

The Correlation between Risk Management and Organizational Performance: An Empirical Investigation using Panel Data

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Abstract

The study analyzes risk management and organizational performance in deposit money banks in Nigeria. Two measures of organizational performance concentration are used. The first is the return on assets, while the second is return on equity. Determination of the relationship between risk management and organizational performance is done using panel data regression models. Explanatory variables, such as standard deviation of return on assets, standard deviation of return on revenue, current ratio, quick ratio, equity over total assets, equity over loan ratio, debt over equity and debt over total assets are used. Five hypotheses are tested and overall, organizational performance is positively affected by the risk management mechanisms of the bank and its liquidity policies. However, the relationship between financial leverage, size and age of the bank and financial performance is negative. The study concludes that risk and liquidity management policies are important to high financial performance. However, banks should put in place sound risk management mechanisms and policies to guide their operations. Also, banks should adhere strictly to sound liquidity management practices to guide against lack of liquidity. They should utilize earnings rather than seeking for external financing. Finally, banks should reduce their level of noncurrent assets and invest more in current assets in order to earn more profits from operations.

Keywords: Risk management, organizational performance, deposit money banks, liquidity, financial leverage, size, age, Nigeria

1. Introduction

The history of the entire human society is marked by the exposure to risks of all kinds and the efforts undergone by mankind to deal with the risks. For example, imagine the risks associated with the Soviet space expedition in the 1960s and the American moon landing response. It is interesting to note that risk is a necessary part of human endeavour. Human progress is been made with risks of all sorts. Consider the early expeditions to the Americas and the African continent by European explorers. With the successes recorded from taking risks, more nations are daring into space, for example. US, Russia, Europe, China, India, are the leading nations in space science and exploration. Most of the advances in medicine and science are credited to risk taking.

Risk management has always been a focal point for finance enthusiasts since the beginning of the industrial revolution (Dima and Orzea, 2014). Risk management affects the decision making process and hence corporate governance as well. Recent financial crises point to the need for some forms of risk management strategies for deposit money banks. Financial failure is hardly a new phenomenon, but the rapidity with which organizations get into trouble in recent years is new. For example, Toshiba Chief Executive just resigned over earnings management scandal amounting to \$1.2 billion over a period of 6 years. Microsoft, the software giant recorded \$3.2 billion second quarter loss. Though Apple second quarter profits went up by \$10.5 billion, the market price falls by 7%. The 2008 savings and loans crises in the United States spilled over the world. Five deposit money banks in Nigeria were taken over by the government-owned Asset Management Company (AMCO). This action was taken following the initial ₦400 billion bailout by the Central Bank of Nigeria (CBN) to prevent the collapse of the banking sector. Competition in the banking sector has not help matters. The dog eats dog attitude of banks is typically seen as detrimental to financial system stability (FSS). The basic idea is that when banks compete intensely for deposits, interest rates fall and their franchise value is eroded. Banks have then less to lose from a default and their incentives to take on risk increase. This argument has been very important in shaping banking regulation around the world, for instance in the form of competition, merger and recapitalization policies.

The goal of financial management has been to increase shareholders' return (Santomero, 1997). This has been the long held objective of bank management. The objective often comes at the cost of increasing risk. The relationship between risk and return is well established: the higher the risk, the higher the expected return (Stultz, 1984; Smith, Smithson & Wilford, 1990 & Wee & Lee, 1995). Bank faces various risks such as interest risk, market risk, credit risk, off balance risk, technology and operational risk, foreign exchange risk, country risk, liquidity risk, and insolvency risk (Tandelilin, Kaaro, Mahadwartha, & Supriyatna, 2007). The bank motivation for risk management comes from those risks which can lead to bank failure or poor performance. Issues of risk management in banking sector have greater impact not only on the bank but also on the economic growth and sustainable development. In the process of doing business, it is inevitable that the firm will be faced

with unexpected and very often unpleasant surprises that threaten to undercut or, even worse, to destroy the business. That is the essence of risk and how a firm respond to it will determine whether it will survive and succeed or not. Risk management is a concept that has been used since the beginnings of the human kind, it is an evolving concept. The roots of risk management can be found in corporate insurance industry. The risk has long been studied especially in the last years. It is one of those concepts that do not have a universal definition. Every scholar has a different approach to risk. Gallati (2003) defines risk as a condition in which there exists an exposure to adversity, or a condition in which there exists a possibility of deviation from a desired outcome that is expected or hoped for. Other definitions (Bessis, 2002; Machiraju, 2008; Schroeck, 2002) include the restriction that risk is based on real world events, including a combination of circumstances in the external environment. But unfortunately this definition does not take into consideration the circumstances in the internal environment of the firm.

Risk management of a bank will impact its performance. Risky banks tend to attract only risk taking investors. The relationship of risk and returns has to be managed so that the investors do get the return associated and expected with the risk they are bearing. This leads to the first sets of the study hypotheses:

H₁: Business risk has a positive impact on organizational performance.

H₂: Firm risk has a positive impact on organizational performance.

Liquidity measures the bank ability to meet its short-term obligations using its most liquid assets. That is, liquidity is the ease with which a bank can pay its bills and liabilities over the next year, especially if it must convert its assets into cash in order to do so. Two common ways to measure liquidity are the current ratio and the quick ratio. One of the main issues regarding liquidity management is the tradeoff between the lower profitability of current assets and the financial slack provided from it (Beranek, 1966). According to Assaf Neto (2003), the liquid assets are usually less profitable than the fixed assets. Investments in liquid assets do not generate production or services. According to Eljelly (2004) the management of liquidity becomes even more important during crises periods. Liquidity management is important in good times and it takes further importance in troubled times. Also according to him, the efficient management of the liquidity levels of a firm is of extreme relevance for the firm performance and well being. Ross, Westerfield and Jordan (2000) and Gitman and Zutter (2010) also corroborate this idea, confirming a tradeoff between high amounts of liquidity and maximizing performance. This dilemma would be a consequence of the fact that high values used in current assets tend to generate costs for maintenance, not directly adding value to the firm and thereby generating performance. It is thus a dilemma for managers between liquidity and performance demonstrated by a negative relationship between the two variables. This leads to the third hypothesis of the study as follows:

H₃: Liquidity has a negative impact on organizational performance.

A firm's capital structure refers to the mix of its financial liabilities. As financial capital is an uncertain but critical resource for all firms, suppliers of finance are able to exert control over firms. Debt and equity are the two major classes of capital, with debt holders and equity holders representing the two types of investors in the firm. Each of these is associated with different levels of risk, benefits, and control. It is the way the corporation finances its assets through some combination of equity, debt, or hybrid securities. A firm's capital structure is then a composition or structures of its liabilities (Harris and Raviv, 1991). Leverage is measured as the debt-to-equity ratio; the higher the ratio, the higher the gearing and the greater the risk of insolvency. Repayment capacity method measures the ability to repay debt from both firm and non-firm income. It evaluates the capacity of the business to service additional debt or to invest additional funds after meeting all other cash commitments (Dybvig and Wang, 2002; and Gunasekaran, 2010). This leads to the fourth hypothesis of the study, which states that:

H₄: Leverage has a positive impact on organization performance.

The issues of whether larger firms are superior in performance to smaller firms, or vice-versa, and whether older firms are superior in performance to younger firms, or vice-versa, have generated large amounts of theoretical and empirical research in accounting, finance, economics, management and sociology disciplines. Yet, the theoretical postulates and empirical evidence are equivocal, at best, on the impacts that size and age have on firm-level performance, and it is likely that the true nature of the relationship is very environment-specific, and highly dependent on a number of institutional factors which affect the performance of firms. The hypotheses that derive from theory with respect to the impact of size and age on firms' performance are mediated by the institutional environment that firms face, and it is feasible that the equivocality in the literature arises because institutional issues, which necessarily are country-specific, have not been taken into account. This leads to the final hypothesis of the study, which states that:

H₅: Size and age have positive impact on organization performance.

The remaining part of the study is organized as follows. The following section reviews the literature on the relationship between risk management and organizational performance. Subsequently, the next section discusses the data and methodology undertaken by this study and nature of data collection and data sources. This is followed by the analysis of the results, and lastly, conclusions.

2. Literature Review

Studies on the relationship between risk management and organizational performance of banks mostly have been conceptual in nature, often drawing the theoretical link between good risk management practices and improved bank performance. Schroeck (2002) and Nocco and Stulz (2006) stress the importance of good risks management practices to maximize firms' value. In particular, Nocco and Stulz (2006) suggest that effective enterprise risk management (ERM) have a long-run competitive advantage to the firm (or banks) compared to those that manage and monitor risks individually. It is, therefore suggested that firms should manage risks strategically by viewing all the risks together within a coordinated manner. This is the view shared by this study. In relation to this, Stulz (1996) associates good risk management practices with the elimination of costly lower-tail outcomes by proposing full-cover risk management as compared to selective risk management. The study suggests that prudent risks management is important in reducing the bankruptcy costs. Additionally, there are potential benefits that risk management could also reduce taxes. Several other studies draw the link between good risk management practices with improved financial performances (Smith, 1995; Schroeck, 2002). In particular, these studies propose that prudent risk management practices reduce the volatility in banks' financial performance, namely operating income, earnings, firm's market value, share return and return on equity. Schroeck (2002) proposes that ensuring best practices through prudent risk management result in increased earnings.

Despite the voluminous studies on the link between risk management practices and companies performance, studies providing empirical evidence on the link between risk management practices and bank financial performance, has been limited to the developed economies. Among these studies, Drzik (2005) shows that bank investment in risk management helps to reduce earnings and loss volatility. In the same vein, Pagach and Warr (2007) examine factors that influence the firm level of ERM and finds that the more leveraged the firms are, the more volatile are their earnings. Using the hazard model to examine factors that influence firms' adoptions of the ERM, the study documents firms that are more leveraged, more volatile earnings, and poorer stock performances, are more likely to adopt ERM. In addition, greater CEO option and increasing stock portfolio volatility also increase the likelihood for the adoption of ERM. The study suggests that the ERM is being adopted beyond the basic risk management purpose, with offsetting CEO risk taking incentives and seeking to improve operating performance as other main reasons to adopt ERM.

A different dimension of analyzing the relationship between risk management and financial performance is offered by Angbazo (1997). By testing the influence of risk factors in determining banks' profitability, the study finds that default risk is a determinant of banks' net interest margin (NIM) and the NIM of super-regional banks and regional banks are sensitive to interest rate risk as well as default risk. 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.

Saunders and Schumacher (2000) provide further support to the importance of controlling risks to financial performance. By investigating the determinants of NIM for 614 banks of 6 European countries and US from 1988 to 1995, the study finds that interest rate volatility has a positive significant impact on the banks profitability. Hakim and Neamie (2001) examine the relationship between credit risk and bank's performance of Egypt and Lebanon bank in 1990s. Using data for banks from the two countries over the period 1993-1999, the study estimates a fixed effects model of bank return with varying intercepts and coefficients. The findings show that credit variable is positively related to profitability, while liquidity variable is insignificant across all banks and have no impact on profitability. The study also finds a strong link between capital adequacy and commercial bank return, with high capitalization being the hindrance to return.

Ahmad and Ariff (2007) examine 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.

Ben-Naceur and Omran (2008) 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. Felix and Claudine (2008) investigate 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. Kithinji (2010) assesses 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.

Al-Khouri (2011) assesses the effects of bank 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. Similarly, Kargi (2011) evaluates the impact of credit risk on the profitability of Nigerian banks. Financial ratios as measures of bank performance and credit risk were used. The data collected were from secondary sources mainly the annual reports and accounts of the sampled banks from 2004 to 2008. Descriptive statistics, correlation and regression techniques were used in the analysis. The findings revealed that credit risk management has a significant impact on the profitability of Nigeria banks.

Nimalathasan and Pratheepkanth (2012) identify the impact of systematic risk management on profitability, during 2007 to 2011. In the study, systematic risk management was defined as the degree of financial leverage (DFL) and degree of operating leverage (DOL) as independent variables and profitability (net profit, return on capital employed (ROCE) and return on equity (ROE)] as the dependent variables. In order to select the sample, convenience sampling techniques method was used. The study suitably used both secondary data. Operational hypotheses were formulated, results revealed that systematic risk management has a positive association ($r = 0.755$, $p < 0.05$) with profitability. Further, systematic risk management is enhanced by DFL and DOL in the selected financial institutions. Chen and Pan (2012) examine 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.

Kolapo, Ayeni and Oke (2012) carry 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 banks were selected for the study. 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 and advances (NPL/LA), ratio of total loan and 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 0.65 percent while a 100 percent increase in total loan and advances increase profitability by about 9.6 percent.

Also, Adeusi, Akeke, Adebisi and Oladunjoye (2013) examine the association of risk management practices and bank financial performance in Nigeria. Secondary data sourced was based on a 4 year progressive annual reports and financial statements of 10 banks and a panel data estimation technique adopted. The result implies an inverse relationship between financial performance of banks and doubtful loans, and capital asset ratio was found to be positive and significant. Fredrick (2013) analyses the impact of credit risk management on the financial performance of commercial banks and also attempted to establish if there exists any relationship between the credit risk management determinants by use of CAMEL indicators and financial performance of commercial banks in Kenya. A causal research design was undertaken in this study and this was facilitated by the use of secondary data which was obtained from the Central Bank of Kenya publications on banking sector survey. The study used multiple regression analysis in the analysis of data and the findings have been presented in the form of tables and regression equations. The study found that there is a strong impact between the CAMEL components on the financial performance of commercial banks. The study also established that capital adequacy, asset quality, management efficiency and liquidity have weak relationship with financial performance (ROE) whereas earnings had a strong relationship with financial performance.

Furthermore, Rufai (2013) assesses the efficacy of credit risk management on banks performance. He examines the effects credit risk has on the profitability of the bank. The study examines the relationship between interest income and bad debt of Union Bank of Nigeria Plc. Secondary sources of data were used for the study. Time series and trend analysis are used for the analysis. Correlation coefficient and regression analysis were used in testing the hypotheses. The study concludes that credit risk affects the performance of Union Bank of Nigeria Plc and that to maintain high interest income, attention needs to be given to credit risk management

especially regarding the lending philosophy of the bank.

Ariffin and Kassim (2014) analyse the relationship between risk management practices and financial performance in the Islamic banks in Malaysia. The study assesses the current risk management practices of the Islamic banks and links them with the bank financial performance. The study uses both the primary (survey questionnaires) and secondary data (annual reports). The results of the study shed more lights on the current risk management practices of the Islamic banks in Malaysia. Similarly, Tarraf and Majeske (2014) examine the relationship among corporate governance, risk taking and financial performance at bank holding companies' (BHCs) during the financial crisis of 2008. While the paper did not find a significant relationship between corporate governance and risk-taking level, it shows that BHCs with lower risk performed better than BHCs with higher risk during the crisis. The results suggest that risk taking contributed to the financial crisis.

Soyemi, Ogunleye and Ashogbon (2014) examine risk management practices among deposit money banks in Nigeria with a view to relating these practices to their financial performance in the 2012 financial year. The study uses secondary data gathered through content analysis of the selected banks' annual reports and accounts. Thereafter, these cross sectional data were then analysed using descriptive statistics to depict pattern and robust standard errors OLS regression to estimate significant influence between bank risk management practices (credit, liquidity, operating and capital risk practices) and their financial performance. The findings appear to be largely consistent with previous works as the explanatory variables significantly accounted for variations in financial performance.

Li, Zou and Lions (2014) investigate the relationship between credit risk management and profitability of commercial banks in Europe. In the research model, ROE and ROA are defined as proxies of profitability while NPLR and CAR are defined as proxies of credit risk management. The research collects data from the 47 largest commercial banks in Europe from 2007 to 2012 and formulates four hypotheses which are related to the research question. A series of statistical tests were performed in order to test if relationship exists. Other statistical tests are performed to investigate if the relationship is stable or not. The findings reveal that credit risk management does have positive effects on profitability of commercial banks. Between the two proxies of credit risk management, NPLR has a significant effect on the both ROE and ROA while CAR has an insignificant effect on both ROE and ROA. However, from 2007 to 2012, the relationships between all the proxies are not stable but fluctuating.

Iwedi and Onuegbu (2014) empirically investigate the effect of credit risk and performance of banks in Nigeria over a period of 15 years (1997-2011). Five banks were selected from the twenty-one deposit money banks in Nigeria using judgmental sampling techniques. Data were sourced from the annual reports and accounts of the banks. The data comprise of time- series and cross sectional data which were pooled into a panel data set and estimated using panel data regression techniques. The result shows that there is a positive relationship between ratio of non-performing loans to loan and advances (LogNPL) and banks performance (LogROA). This indicates that banks in the study carry a very minimal level of non-performing loans in their loan portfolio and as such this does not conform to the study priori expectations. While also there exist a positive relationship between Ratio of loan and advances to total deposit (LogLA) and banks performance (LogROA), and this is significant at 1%.

Also, Alshatti (2015) examines the effect of credit risk management on financial performance of Jordanian commercial banks during the period (2005-2013). Thirteen commercial banks were chosen for the study and two models were designed to measure this relationship. The research revealed that credit risk management affects financial performance of the Jordanian commercial banks as measured by ROA and ROE. The research further concludes that the credit risk management indicators considered in this research have a significant effect on financial performance of the Jordanian commercial banks. Similarly, Gizaw, Kebede and Selvaraj (2015) empirically examine the impact of credit risk on the profitability of commercial banks in Ethiopia. Secondary data were collected from 8 sampled commercial banks for a period of 12 years from their annual reports and National Bank of Ethiopia. The data were analysed using descriptive statistics and panel data regression model and the results show that credit risk measures: non-performing loan, loan loss provisions, and capital adequacy have a significant impact on the profitability of commercial banks in Ethiopia.

Uwalomwa, Uwuigbe and Oyewo (2015) assess the effects of credit management on bank performance in Nigeria. The audited corporate annual financial statements of listed banks covering the period 2007-2011 were analyzed. Ten listed banks were selected and analyzed for the study using the purposive sampling method. The study uses descriptive statistics and econometric analysis using the panel linear regression methodology consisting of periodic and cross sectional data in the estimation of the regression equation. Findings from the study revealed that while ratio of non-performing loans and bad debt do have a significant negative effect on the performance of banks in Nigeria, the relationship between secured and unsecured loan ratio and bank performance was not significant.

3. Data and Methodology

The study time horizon is from 2005 to 2014. The fifteen listed deposit money banks in the Nigeria Stock Exchange (NSE) are used. Their annual reports and accounts are the basic source for the data collection. Total sample observation is 150. A panel data study is the most appropriate method to determine the relationship between risk management and organizational performance. Risk management and organizational performance have been the focal point for many studies. The cause of the great number of studies is that organizational performance is at the heart of all corporate governance theories. The models for the current study are:

$$ROA_{i,t} = \alpha + \beta_1 RORV_{i,t} + \beta_2 ROAV_{i,t} + \beta_3 CUR_{i,t} + \beta_4 QUR_{i,t} + \beta_5 ETA_{i,t} + \beta_6 ELR_{i,t} + \beta_7 DER_{i,t} + \beta_8 DTA_{i,t} + \beta_9 TASS_{i,t} + \beta_{10} DEPO_{i,t} + \beta_{11} LOAN_{i,t} + \beta_{12} OWNS_{i,t} + \beta_{13} EMPL_{i,t} + \beta_{14} BODS_{i,t} + \beta_{15} SUBS_{i,t} + \beta_{16} CAPD_{i,t} + \beta_{17} AGE_{i,t} + e_{i,t}$$

$$ROE_{i,t} = \alpha + \beta_1 RORV_{i,t} + \beta_2 ROAV_{i,t} + \beta_3 CUR_{i,t} + \beta_4 QUR_{i,t} + \beta_5 ETA_{i,t} + \beta_6 ELR_{i,t} + \beta_7 DER_{i,t} + \beta_8 DTA_{i,t} + \beta_9 TASS_{i,t} + \beta_{10} DEPO_{i,t} + \beta_{11} LOAN_{i,t} + \beta_{12} OWNS_{i,t} + \beta_{13} EMPL_{i,t} + \beta_{14} BODS_{i,t} + \beta_{15} SUBS_{i,t} + \beta_{16} CAPD_{i,t} + \beta_{17} AGE_{i,t} + e_{i,t}$$

Whereas:

Organizational performance is the dependant variable and is measured by two proxies: return on asset (ROA) and return on equity (ROE). Return on asset is calculated as profit before tax over total assets. Return on Equity (ROE) is calculated as profit before tax over equity. Both ratios are used to measure financial performance of the firm (Yasser, Entebang & Abu-Mansur, 2011 & Mirza & Javed, 2013).

α , β are constants and coefficients respectively.

RORV = standard deviation of bank gross earnings (revenue) over total asset as measure of business risk. The ratio is used by Bhagat and Bolton (2008).

ROAV = standard deviation of return on asset of bank for past five years. The ratio is used by Reddy (2010).

CUR = current ratio as a measure of liquidity risk and is calculated as current asset over current liabilities

QUR = quick ratio as a measure of liquidity risk and is calculated as cash plus near cash securities over current liabilities.

ETA = equity to total assets as a measure of risk associated with leverage and is calculated as equity capital over total assets.

ELR = equity to loan ratio as a measure of risk and is calculated as equity capital over total loans to customers.

DER = debt to equity ratio as a measure of financial risk and is calculated as total liabilities to equity capital.

DTA = debt to total assets as a measure of operating leverage and is calculated as total liabilities over total assets.

TASS = total assets scaled as a measure of bank size.

DEPO = deposits from customers scaled as a measure of bank size.

LOAN = loans to customers scaled as a measure of bank size.

EMPL = number of employees scaled as a measure of bank size

OWNS = ownership structure is a control variable measured by percentage of local holdings.

BODS = board of directors size is a control variable measured by the number of board members

SUBS = number of subsidiaries and associates as a control variable measured by the number of subsidiaries and associate firms the bank has interests.

CAPD = paid up capital is a control variable measured by the proportion of authorized capital paid up.

AGE = age is a control variable measured by the age of the bank

e = error term

i, t are bank and time subscripts

Scales of some variables were used to both models to improve the approach of normal distribution and to minimize the heteroskedasticity problems (Lazarides, Drimpetas & Dimitrios, 2009).

4. Statistical Results

Summary of descriptive statistics results for all the variables as used in the study is presented in table 1. The correlation matrix of the variables is presented in Table 2. The regression models are reported in table 3.

Table 1 Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA	150	.01	.09	.0428	.02783
ROE	150	.04	.52	.2213	.14535
ROAV	150	.14	.41	.3140	.08814
RORV	150	.02	.26	.0460	.05998
CUR	150	.64	1.26	1.0013	.18011
QUR	150	.28	.67	.4173	.12239
LOAN	150	.05	.74	.3400	.23170
ETA	150	.06	.76	.2213	.16261
ELR	150	1.26	2.87	2.0180	.45030
DER	150	1.21	16.03	5.3740	3.65552
DTA	150	.74	.97	.8340	.06905
TASS	150	.13	2.01	.7920	.58133
DEPO	150	.11	1.25	.5320	.39334
EMPL	150	.02	.13	.0453	.03248
OWNS	150	.02	.10	.0760	.02414
BODS	150	.07	.19	.1520	.03167
AGE	150	.02	.05	.0253	.00990
SUBS	150	.03	.23	.1053	.05357
PAID	150	.04	.15	.0860	.03312
Valid N (listwise)	150				

Source: IBM SPSS Statistics 22 Output

From table 1, the mean statistic value of return on asset is 4.28% with a standard deviation of 2.78%. The minimum and maximum mean values are 1% and 9% respectively. Similarly, the average statistic value of return on equity is 22% with a standard deviation of 14.5%. The minimum and maximum mean values are 4% and 52% respectively. The mean statistic value of return on asset deviation is 31.4% with a standard deviation of 8.8%. The minimum and maximum mean values are 14% and 41% respectively. Similarly, the average statistic value of return on revenue deviation is 5% with a standard deviation of 6%. The minimum and maximum mean values are 2% and 26% respectively. The average statistic value of current ratio is 1.001 times with a standard deviation of 0.18 times. The minimum and maximum mean values are 0.64 times and 1.26 times respectively. Similarly, the average statistic value of quick ratio is 0.42 times with a standard deviation of 0.12 times. The minimum and maximum mean values are 0.28 times and 0.67 times respectively.

Also, the mean statistic value of loan is 34% with a standard deviation of 23%. The minimum and maximum mean values are 5% and 74% respectively. Similarly, the average statistic value of equity over total asset is 22% with a standard deviation of 16%. The minimum and maximum mean values are 6% and 76% respectively. The average statistic value of equity to loan ratio is 202% with a standard deviation of 45%. The minimum and maximum mean values are 126% and 287% respectively. Similarly, the average statistic value of debt to equity ratio is 537% with a standard deviation of 365%. The minimum and maximum mean values are 121% and 1603% respectively. The mean statistic value of debt to total asset is 83.4% with a standard deviation of 6.9%. The minimum and maximum mean values are 74% and 97% respectively. Similarly, the average statistic value of total assets is 0.792 with a standard deviation of 0.581. The minimum and maximum mean values are 0.13 and 2.01 respectively.

Furthermore, the average statistic value of deposits from customers is 0.532 with a standard deviation of 0.39. The minimum and maximum mean values are 0.11 and 1.25 respectively. Similarly, the average statistic value of number of employees is 0.045 with a standard deviation of 0.032. The minimum and maximum mean values are 0.02 and 0.13 respectively. The mean statistic value of local ownership structure is 76% with a standard deviation of 24%. The minimum and maximum mean values are 20% and 100% respectively. Also, the average statistic value of size of board of directors is 15 with a standard deviation of 3. The minimum and maximum mean values are 7 and 19 respectively. Similarly, the average statistic value of age is 25 years with a standard deviation of 10 years. The minimum and maximum mean values are 20 years and 50 years respectively. The mean value of number of subsidiaries and associates firms is 11 with a standard deviation of 5. The minimum and maximum mean values are 3 and 23 respectively. Finally, the average statistic value of paid up capital is ₦8.6 billion with a standard deviation of ₦3.3 billion. The minimum and maximum mean values are ₦4 and ₦15 respectively.

Table 2 Correlation Matrix

Variable	Number of observations	Pearson correlation coefficient	Sig. 2-tailed
ROA	150	1.000	
ROE	150	0.812	0.000
ROAV	150	0.835	0.015
RORV	150	0.702	0.047
CUR	150	0.467	0.080
QUR	150	0.418	0.121
LOAN	150	-0.465	0.080
ETA	150	0.065	0.819
ELR	150	-0.240	0.390
DER	150	-0.414	0.125
DTA	150	-0.414	0.125
TASS	150	-0.487	0.066
DEPO	150	-0.500	0.058
EMPL	150	-0.503	0.056
OWNS	150	0.143	0.610
BODS	150	-0.290	0.294
AGE	150	-0.369	0.176
SUBS	150	-0.526	0.044
PAID	150	-0.077	0.785

Source: IBM SPSS Statistics 22 Output

Table 2 shows that the relationship between bank risk management and financial performance is positive. The t-values for both ROAV and RORV are positive (0.835, 0.702). Similarly, the p-values of ROAV and RORV are significant (0.015, 0.047). Hypotheses 1 and 2 are hereby accepted. These results collaborate with a number of studies (Kolapo et al., 2012; Adeusi et al., 2013; Uwalomwa et al., 2015 & Gizaw et al., 2015). Similarly, long-term liquidity management has positive relationship with financial performance. Both the t-values for current ratio and quick ratio are positive (0.467, 0.418). Hypothesis 3 is rejected. This result is in agreement with Vieira (2010) who suggests that in the long run, banks must find balance between liquidity and profitability. The relationship between leverage and financial performance is negative. The t-values of leverage ratios are negative (equity-loan: -0.240; debt-equity: -0.414 & debt-total asset: -0.414). Hypothesis 4 is rejected. These results add to the list of controversial studies on the relationship between financial leverage and financial performance (Margaritis & Psillaki, 2010; Cai & Zhang, 2011; Xu, 2012 & Vithessonthi & Tongurai, 2014).

The older banks are less profitable. The relationship between age and bank performance is negative (t-value = -0.369). This result is in agreement with Majumdar (1997) and Faulkender and Petersen (2006) which suggest that age has a negative impact on productivity and profitability. Similarly, the relationship between bank size and performance is negative. The bigger banks are less profitable. The smaller banks performed better in terms of profitability. The t-values of variables measuring size are negative (loans, -0.465; total assets, -0.487; deposits, -0.500; number of employees, -0.503; board size, -0.290; number of subsidiaries/associates, -0.526 & paid up capital, -0.077). These results are in line with the findings of Mohan and Aggarwal (1990), Jalan (1991), Nayyar (1994), Majumdar (1997), and Faulkender and Petersen (2006). Hypothesis 5 is rejected. However, the relationship between ownership structure and financial performance is positive (t-value = 0.143). This result agrees with the work of Mirza and Javed (2013) which suggests that ownership structure is a major determinant of financial performance.

Table 3 Regression Matrix

Model	R	R ²	ANOVA Mean ²	ANOVA Sum of Squares
ROA	1.000	1.000	0.001	0.012
ROE	1.000	1.000	0.029	0.402

Source: IBM SPSS Statistics 22 Output

Table 3 shows that R and R² for both models (ROA and ROE) are 100% each. R-squared is a statistical measure of how close the data are to the fitted regression line. It is also known as the coefficient of determination, or the coefficient of multiple determination for multiple regression. It is the percentage of the response variable variation that is explained by a linear model. A 0% indicates that the model explains none of the variability of the response data around its mean. 100% indicates that the model explains all the variability of the response data around its mean.

5. Conclusions

This study shows that there is a significant relationship between bank performance and risk management. Better

risk management results in better bank performance. Thus, it is of crucial importance that banks practice prudent risk management and safeguarding the assets of the banks and protect the investors' interests. Although, the relationship between long-term liquidity management and financial performance is positive, it is not statistically significant. This conclusion is compatible with Demsetz and Villalonga (2001) study. The lack of a statistical significant relation depicts the tradeoff relationship between liquidity and profitability. The relationship between financial leverage, size and financial performance is negative. As a policy implication, the study provides important input for the CBN to compel banks to establish enterprise-wide risk management policy. The study will also enable bank managers to allocate resources more efficiently across their business units. The study also contributes in terms of how deposit money banks can better manage risks and evaluate their performance.

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