of non-performing loans; the Basel II Accord emphasized on credit risk management practices; compliance with which ensures sound approach to mitigating credit risk consequently achieving improved commercial banks profitability.

This study however looked at this interaction from the point of Loan Loss provision, Non-performing loans and the Loan/Deposit Ratio as the proxy for the Credit Risk Management and Performance of commercial banks from the Return on Equity (ROCE). Hence, the study variables are conceptualized into a framework as illustrated by the diagram below:

Commercial banks performance and credit risk management

Banks are established with various objectives. These could either be to influence banks' performance, enhancing profitability or increasing shareholders return, and are often accomplished at the cost of increased risk. Risk-taking is an inherent component of banking and achieving either of these objectives is a reward for successfully managing risk. Soyemi, Ogunleye, and Ashogbon (2014) observed that the greater the risk, the higher the return, hence, the business must strike a trade-off between the two. In addition, risk management in banking impacts significantly on economic growth of the nation and business development. Inefficient management of risk by banks may not only prevent banks from achieving its objectives but can also lead to bankruptcy. Therefore, banking activities are always involved with various kinds of risk. Risks are considered warranted when they are understandable, measurable, controllable and within a banks capacity to willingly resist its adverse effect (NRB, 2010). Sound risk management enables bank management to take risks knowingly, reduce risks when appropriate, and prepare for the risk that cannot be predicted (NRB, 2010). If successfully carried out it benefits the banks by increasing efficiency and profitability, attracting more customers and staying in line with the guidelines (Adeusi, Akeke, Adebisi, & Oladunjoye, 2014). Therefore, efficient management of risk by banks has influence on their accounting performance.

2.2 Theoretical Literature

Modern portfolio theory model

Modern portfolio theory was largely defined by the work of Markowitz (1952) in a series of articles published in the late 1950s. The theory was extended and refined by Sharpe (1934), Litner (1983), Tobin (1918), and others in the subsequent decades.

MPT is a theory of finance which attempts to maximize portfolio expected return for a given amount of portfolio risk, or equivalently minimize risk for a given level of expected return, by carefully choosing the proportions of various assets. Modern Portfolio theory was introduced by Harry Markowitz in his paper "Portfolio Selection," which appeared in the 1952 Journal of Finance. The portfolio theory integrates the process of efficient portfolio formation to the pricing of individual assets. It explains that some sources of risk associated with individual assets can be eliminated or diversified away, by holding a proper combination of assets (Bodie et al, 1999).

Investing is a tradeoff between risk and expected return. In general, assets with higher expected returns are riskier. For a given amount of risk, MPT describes how to select a portfolio with the highest possible expected return. Or, for a given expected return, MPT explains how to select a portfolio with the lowest possible risk (the targeted expected return cannot be more than the highest-returning available security, of course, unless negative holdings of assets are possible.) Therefore, MPT is a form of diversification. Under certain assumptions and for specific quantitative definitions of risk and return, MPT explains how to find the best possible diversification strategy.

In summary, portfolio management theory assesses risk and return relationships for combinations of securities. While the expected return of a portfolio is the simple weighted average of the expected returns of its component securities, portfolio risk must also consider the correlation among the returns of individual securities.

2.3 Empirical review

Oduro, Asiedu and Gadzo (2019) have identified the factors that determine the level of bank credit risk and further estimate the effects of bank credit risk on corporate financial performance using financial data from banks on the Ghana Stock Exchange over a 15-year period from 2003 to 2017. Using the method of 2SLS, it was observed variables such as capital adequacy, operating efficiency, profitability, and net interest margin are inversely related to credit risk. Conversely, bank size and financing gap tend to relate positively with credit risk. Also, anualised changes in inflation tend to positively affect credit risk. Again, it was observed that, increase in bank credit risk negatively affects corporate financial performance which is

consistent with Basel accord. Thus, for banks to survive in their industry, critical attention needs to be paid to management of its credit risk exposure.

Zhang, Kou and Peng, (2019) proposed a consensus model that considers the cost and degree of consensus in the group decision making process. With a certain degree of consensus the generalized soft cost consensus model was developed by defining the generalized aggregation operator and consensus level function. The cost is properly reviewed from the perspective of the individual experts and the moderator. Economic significance of the two soft consensus cost models is also assessed. The usability of the model for the real-world context is checked by applying it to a loan consensus scenario that is based on online data from a lending platform. Group decision making is critical for changing the opinions of everyone to arrive at a synchronized strategy for minimizing the risks of the bank with the help of hedging (Zhang, Kou, & Peng, 2019).

Kou, Chao, Peng, Alsaadi and Herrera-Viedma, (2019) identified that financial systemic risk is a major issue in financial systems and economics. Machine learning methods are employed by researchers that are trying to respond to systemic risks with the help of financial market data. Machine learning methods are used for understanding the outbreak and contagion of the systemic risk for improving the current regulations of the financial market and industry. The paper studies the research and methodologies on measurement of financial systemic risk with the help of big data analysis, sentiment analysis and network analysis. Machine learning methods are used along with systematic financial risk management for controlling the overall risks faced by the banks that are related to hedging of the financial instruments of the bank.

Nwude and Okeke (2018) investigated the impact of credit risk management on the performance of deposit money banks in Nigeria using five banks that had highest asset base. Ex-post facto research design was adopted using dataset for the period 2000–2014 collated from the annual reports and financial statement of the selected deposit money banks. Three hypotheses were proposed and tested using ordinary least square regression model. The findings reveal that credit risk management had a positive and significant impact on total loans and advances, the return on asset and return on equity of the deposit money banks. The study recommended that bank managers need to put more efforts to control the non-performing loan by critically evaluating borrowers' ability to pay back. The regulator should strengthen its monitoring capacity in this regard.

3. METHODOLOGY

This study employed an ex-post facto design to determine the effect of credit risk management on bank performance in Nigeria. Data for this study were collected by the use of secondary data only. The secondary source of information was based on official website, annual audited report, journals and CBN's statistical bulletin publication.

Method of data analysis

In this study, the bane of this study is to empirically examine the quantitative impact of credit risk management on the performance of commercial banks in Nigeria over the period of 8 years (2012-2019).

The econometric analysis of the model was done as follows; first, the researcher carried out the statistical description of the variables. Secondly, the panel data regression analysis was examined to empirically ascertain the impact of credit risk management on the performance of commercial banks in Nigeria. The process was executed using econometric statistical package Eview 9 to analyze data.

Model specification

The empirical model for this study is formulated based on relevant reviewed literatures, theoretical postulations (the modern portfolio theory) and significant observed variables selected from highly methodological studies. The model to be adopted for this study is underpinned to the model of Kargi (2011) in his study "credit risk and the performance of Nigerian banks" which measured profitability with Return on Assets (ROA) as a function of the ratio of non-performing loan to loan and advances (NPL/LA) and ratio of total loan and advances to total deposits (LA/TD) used as indicators of credit risk. However, this

study improved on the model by incorporating Return on equity (ROE) to measure profitability and loan loss provisions as an additional variable for measurement of credit risk management.
This study adopts a panel while estimating the impact of credit risk management on the performance of commercial banks in Nigeria. The general form of the model is:

$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$----------(1)

Where I is the cross-sectional dimension and t represents the time serie dimension, Y_{it} represents the dependent variable in the model and X_{it} contains the set of explanatory variables, α is the constant, β represents the coefficient and ε_{it} represents the random error term. The multiple regression equation thus formed is as follows:-

$ROA_{it} = \beta_{it} + \beta_1 NPL_{it} + \beta_2 LLP_{it} + \beta_3 LR_{it} + \varepsilon_{it}$----------(2)

Where:

ROA = return on assets

NPL = non-performing loans

LA = loan loss provisions

LR = liquidty ratio

ε_{it} = error term

β_0 = intercept

β_1, β_2 and β_3 =parameter estimates

The variables ROA and ROE represent bank profitability of Nigerian commercial banks. Similarly, the variables NPL, LLP, and LR represent credit risk management of Nigerian commercial banks.

4. RESULTS AND DISCUSSION OF FINDINGS

The study uses panel data regression model in the analysis. The technique of panel data estimation takes care of the problem of heterogeneity in the five (5) Banks selected for the study. Also, by combining time series of cross-section observation, panel data give more informative data, more variability, less co-linearity among the variables, more degree of freedom and more efficiency (Gujarati and Sangeetha, 2007).

Pooled Least Square Results

Table 4.1: Result of pooled least square

Dependent variable: ROA

Method: Pooled least square

Sample: 2012 2019

Included Observations: 40

Variable	Coefficient	Std error	t-statictics	Prob.
C	0.021316	0.003992	5.339808	0.0000
LR	0.017133	0.005552	3.086060	0.0023
NPL	-0.003974	0.001482	-2.681062	0.0080
LLP	-0.240010	0.044156	-5.435509	0.0000
R-squared	0.225091	Adjusted R-squared	0.213230	

F-statistic	18.97763	Prob(F-statistic)	0.000000	
		Durbin-Watson stat	2.658164	

Source: Result of analysis drawn from E-view 9

The result presented above from a cross sectional pooled least square analysis showing the relationship between credit risk management and commercial banks performance using return on asset as proxy for performance.

The result shows that there is a significant relationship between credit risk management and commercial banks performance at 5% level of significance. Liquidity ratio has a positive significant relationship with return on asset; which implies that a unit increase in liquidity ratio of banks will result to 0.017 units on the return on assets.

The result also shows that non-performing loan has negative significant impact on return on assets. A unit increase in non-performing loan of banks will lead to 0.003 unit decrease on return on assets.

Loan loss provision shows a negative significant impact on return on assets which implies that a unit increase in loan loss provision of banks will result to a 0.24 unit decrease on return on assets.

The R-squared value of 0.225091 implies that liquidity ratio, non performing loans and loan loss provision ratio accounted for about 22% variation in the level of return on assets of the listed commercial banks in Nigeria during the period under review

Fixed Effect Result

Table 4.2: Fixed effect result

Dependent variable: ROA

Method: Panel Least Squares

Sample: 2012 2019

Total panel (balanced) observations: 40

Variable	Coefficient	Std error	t-statictics	Prob.
C	0.029125	0.004425	6.581721	0.0000
LR	-0.020112	0.006776	-2.968391	0.0056
NPL	0.014466	0.005070	2.853160	0.0075
LLP	0.062708	0.053667	1.168471	0.2512
Effects Specification				
R-squared	0.909957	Adjusted R-squared	0.890260	
F-statistic	46.19810	Prob(F-statistic)	0.000000	
		Durbin-Watson stat	1.717618	

Source: Result of analysis drawn from E-view 9

The above shows a positive significant relationship between credit risk management and commercial banks performance of selected banks in Nigeria during the period under review.

The liquidity ratio indicates a negative significant impact on return on assets with a coefficient of 0.02012. The result implies that a unit increase in liquidity ratio will result to 0.020 unit decrease in return on assets.

Also, the non-performing loan has a positive significant impact on the performance of commercial banks in Nigeria with a coefficient of 0.01446. The result shows that a unit increase in non-performing loan will lead to about 0.014 unit increase on return on assets.

In addition, the result also shows that the loan loss provision has a positive insignificant impact on the performance of commercial banks in Nigeria.

The model shows an R-squared of 0.909957. The value of the R-squared implies that liquidity ratio, non-performing loan and loan loss provision accounts for about 91% variation in the level of return on assets of the listed commercial banks in Nigeria during the period under review.

Random Effect Result

Dependent variable: ROA

Method: Panel EGLS (Cross-section random effects)

Sample: 2012 2019

Total panel (balanced) observations: 40

Swamy and Arora estimator of component variances

Variable	Coefficient	Std error	t-statistics	Prob.
C	0.029686	0.010142	2.926983	0.0059
LR	-0.018153	0.006674	-2.719757	0.0100
NPL	-0.012000	0.004801	2.499313	0.0171
LLP	0.055542	0.053442	1.039293	0.3056
Effects Specification				
Adjusted R-squared	0.151680	F-statistic	13.324399	
F-statistic	46.19810	Prob(F-statistic)	0.030349	
Durbin-Watson stat	2.036445			
Unweighted Statistics				
R-squared	-0.844238			
Durbin-Watson stat	1.057144			

Source: Result of analysis drawn from E-view 9

The above cross section random effects result shows that credit risk management has a significant impact on the performance of commercial banks in Nigeria at 5% level of significance based on the probability of the intercept.

The result indicates that liquidity ratio has a negative significant impact on the return on assets with a coefficient of -0.018153. The value of the coefficient implies that a unit increase in liquidity ratio will lead to 0.018 unit decrease on return on assets.

However, the non performing loan shows a negative significant impact on return on assets with a coefficient of -0.012. The value of the coefficient implies that a unit increase in non-performing loan will result to about 0.012 unit decrease on return on assets.

Also, loan loss provision shows a positive insignificant impact on Return on Assets at a 5% level of significance.

The R-squared value of 0.216935 implies that the independent variables (LR, NPL and LLP) are responsible for about 22% variation in the dependent variable (ROA).

Correlation Random Effects – Hausman Test

This is used as a test to determine the right model between the fixed and random effects model.

Null Hypothesis (H_0): Random Effects model is appropriate

Alternative Hypothesis (H_A): Fixed Effects model is appropriate

Decision Criterion: - Reject H_0 if probability value is less than 5%.

Accept H_0 if probability value is greater than 5%

Table 4.4: Correlated Random Effects – Hausman Test

Test cross-section random effects

Test Summary		Chi Sq statistics	Chi sq df	Prob.
Cross-section random		3.136152	3	0.3711
	Cross-section random effects test comparisons:			
Variable	Fixed	Random	Var(Diff)	Prob.
LR	-0.020112	-0.018153	0.000001	0.0929
NPL	0.014466	0.012000	0.000003	0.1301
LLP	0.062708	0.055542	0.000024	0.1441

Source: Result of analysis drawn from E-view 9

A look at the probability value and making inference based on the decision criterion. The probability value here is 0.3711 which is greater than 5% critical value. Therefore, we accept null hypothesis and conclude that the random effects model is most appropriate for analysis of the study.

Discussion of results

An examination of the random effect result in table 4.3 shows that all the coefficients except for loan loss provision are individually statistically significant at 5% level of significance. The R-squared value is considerable low (0.216935), and significant. This implies that 21.7% of variation on return on assets can be explained by the explanatory variables. The low value of the R-squared can be said to mean that an insignificant proportion of the dependent variable was predicted by the independent variables while the remaining 78.3% variation in the return on assets is predicted by some other variables which have not been considered in this study. Just below the R-squared is the value of the Adjusted R-squared (0.151680) in table 4.3 which provides a more accurate picture of overall explanatory power of independent variables by omitting the overestimation impact of the addition of more variables in the model. The value of the adjusted R-squared is showing that 15% of the return on assets is explained by the independent variables.

The probability value (p-value) of independent variables explains how reliably a dependent variable is being predicted by this particular independent variable. The probability values of independent variables are compared with significance level which can be 1%, 5% or 10% but often it is considered 5%.

These results are consistent with Khan et al. (2011), Musyoki and Kadubo (2012), Poudel (2012), Kolapo et al. (2012) and Swamy (2013). All these studies have shown that the ratio of non-performing loans has a significant negative impact on the performance of banks measured by return on assets. The negative association between NPL and ROA indicates that the increase in non-performing assets can cause deterioration in profitability and performance of the banks. It can create delinquencies to manage the credit quality and hence damages the reliability of the banks.

From the regression analysis result, the F-statistics of 13.324399 has associated probability of 0.030349. Since the probability is less than the specified 5% level of significance, the overall effect of the credit risk management variables on commercial banks performance is statistically significant and also indicates the goodness of fit of the estimated model. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted with respect to the overall impact of credit risk management on commercial banks performance in Nigeria.

5. CONCLUSION AND POLICY RECOMMENDATIONS

Based on the analysis and findings thereof, the study concludes that the credit risk management measures considered in this study is relevant in determining performance of commercial banks in Nigeria. Increased liquidity rate of banks can raise liquidity issues that can adversely affect the performance of the banks. Increasing non-performing assets can cause deterioration in profitability and performance of commercial banks in Nigeria. Also, loan loss provision recognized the risk arising from lending and opts for strengthening of credit risk management capability of commercial banks. The aggregated effect of the credit risk management measures on commercial banks performance is significant. Therefore, the study concludes that credit risk management has significant impact on performance of commercial banks in Nigeria. At the 5% level of significance, overall impact on commercial banks performance of the credit risk management in the study is found to be significant. Consequently, the null hypothesis is rejected.

Based on the findings summarized and the conclusion thereof, the researchers there recommend the following:

1) That bank maintains minimum level of non-performing loans; maintain a stable liquidity rate and maintain an appropriate level of loan loss provision that would enhance return on assets and strengthen their financial performance.
2) That bank should enhance their capacity in credit analysis while the regulatory authority should pay more attention to banks compliance to relevant provisions of the Bank and other Financial Institutions Act (1999) and prudential guidelines.
3) Also, for further studies we recommend that other variables that measures credit risk management should be considered in order to address the low variation of the explained variable caused by the explanatory variables.

REFERENCES

Abiola, I. and Olausi A. S (2014). *"The impact of credit risk management on the commercial banks performance in Nigeria". International Journal of Management and Sustainability* 3(5):295–306

Ahsan, M.K (2016). *"Measuring financial performance based on CAMEL: A study on selected Islamic banks in Bangladesh".Asian Business Review*, 6(1), 47-54.

Al-Khouri, R. (2011). *"Assessing the risk and performance of the GCC Banking Sector".International Journal of Finance and Economics, ISSN 1450-2887, Issue65, 72-8.*

Altman, E. I., Brady, B., Resti, A. & Sironi, A. (2014). *"The link between default and recovery rates: theory, empirical evidence and implications". Journal of Business*, 78 (6): 2203-27. http://dx.doi.org/10.1086/497044

Alshatti, A. S. (2015). *"The effect of credit risk management on financial performance of the Jordanian commercial banks". Investment Management and Financial Innovations*, 12(1), 8-21

Annual Reports of FBN 2012-2019

Annual Reports of Access Bank 2012 – 2019

Annual Reports of Zenith Bank 2012 – 2019

Annual Reports of UBA 2012 – 2019

Annual Reports of GTB 2012 – 2019

Basel Committee on Banking Supervision, (2001*). "Risk management practices and regulatory capital: Cross-sectional comparison. Basel Committee on Banking Supervision".* Available from www.bis.org.

Basel Committee on Banking Supervision. (2006). *"Studies on credit risk concentration: An overview of the issues and a synopsis of the results' from the research task force project".* Retrieved from www.bis.org.

Bello, A., Anfofum, A. A., & Farouk, B. K. (2021). *"Impact of bank credit on manufacturing sector output in Nigeria". Journal of economics and allied research,* vol. 6(2*), 85-97.*

Boahene, S. H., Dasah, J., & Agyei, S. K. (2012). *"Credit risk and profitability of selected banks in Ghana".Journal of Finance and Accounting, 3*(7), 6–14.

Boyd, J. H. (2010). *"The profitability and risk effects of allowing bank holding. Federal Reserve Bank of Minneapolis". Quarterly Review-Federal Reserve Bank of Minneapolis,* 12(2), 3-15

Das, A. and Ghosh, S. (2007). *"Determinants of credit risk in Indian state owned banks: An empirical investigation". MPRA Paper,*1-21.

Demirguc-Kunt, A. and Huzinga, H. (1999). *"Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence".The World Bank Economic Review, 13(2), 379-40.*

Fitch Rating, a subsidiary of Fitch Group, London and New York (accessed from www.fitchratings.com).

Fredrick, O (2012). *"The impact of credit risk management on the financial performance of commercial banks in Kenya".African Management Review,* 3(1), 22-37.

Gadzo, S. G., Kportorgbi, H.K. and Gatsi, J.G. (2019). *"Credit risk and operational risk on financial performance of universal banks in Ghana: A partial least squared structural equation model (PLS SEM) approach".Cogent Economics & Finance, 7,* 1-16, 7:1589406. https://doi.org/10.1080/23322039.2019.1589406

Gastineau G. L. (1992). "*Dictionary of Financial Risk Management".* Swiss Bank Corporation, Chicago.

Gujarati, D. N. and Sangeetha, S. (2007). "*Basic Econometric".* 4th Edition, McGraw-Hill Education Books Ltd., India.

Islam, M. A. & Rana, R.H. (2017). *"Determinants of Bank Profitability for the Selected Private Commercial Banks in Bangladesh: A Panel Data Analysis".Banks and Bank Systems,* Volume 12 (3), 179-192.

Jensen, M. C., & Meckling, W. H. (1976). *"Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure".Journal of Financial Economics,* Vol. 3(4), 303-360.

Kattel, I. K. (2016). *"Evaluating the credit risk measurement practices of commercial banks in Nepal". Journal of Business and Management,* 18(3), 132-137.

Kargi, H. S. (2011). *"Credit risk and performance of Nigerian banks".* (Unpublished Thesis). Ahmadu Bellu University, Zaria, Nigeria

Kodithuwakku, S. (2015). *"Impact of credit risk management on the financial performance of*

commercial banks in Sri Lanka".International Journal of Scientific Research and Innovative Technology, 2(7), 24-29.

Kolapo, T. F., Ayeni, R.. K. and Oke, M. O. (2012). *"Credit risk and commercial banks' performance in Nigerian: A panel model approach".Australian Journal of Business and Management Research,2*(2), 31-38.

Kou, Chao X, Peng Y, Alsaadi FE, Herrera-Viedma E (2019). *"Machine learning methods for systemic risk analysis in financial sectors".* Technol Econ Dev Econ:1–27

Karuga, J. M., & Ntiti, S. (2015). *"An Evaluation of the Effect of Credit Risk Management (CRM) on the Profitability of Nigerian Banks". Journal of Modern Accounting and Auditing*, 10(1), 12.

Lall, K. (2014). *"Financial performance of Malaysia local banks: during periods of pre-merger And post-merger". Journal of Economics, Business and Management,* 3(9), 78-90

Markowitz, H. (1991). "*Efficient diversification of investments in Portfolio Selection".* Cambridge: M.A: Basil Blackwell.

Markowitz, H. (1952). *"Portfolio selection".Journal of Finance. 39, pp. 77- 97.*

Mohiuddin, G. (2014). *"Use of CAMEL model: A study on the financial performance of selected commercial banks in Bangladesh".Universal Journal of Accounting and Finance, 2*(5), 51-160.

Muteti, A. R. (2014). *"Does the loan loss provision affect the banking profitability in case of Pakistan?". Asian Economic and Financial Review*, 2(7), 772-783.

Musyoki, D., & Kadubo, A. S. (2012). "*The impact of credit risk management on the financial performance of banks in Kenya for the period 2000-2006". International Journal of Business and Public Management*, 2(2), 72-80.

Ndoka, S., & Islami, M. (2016). *"The Impact of Credit Risk Management in the Profitability of Albanian Commercial Banks During the Period 2005-2015".European Journal of Sustainable Development, 5*(3), 445-457

Nwude, E. C. and Okeke, C. (2018). *"Impact of Credit Risk Management on the Performance of Selected Nigerian Banks".International Journal of Economics and Financial Issues*, 8(2), 287-297. Retrieved from file:///C:/Users/user/Downloads/6001-15787-1-PB.pdf

Oduro,R., Asiedu, M. A. and Gadzo, S. G. (2019). *"Impact of credit risk on corporate financial performance: Evidence from listed banks on the Ghana stock exchange". Journal of Economics and International Finance, 11*(1), 1-14**.** DOI: 10.5897/JEIF2018.0940. Retrieved fromhttp://www.academicjournals.org/JEIF

Owojori, A.A., I.R. Akintoye and F.A. Adidu (2011). *"The challenge of risk management in Nigerian banks in the post consolidation era". Journal of Accounting and Taxation*, 3(2): 23-31.

Poudel, R. P. Sharma (2012). "*The impact of credit risk management on financial performance of commercial banks in Nepal".International Journal of Arts and Commerce,* 1(5), 9-15

Raad, M. L. (2015). *"Credit risk management (CRM) practices in commercial banks of Bangladesh: A study on basic bank ltd". International journal of economics, finance and management sciences,* Vol. 3, (2), 78-90

Reinhart C. M, and Rogoff, K. S (2008). *"Is the 2007 US sub-prime financial crisis so different? An international historical comparison". Am Econ Rev* 98(2):339–344

Shukla, S.S (2015). *"Analysing financial strength of public and private sector banks: A CAMEL*

Approach".Pacific Business Review International, 7(8),44-50.

Singh, A. (2015). *"Performance of credit risk management in Indian commercial banks". International journal of management and business research*, 5(3), 169-188.

Soyemi, K. A., Ogunleye, J. O., & Ashogbon, F. O. (2014). *"Risk management practices and financial performance: evidence from the Nigerian deposit money banks (DMBs)". The Business & Management Review*, 4(4), 345.

Swamy, V. (2013). *"Determinants of bank asset quality and profitability- An empirical assessment". Munich Personal RePEc Archive*, (MPRA) Paper No. 47513.

Zhang H, Kou G, Peng Y (2019). *"Soft consensus cost models for group decision making and economic interpretations". Eur Journal of Oper Res* 277(3):964–980