

CREDIT RISK AND COMMERCIAL BANKS' PERFORMANCE IN NIGERIA: A PANEL MODEL APPROACH

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ABSTRACT

The study carried out an empirical investigation into the quantitative effect of credit risk on the performance of commercial banks in Nigeria over the period of 11 years (2000-2010). Five commercial banking firms were selected on a cross sectional basis for eleven years. The traditional profit theory was employed to formulate profit, measured by Return on Asset (ROA), as a function of the ratio of Non-performing loan to loan & Advances (NPL/LA), ratio of Total loan & Advances to Total deposit (LA/TD) and the ratio of loan loss provision to classified loans (LLP/CL) as measures of credit risk. Panel model analysis was used to estimate the determinants of the profit function. The results showed that the effect of credit risk on bank performance measured by the Return on Assets of banks is cross-sectional invariant. That is the effect is similar across banks in Nigeria, though the degree to which individual banks are affected is not captured by the method of analysis employed in the study. A 100 percent increase in non-performing loan reduces profitability (ROA) by about 6.2 percent, a 100 percent increase in loan loss provision also reduces profitability by about 0.65percent while a 100 percent increase in total loan and advances increase profitability by about 9.6 percent. Based on our findings, it is recommended that banks in Nigeria should enhance their capacity in credit analysis and loan administration 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.

Keywords: Credit risk, Nigeria, Banking Firms, Profitability, Panel Data Regression.

INTRODUCTION

Banks are germane to economic development through the financial services they provide. Their intermediation role can be said to be a catalyst for economic growth. The efficient and effective performance of the banking industry over time is an index of financial stability in any nation. The extent to which a bank extends credit to the public for productive activities accelerates the pace of a nation's economic growth and its long-term sustainability.

The credit function of banks enhances the ability of investors to exploit desired profitable ventures. Credit creation is the main income generating activity of banks (Kargi, 2011). However, it exposes the banks to credit risk. 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). Credit risk is an internal determinant of bank performance. The higher the exposure of a bank to credit risk, the higher the tendency of the bank to experience financial crisis and vice-versa.

Among other risks faced by banks, credit risk plays an important role on banks' profitability since a large chunk of banks' revenue accrues from loans from which interest is derived. However, interest rate risk is directly linked to credit risk implying that high or increment in interest rate increases the chances of loan default. Credit

risk and interest rate risk are intrinsically related to each other and not separable (Drehman, Sorensen, and Stringa, 2008). Increasing amount of non-performing loans in the credit portfolio is inimical to banks in achieving their objectives. Non-performing loan is the percentage of loan values that are not serviced for three months and above (Ahmad and Ariff, 2007).

Due to the increasing spate of non-performing loans, the Basel II Accord emphasized on credit risk management practices. Compliance with the Accord means a sound approach to tackling credit risk has been taken and this ultimately improves bank performance. Through the effective management of credit risk exposure, banks not only support the viability and profitability of their own business, they also contribute to systemic stability and to an efficient allocation of capital in the economy (Psillaki, Tsolas, and Margaritis, 2010).

The Nigerian banking industry has been strained by the deteriorating quality of its credit assets as a result of the significant dip in equity market indices, global oil prices and sudden depreciation of the naira against global currencies (BGL Banking Report, 2010). The poor quality of the banks' loan assets hindered banks to extend more credit to the domestic economy, thereby adversely affecting economic performance. This prompted the Federal Government of Nigeria through the instrumentality of an Act of the National Assembly to establish the Asset Management Corporation of Nigeria (AMCON) in July, 2010 to provide a lasting solution to the recurring problems of non-performing loans that bedeviled Nigerian banks. According to Ahmad and Ariff (2007), most banks in economies such as Thailand, Indonesia, Malaysia, Japan and Mexico experienced high non-performing loans and significant increase in credit risk during financial and banking crises, which resulted in the closing down of several banks in Indonesia and Thailand.

The aim of this paper is to assess the impact of credit risk on the performance of Nigerian banks over a period of eleven years (2000-2010). The study is motivated by the damaging effect of classified assets on bank capitalization and would be of utmost relevance as it addresses how credit risk affects banks' profitability using a robust sample and the findings would serve as the basis to provide policy measures to the various stakeholders on how to tackle the effect of credit risk in order to enhance the quality of banks' risk assets.

A total of twenty commercial banks operate presently in Nigeria, out of which cluster sample of five was drawn. The banks in no particular order include First Bank Plc., United Bank for Africa Plc., Guaranty Trust Bank Plc., Zenith Bank Plc., and Access Bank Plc. The basis for the selection rests on the fact that these banks have been rated as the topmost five Nigerian banks by Fitch rating and Bankers' magazine as at January 2012 and they account for over fifty percent of deposit liabilities in the Nigerian banking sector. The remainder of the paper is outlined as follows- Section two reviews related literature on the subject matter, section three discusses the methodology, section four focuses on data analysis and interpretation of findings and section five presents the conclusion and recommendations.

LITERATURE REVIEW

A bank exists not only to accept deposits but also to grant credit facilities, therefore inevitably exposed to credit risk. Credit risk is by far the most significant risk faced by banks and the success of their business depends on accurate measurement and efficient management of this risk to a greater extent than any other risks (Gieseche, 2004). According to Chen and Pan (2012), credit risk is the degree of value fluctuations in debt instruments and derivatives due to changes in the underlying credit quality of borrowers and counterparties. Coyle (2000) defines credit risk as losses from the refusal or inability of credit customers to pay what is owed in full and on time. Credit risk is the exposure faced by banks when a borrower (customer) defaults in honouring debt obligations on due date or at maturity. This risk interchangeably called 'counterparty risk' is capable of putting the bank in distress if not adequately managed. Credit risk management maximizes bank's risk adjusted rate of return by maintaining credit risk exposure within acceptable limit in order to provide framework for understanding the impact of credit risk management on banks' profitability (Kargi, 2011). 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.

The main source of credit risk include, limited institutional capacity, inappropriate credit policies, volatile interest rates, poor management, inappropriate laws, low capital and liquidity levels, direct lending, massive licensing of banks, poor loan underwriting, laxity in credit assessment, poor lending practices, government interference and inadequate supervision by the central bank (Kithinji, 2010). 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.

CREDIT RISK MANAGEMENT STRATEGIES

The credit risk management strategies are measures employed by banks to avoid or minimize the adverse effect of credit risk. A sound credit risk management framework is crucial for banks so as to enhance profitability guarantee survival. According to Lindergren (1987), the key principles in credit risk management process are sequenced as follows; establishment of a clear structure, allocation of responsibility, processes have to be prioritized and disciplined, responsibilities should be clearly communicated and accountability assigned. The strategies for hedging credit risk include but not limited to these;

- i. **Credit Derivatives:** This provides banks with an approach which does not require them to adjust their loan portfolio. Credit derivatives provide banks with a new source of fee income and offer banks the opportunity to reduce their regulatory capital (Shao and Yeager, 2007). The commonest type of credit derivative is credit default swap whereby a seller agrees to shift the credit risk of a loan to the protection buyer. Frank Partnoy and David Skeel in *Financial Times* of 17 July, 2006 said that “credit derivatives encourage banks to lend more than they would, at lower rates, to riskier borrowers”. Recent innovations in credit derivatives markets have improved lenders’ abilities to transfer credit risk to other institutions while maintaining relationship with borrowers (Marsh, 2008).
- ii. **Credit Securitization:** It is the transfer of credit risk to a factor or insurance firm and this relieves the bank from monitoring the borrower and fear of the hazardous effect of classified assets. This approach insures the lending activity of banks. The growing popularity of credit risk securitization can be put down to the fact that banks typically use the instrument of securitization to diversify concentrated credit risk exposures and to explore an alternative source of funding by realizing regulatory arbitrage and liquidity improvements when selling securitization transactions (Michalak and Uhde, 2009). A cash collateralized loan obligation is a form of securitization in which assets (bank loans) are removed from a bank’s balance sheet and packaged (tranche) into marketable securities that are sold on to investors via a special purpose vehicle (SPV) (Marsh, 2008).
- iii. **Compliance to Basel Accord:** The Basel Accord are international principles and regulations guiding the operations of banks to ensure soundness and stability. The Accord was introduced in 1988 in Switzerland. Compliance with the Accord means being able to identify, generate, track and report on risk-related data in an integrated manner, with full auditability and transparency and creates the opportunity to improve the risk management processes of banks. The New Basel Capital Accord places explicitly the onus on banks to adopt sound internal credit risk management practices to assess their capital adequacy requirements (Chen and Pan, 2012).
- iv. **Adoption of a sound internal lending policy:** The lending policy guides banks in disbursing loans to customers. Strict adherence to the lending policy is by far the cheapest and easiest method of credit risk management. The lending policy should be in line with the overall bank strategy and the factors considered in designing a lending policy should include; the existing credit policy, industry norms, general economic conditions of the country and the prevailing economic climate (Kithinji, 2010).
- v. **Credit Bureau:** This is an institution which compiles information and sells this information to banks as regards the lending profile of a borrower. The bureau awards credit score called statistical odd to the borrower which makes it easy for banks to make instantaneous lending decision. Example of a credit bureau is the Credit Risk Management System (CRMS) of the Central Bank of Nigeria (CBN).

REVIEW OF RELATED EMPIRICAL LITERATURE

Credit risk is a serious threat to the performance of banks; therefore various researchers have examined the impact of credit risk on banks in varying dimensions.

Kargi (2011) evaluated the impact of credit risk on the profitability of Nigerian banks. Financial ratios as measures of bank performance and credit risk were collected from the annual reports and accounts of sampled banks from 2004-2008 and analyzed using descriptive, correlation and regression techniques. The findings revealed that credit risk management has a significant impact on the profitability of Nigerian banks. It concluded that banks’ profitability is inversely influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress. Epure and Lafuente (2012) examined bank performance in the presence of risk for Costa-Rican banking industry during 1998-2007. The results showed that performance improvements follow regulatory changes and that risk explains differences in banks and non-performing loans negatively affect efficiency and return on assets while the capital adequacy ratio has a positive impact on the net interest margin.

Kithinji (2010) assessed the effect of credit risk management on the profitability of commercial banks in Kenya. Data on the amount of credit, level of non-performing loans and profits were collected for the period 2004 to 2008. The findings revealed that the bulk of the profits of commercial banks are not influenced by the amount of credit and non-performing loans, therefore suggesting that other variables other than credit and non-performing

loans impact on profits. Chen and Pan (2012) examined the credit risk efficiency of 34 Taiwanese commercial banks over the period 2005-2008. Their study used financial ratio to assess the credit risk and was analyzed using Data Envelopment Analysis (DEA). The credit risk parameters were credit risk technical efficiency (CR-TE), credit risk allocative efficiency (CR-AE), and credit risk cost efficiency (CR-CE). The results indicated that only one bank is efficient in all types of efficiencies over the evaluated periods. Overall, the DEA results show relatively low average efficiency levels in CR-TE, CR-AE and CR-CE in 2008.

Felix and Claudine (2008) investigated the relationship between bank performance and credit risk management. It could be inferred from their findings that return on equity (ROE) and return on assets (ROA) both measuring profitability were inversely related to the ratio of non-performing loan to total loan of financial institutions thereby leading to a decline in profitability. Ahmad and Ariff (2007) examined the key determinants of credit risk of commercial banks on emerging economy banking systems compared with the developed economies. The study found that regulation is important for banking systems that offer multi-products and services; management quality is critical in the cases of loan-dominant banks in emerging economies. An increase in loan loss provision is also considered to be a significant determinant of potential credit risk. The study further highlighted that credit risk in emerging economy banks is higher than that in developed economies.

Al-Khouri (2011) assessed the impact of bank's specific risk characteristics, and the overall banking environment on the performance of 43 commercial banks operating in 6 of the Gulf Cooperation Council (GCC) countries over the period 1998-2008. Using fixed effect regression analysis, results showed that credit risk, liquidity risk and capital risk are the major factors that affect bank performance when profitability is measured by return on assets while the only risk that affects profitability when measured by return on equity is liquidity risk. Ben-Naceur and Omran (2008) in attempt to examine the influence of bank regulations, concentration, financial and institutional development on commercial banks' margin and profitability in Middle East and North Africa (MENA) countries from 1989-2005 found that bank capitalization and credit risk have positive and significant impact on banks' net interest margin, cost efficiency and profitability.

Ahmed, Takeda and Shawn (1998) in their study found that loan loss provision has a significant positive influence on non-performing loans. Therefore, an increase in loan loss provision indicates an increase in credit risk and deterioration in the quality of loans consequently affecting bank performance adversely.

METHODOLOGY

The bane of the study is to empirically examine the quantitative effect of credit risk on the performance of banks in Nigeria over the period of 11 years (2000-2010). As earlier stated in section one, 5 banks were chosen from the twenty existing commercial banks. The banks are First bank of Nigeria Plc., United Bank for Africa Plc., Guaranty Trust Bank Plc., Zenith Bank Plc., and Access Bank Plc. Data were sourced from the Annual Reports and Accounts of the banks in the sample. The data include time-series and cross-sectional data, therefore pooled into a panel data set and estimated using Panel Data regression. The justification for banks in the sample include;

- The five banks have being rated the topmost five banks in Nigeria by the Fitch rating and The Banker's magazine of July, 2012 (A publication of Financial Times). These banks have also made the list of the first 25 and 500 banks in Africa and the world respectively.
- The banks under review have been largely homogenous to the extent that their ownership structures are significantly unaffected by the spate of mergers and acquisitions that characterized the revolution in commercial banking in Nigeria since 2004 and 2011.
- The five banks relatively account for over fifty percent of the total deposit liability in the industry. As at December 2011, the total deposit in the industry was about N10.99 trillion, out of which the five selected banks accounted for N6.17 trillion, representing 56.13% of the total deposit.
- In terms of credit score ratings, the banks have moved from stability to the positive credit rating as of the January 2012 rating (Fitch, Standard and Poors, and Agosto and Co.).
- The banks have a large customer base and are active players on the Nigerian Stock Exchange (NSE).

SPECIFICATION OF THE MODEL

The model 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 Asset (ROA) as a function of the ratio of Non-performing loan to loan & Advances (NPL/LA) and ratio of Total loan & Advances to Total deposit (LA/TD) used as indicators of credit risk. However, the study improved on the model by incorporating the ratio of loan loss provision to classified assets (LLP/CL) as a measure for credit risk.

The model for this study functionally becomes;

$$ROA = f(NPL/LA, LLP/CL, LA/TD) \dots \dots \dots (1)$$

Where;

- ROA: Return on Assets
- NPL: Non-Performing Loan
- LA: Loan and Advances
- LLP: Loan loss provision
- CL: Classified Loan
- TD: Total Deposit

The econometric equation for the model is specified as

$$ROA = \beta_0 + \beta_1 \frac{NPL}{LA} + \beta_2 \frac{LLP}{CL} + \beta_3 \frac{LA}{TD} + \mu \dots \dots \dots (2)$$

Where;

- β_0 = Constant parameter/Intercept
- β_1 - β_3 = Coefficients of independent variables
- μ = Error term

The ‘a priori expectation’ in the model is that all the independent variables are expected to have a negative relationship on bank performance measured by Return on Assets (ROA) except loans and advances which is expected to have a positive relationship with bank performance. The mathematical expression is represented as; $\beta_1, \beta_2 < 0$ and $\beta_3 > 0$ implying that a unit increase in the independent variables will lead to decrease in ROA by a unit

The model in equation 2 can be rewritten as follows:

$$ROA = \beta_0 + \beta_1 NPL^* + \beta_2 LLP^* + \beta_3 LA^* + \mu \dots \dots \dots (3)$$

Where

$$NPL^* = \frac{NPL}{LA}$$

$$LLP^* = \frac{LLP}{CL}$$

$$LA^* = \frac{LA}{TD}$$

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 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).

EMPIRICAL RESULTS

Result of the Constant Effect Model:

The major assumption under this model is that all coefficients are constant across time period and individual bank. By interpretation, following the objective of this study, the assumption can be summarized as follows:

1. The period time used by this study (2000-2010) is the period when the global economy witnessed a downward trend in business cycle from recession to depression, popularly called “economic melt-down”. The constant Effect Model thus assumes that all the coefficients in this model remain unchanged across banks during this period of time
2. The time (melt-down) effect is also constant. That is, all the determinants of Bank performance used in our model (NPL, LLP, LA) are not affected by economic melt-down.

The OLS results of the model are given below

Table 1: Constant Effect Model Estimates.

Variables	Coefficient	Standard error	t-statistics	Probability
NPL	-0.0629	0.0105	-5.9487	0.0000
LLP	-0.00645	0.00087	-7.3791	0.0000
LA	0.0956	0.00939	10.1740	0.0000
C	-0.01027	0.0058	-1.7697	0.082

$R^2 = 0.76$, $D.W = 2.87$, $N = 55$, $Prob.(F) = 0.000$
 Source : Authors' Computation

An examination of the results of the panel data in Table 1 shows that all the coefficient are individually statistically significant at both 1% and 5% level of significance and all the slope coefficients have expected negative signs. The R^2 is considerably high (0.76), and significant. The estimated Durbin Watson statistics is relatively high, suggesting that there is no problem of autocorrelation in the data.

The intercept value is negative (not significant). By assumption the intercept value is the same for all the 5 banks. Also, the slope coefficients of the three variables are assumed to be identical for all five banks. Obviously, these are highly restricted assumptions.

This result obviously distorts the true picture of the relationship between bank performance and all the independent variables across the five banks. Even though the R^2 suggests that 78 percent of the total variation in return on asset across the banking firms is explained by joint variations in the five variables, the influence of time variations by business cycle (economic melt-down) is totally omitted by the Constant Effect Model.

1. Result Of The Fixed Effect Model (FEM) – Cross Sectional Specific

One way to take into account the individuality of each company is to let the intercept vary for each company but still assume that the slope coefficients are constant across firms. The term “Fixed Effect “is due to the fact that although the intercept may differ across individuals (that is, the five banks), each individual’s intercept does not vary over time. That is, it is time invariant. This is the major assumption under this model. That is, while the intercept are cross-sectional variant, they are time invariant. The result of the Fixed Effect Model under this assumption is presented in Table 2.

Table 2: Fixed Effect (Cross Sectional Specific) Estimates

Variable	Coefficients	Standard error	t-statistic	Probability
C	-0.010278	0.006049	-1.69892	0.0959
NPL	-0.06293	5931.006	-5.71066	0.0000
LLP	-0.006453	0.000911	-7.08287	0.0000
LA	0.09561	0.00978	9.7674	0.0000

$R^2 = 0.78$ $D.W=2.87$, $Prob (F) =0.0000$, $N=55$
 Source : Authors' Computation

Compare this regression result with Table 1. In Table 2, Coefficients of NPL, LLP, and LA are highly significant as the probability values of the estimated “t” coefficient are extremely small. The intercept values of the five banks are statistically the same as shown below.

$$FBN = UBA = GTB = ZNT = ACS = 6.11E-18$$

This attribute in the intercepts may be due to the unique features of the banking industry in Nigeria, such as operating under the same control and policy of the Central Bank of Nigeria. To test whether the effect of credit risk on bank performance across banks in Nigeria is cross-sectional variant, we use the restricted F test.

$$F = \frac{(0.78 - 0.76) / 3}{(1 - 0.78) / 55} = 1.675$$

Critical value of F at 3, 55 df = 2.76

Clearly the F value of 1.675 (for 3 numerator degree of freedom and 55 denominator degree of freedom) is not significant and we therefore conclude that the restricted regressions of Table 1 Seems to be valid. The effect of credit risk on bank performance measured by the Return on Assets of banks is cross-sectional invariant i.e. it is similar across banks in Nigeria.

The three exogenous variables in Table 2 are ratio of Non-performing loan to loan & Advances (NPL/LA), ratio of Total loan & Advances to Total deposit (LA/TD) and ratio of loan loss provision to classified assets (LLP/CL) used as indicators of credit risk.

From table 2, a 100% increase in non-performing loan reduces profitability (ROA) by about 6.2%; a 100% increase in loan loss provision also reduces profitability by about 0.65% while a 100% increase in total loan and advances increase profitability by about 9.6%. This should be expected as loans and advances generate interest for banks.

CONCLUSION AND RECOMMENDATIONS

The following conclusions are made from the panel data regression analysis of the effect of credit risk on bank performance measured by return on equity.

The effect of credit risk on bank performance measured by the Return on Assets of banks is cross-sectional invariant. That is, nature and managerial pattern of individual firms do not determine the impact. This is revealed by the restricted F – test under the fixed effect analysis.

Loan and Advances ratio (LA) coefficient exerts most significant positive effect on the profitability across the banking firms.

Based on our findings, it is recommended that banks in Nigeria should enhance their capacity in credit analysis and loan administration 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.

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