NEXUS BETWEEN RISK MANAGEMENT IN MARKETING OF FINANCIAL SERVICES AND PERFORMANCE OF COMMERCIAL BANKS IN NIGERIA

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Abstract
This study examined the effect of risk management on the financial performance of deposit money banks in Nigeria. Specifically, the study investigated the effects of credit risk, liquidity risk, market risk, and capital risk on the return on assets (ROA) of deposit money banks in Nigeria. The study was anchored on Modern Portfolio Theory developed by Markowitz (1952), which emphasizes risk diversification and the optimization of risk-return trade-offs. An ex-post facto research design was adopted, and secondary data covering the period 2000–2023 were obtained from the Central Bank of Nigeria Statistical Bulletin and Nigeria Deposit Insurance Corporation reports. Data were analysed using descriptive statistics and Ordinary Least Squares (OLS) regression techniques. The findings revealed that credit risk exerted a positive but statistically insignificant effect on return on assets. Liquidity risk had a negative and insignificant effect on return on assets. Market risk showed a positive but insignificant effect on return on assets. However, capital risk exhibited a positive and statistically significant effect on return on assets. The study concluded that effective risk management remains a critical determinant of bank performance, with capital adequacy playing the most influential role in enhancing profitability. The study recommends that deposit money banks should strengthen their credit appraisal systems, improve liquidity management frameworks, enhance market risk monitoring mechanisms, and maintain adequate capital buffers in compliance with regulatory requirements to improve financial performance and ensure long-term stability.

Introduction

Commercial banks are financial institutions characterized by risk-taking. Banks typically fulfill an intermediation role by receiving deposits from savers and extending loans to borrowers, thereby exposing themselves to numerous risks that directly and indirectly affect their financial performance (Bavoso, 2022). The global financial system hinges on effective and efficient risk management by financial institutions, especially the banking industry, as they serve as vital intermediaries in fostering economic development and growth. Banks are critical to economic growth since the banking sector influences most economies (Mendoza & Rivera, 2017). Rather than avoiding risk, banking is fundamentally a business of accepting and managing risk (Hull, 2018). Jasevičiene (2012) affirms that accepting and managing risk is the cornerstone of banking operations. Risk refers to uncertainty regarding future outcomes, and in every business venture, including banking transactions, a certain degree of risk is inevitable.

Because banks operate in uncertain financial environments, they are exposed to risks arising from operational failures, inadequate systems, and weak internal processes. Therefore, management must adopt measures to minimize unacceptable risks to ensure sustainability and profitability (Walker *et al*., 2002). Wherever there is risk, risk management becomes essential. Risk management encompasses the identification, assessment, prioritization, and coordinated application of resources to minimize, monitor, and control the probability and impact of adverse events (Nwude & Okeke, 2018).

Adequately managed risk enhances the stability of banks, while poorly managed risk threatens institutional survival and may lead to insolvency. Conversely, risk, if properly managed, can create opportunities that enhance financial performance. Risk disclosure is also essential for transparency and accountability, as it provides stakeholders with information about banks' risk exposures, strengthens investor confidence, and ensures regulatory compliance (Oladele & Akinwumi, 2024). In Nigeria's developing economy, risk management in the banking sector is indispensable for maintaining investor confidence. Ghenimi *et al*. (2017) affirm that liquidity and credit risks are among the most significant risks faced by banks due to their direct influence on performance and stability. Regulators, investors, and customers are more likely to trust institutions that demonstrate strong risk-management frameworks (Adeniran *et al*., 2024).

Credit risk is a major concern that can lead to financial instability and inefficiency, thereby threatening organizational continuity (Omobolade *et al*., 2020). It is reflected in the proportion of non-performing loans relative to total loans. Credit risk management is therefore central to banking operations due to its role in sustaining profitability and financial stability (Addy *et al*., 2024). Credit risk refers to the possibility that a borrower may fail to meet contractual obligations (Incekara & Çetinkaya, 2019; Jorion, 2009).

Liquidity risk arises when a bank is unable to meet its short-term obligations without incurring significant losses. Poor liquidity management can lead to regulatory sanctions, reputational damage, or insolvency, while effective liquidity management enhances resilience and profitability.

In addition, banks are exposed to market risk, which arises from fluctuations in interest rates, exchange rates, and asset prices. Operational risk also remains significant, arising from internal process failures, human error, system breakdowns, or external events such as fraud. In Nigeria,

operational risk is frequently associated with fraud and forgeries (Adepoju & Alhassan, 2010). Ogunleye (2001) observed that ignorance and neglect of regulatory guidelines by bank management contribute significantly to risk exposure. Some managers fail to comply with risk mitigation standards, thereby increasing institutional vulnerability.

Risk management practices, including credit and liquidity risk disclosure, enhance transparency and strengthen stakeholder confidence. Such disclosures are essential for effective governance, particularly in Nigeria's volatile economic environment. Accordingly, effective risk management is vital for sustaining bank performance and ensuring long-term financial stability. Therefore, this study investigates credit risk, liquidity risk, market risk, and capital risk in relation to the performance of deposit money banks in Nigeria.

Risk Management Practices in Banking System

Risk management in banking has evolved significantly over the past several decades, driven by regulatory requirements, technological advancements, and lessons learned from global financial crises. The Basel Committee on Banking Supervision has played a central role in shaping international standards for banking risk management through the Basel I, Basel II, and Basel III frameworks, which provide comprehensive guidelines for capital adequacy, liquidity management, and risk assessment (Basel Committee on Banking Supervision, 2017).

Credit risk, defined as the potential loss arising from a borrower's failure to repay a loan or meet contractual obligations, remains the most significant risk faced by banks (Bessis, 2015). Effective credit risk management involves the development of sound credit policies, rigorous credit appraisal, appropriate pricing of credit products, and continuous monitoring of credit exposures. Empirical studies in Nigeria have consistently shown the importance of credit risk management on bank performance. Kargi (2011) found that credit risk management significantly influences the profitability of Nigerian banks, while Kolapo *et al*. (2012) reported that poor credit risk management negatively affects commercial bank performance.

Market risk refers to the possibility of loss arising from changes in market variables such as interest rates, exchange rates, equity prices, and commodity prices. Banks are exposed to market risk through trading activities, investment portfolios, and foreign exchange positions (Hull, 2018).

Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people, systems, or external events (Basel Committee on Banking Supervision, 2006). In the Nigerian banking environment, operational risk is strongly associated with fraud, cybercrime, system failure, and regulatory non-compliance.

Liquidity risk refers to the inability of a bank to meet its financial obligations as they fall due without incurring unacceptable losses. Effective liquidity management requires maintaining sufficient liquid assets, diversified funding sources, and stress testing of cash flow positions (Drehmann & Nikolaou, 2013).

Modern Portfolio Theory and Risk Management

Modern Portfolio Theory (MPT), developed by Markowitz (1952), provides the theoretical foundation for understanding risk-return trade-offs in financial decision-making. The theory proposes that investors can construct portfolios that maximize expected return for a given level of risk or minimize risk for a given level of return. In the banking context, MPT explains how banks manage loan portfolios and investment assets in order to optimize returns while minimizing exposure to risk (Elton *et al*., 2019). The central assumption is that risk can be reduced through diversification. Applying MPT to banking implies that financial institutions should diversify their risk exposure across sectors, geographic regions, and customer categories to reduce overall portfolio volatility. In Nigeria, this principle is especially relevant because banks are exposed to highly diversified but volatile sectors such as oil and gas, agriculture, and manufacturing (Okafor *et al*., 2020). However, while MPT is useful, it has limitations in banking environments where risks are not always fully diversifiable, especially systemic risks such as economic shocks and regulatory instability.

Methods

The study adopted an ex-post facto research design because it relied on historical financial data and did not involve manipulation of any variables. The study focused on deposit money banks operating in Nigeria, with data covering the period from 2000 to 2023. Data for the study were obtained from secondary sources, specifically the Central Bank of Nigeria Statistical Bulletin (2023) and reports of the Nigerian Deposit Insurance Corporation. The dependent variable of the study was return on assets, while the independent variables comprised credit risk, liquidity risk, market risk, and capital risk. The functional relationship between the variables was specified such that return on assets

is expressed as a function of the selected risk management indicators. This relationship was further expressed in an econometric form as $ROA_t = \beta_0 + \beta_1 CR_t + \beta_2 LR_t + \beta_3 MR_t + \beta_4 CAPR_t + \mu_t$, where β_0 represents the intercept term, β_1 to β_4 represent the coefficients of the explanatory variables, and μ_t represents the stochastic error term capturing other unobserved factors affecting bank performance. The Ordinary Least Squares regression technique was employed in estimating the model because it provides Best Linear Unbiased Estimates under the classical assumptions of regression analysis. Prior to estimation, diagnostic tests were conducted to ensure the validity and reliability of the model. These included the Breusch-Godfrey Serial Correlation test to check for autocorrelation, the Breusch-Pagan-Godfrey test to examine heteroskedasticity, the Jarque-Bera test to assess normality of residuals, and the CUSUM and CUSUM of squares tests to determine the stability of the model over time. These diagnostic procedures were necessary to confirm that the regression estimates were robust and suitable for inference and policy interpretation.

Data Presentation and analysis

The research examined the effect of risk management on the performance of deposit money banks in Nigeria from 2000 - 2023.The data for the study was collected from Central Bank of Nigeria Statistical bulletin (2023) and Nigerian Deposit Insurance Corporation (NDIC) reports. Table 1 shows the data for Return on Assets of bank (ROA), Credit Risk (CR), Liquidity Risk (LR), Market Risk (MR) and Capital Risk (CAPR).

Table 1: ROA, CR, LR, CAPR and MR from 2000 to 2023

Year	*Return on Assets %*	*Credit Risk* ₦' Million)	*Liquidity Risk %*	*Capital Risk %*	*Market Risk %*
2000	3.96	21.5	32.38	17.52	10.16
2001	4.86	16.5	55.55	17.68	9.63
2002	2.63	21.27	69.15	17.75	8.07
2003	2	21.59	47.4	14.78	6.94
2004	2.58	23.08	50.44	13.16	3.2
2005	0.75	20.13	61.11	20.78	−1.01
2006	0.59	7.92	62.19	22.57	−2.65
2007	5.92	8.3	61.98	20.94	−2.19

2008	3.94	6.25	44.17	21.91	−5.77
2009	-9.28	32.8	44.45	0.24	25.56
2010	3.91	15.04	51.77	4.06	0.95
2011	0.04	4.95	69.29	17.71	2.37
2012	2.62	3.51	68.01	18.07	2.37
2013	2.15	3.2	50.63	17.18	−0.12
2014	2.29	2.81	53.65	15.92	0.79
2015	2.18	4.88	48.63	17.66	21.91
2016	1.48	12.8	43.93	14.78	31.15
2017	0.48	14.84	45.56	10.23	20.63
2018	0.88	11.7	51.87	15.26	0.09
2019	2.3	6.06	45.45	14.54	0.27
2020	0.02	6.13	44.44	15.05	16.91
2021	1.4	4.94	41.33	14.53	11.55
2022	1.9	4.21	44.12	13.76	6.43
2023	3.15	4.07	43.98	13.13	51.47

Source: *CBN Statistical bulletin and NDIC 2023*

Descriptive Statistics Summary of Data

The descriptive statistics in table 2 revealed that the return on assets of deposit money banks in Nigeria averaged 1.78% with wide fluctuations (std. dev. 2.79), ranging from a minimum of –9.28% in 2009 during the financial crisis to a maximum of 5.92% in 2007, reflecting unstable profitability over the years. Credit risk averaged ₦11.60 million with noticeable variability (std. dev. 8.25), peaking at ₦32.8 million in 2009 and dropping as low as ₦2.81 million in 2014. Liquidity risk was relatively high, averaging 51.31% (std. dev. 9.62), with a minimum of 32.38% in 2000 and a maximum of 69.29% in 2011, suggesting banks generally maintained strong liquidity buffers. Capital risk averaged 15.38% (std. dev. 5.07), ranging from as low as 0.24% in 2009, which indicates severe stress, to as high as 22.57% in 2006, showing stronger solvency. Market risk recorded the greatest

volatility with a mean of 9.11% and standard deviation of 13.23, ranging from –5.77% in 2008 to 51.47% in 2023, reflecting heightened exposure to market fluctuations in recent years.

Table 2: Descriptive Statistics Summary of Data

	ROA	CR	LR	CAPR	MR
Mean	1.547368	12.24632	50.07368	13.99105	12.12895
Median	2.180000	11.70000	47.40000	14.78000	8.070000
Maximum	4.860000	32.80000	69.29000	18.07000	51.47000
Minimum	-9.280000	2.810000	32.38000	0.240000	0.090000
Std. Dev.	2.921462	8.694756	9.769835	4.688985	13.28398
Skewness	-2.759042	0.711813	0.770140	-1.830589	1.524246
Kurtosis	11.23178	2.546183	3.116727	5.688380	5.034362
Jarque-Bera	77.75075	1.767524	1.888984	16.33337	10.63361
Probability	0.000000	0.413226	0.388877	0.000284	0.004908
Sum	29.40000	232.6800	951.4000	265.8300	230.4500
Sum Sq. Dev.	153.6290	1360.778	1718.094	395.7584	3176.354
Observations	19	19	19	19	19

Source: *Data output via E-views 12 .0*

Diagnostic Test Result

Test for Serial Correlation – Breusch-Godfrey (BG) Tests

The Breusch-Godfrey (BG) Serial Correlation test is used to check for the presence of autocorrelation in the residuals of a regression model beyond the first order. The hypotheses for the test are: H_0: there is no serial correlation in the residuals**,** and H_1: there is serial correlation in the residuals**.**

Table 3: Breusch-Godfrey Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.095890	Prob. F(2,10)	0.3712
Obs*R-squared	3.235953	Prob. Chi-Square(2)	0.1983

Source: *Author's E-view 12*

From Table 3, the F-statistic (1.095890) with a probability value of 0.3712, and the Obs*R-squared statistic (3.235953) with a probability value of 0.1983, are both greater than the 5% significance level. This indicates that the null hypothesis of no serial correlation cannot be rejected. Therefore, the result suggests that the regression model is free from serial correlation, meaning the residuals are independently distributed and the estimates from the model are reliable for statistical inference.

Normality Test

The normality test is used to determine whether the residuals of a regression model are normally distributed, which is an important assumption for valid statistical inference. It helps to check if the error terms follow a bell-shaped distribution, ensuring that hypothesis tests like t-tests and F-tests are reliable. Common methods for testing normality include the Jarque-Bera test, Shapiro-Wilk test, and visual inspection through histograms or bar charts.

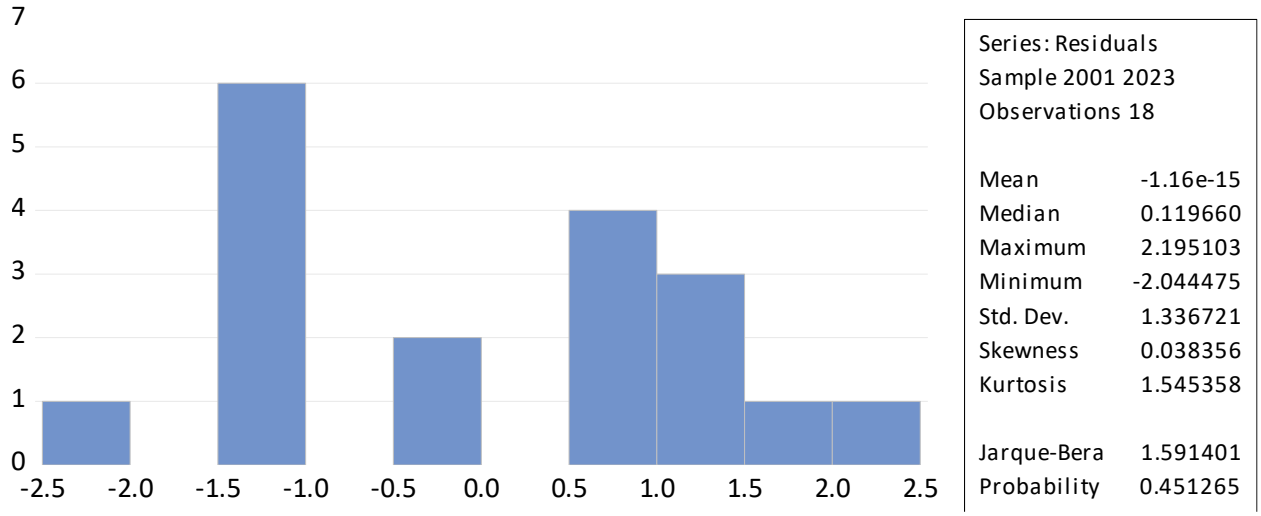

Fig 1 Normality test

From the bar chart of the normality test, the residuals appear to follow a distribution close to normal, as indicated by the symmetric shape around the mean and the alignment with the expected normal curve. Furthermore, the probability value of the normality test (if greater than 0.05) suggests that we fail to reject the null hypothesis of normality, meaning the residuals are normally distributed. This validates the regression model's assumption of normality, indicating that the results obtained from the model are statistically reliable for interpretation and policy recommendations.

Test for Heteroskedasticity

The heteroskedasticity test is used to determine whether the variance of the error terms in a regression model is constant (homoskedasticity) or varies across observations (heteroskedasticity). The null hypothesis (H_0) states that there is homoskedasticity (constant variance), while the alternative hypothesis (H_1) states that heteroskedasticity exists (non-constant variance). The Breusch-Pagan-Godfrey test is one of the common methods used to check this assumption.

Table 4: Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.237472	Prob. F(9,7)	0.9383
Obs*R-squared	1.620676	Prob. Chi-Square (5)	0.8987

Source: *Author's E-view 12*

The results from Table 4 show an F-statistic probability of 0.9383 and a Chi-Square probability of 0.8987, both of which are greater than the 0.05 significance level. This means we fail to reject the null hypothesis (H_0) of homoskedasticity, indicating that the residuals of the regression model have constant variance. Therefore, the model does not suffer from heteroskedasticity, making its estimates efficient and reliable for policy and decision-making purposes.

Stability Text

The stability test results are shown in figure 2 and 3. The CUSUM and CUSUM square test is the tests used to check stability within the model. The results of stability test show evidence that the model is stable. This is indicated by a movement of blue lines located within the critical lines (two-red dotted lines) in the figures. Therefore, at 5% level of significance, the CUSUM stability tests confirm good performance of the model.

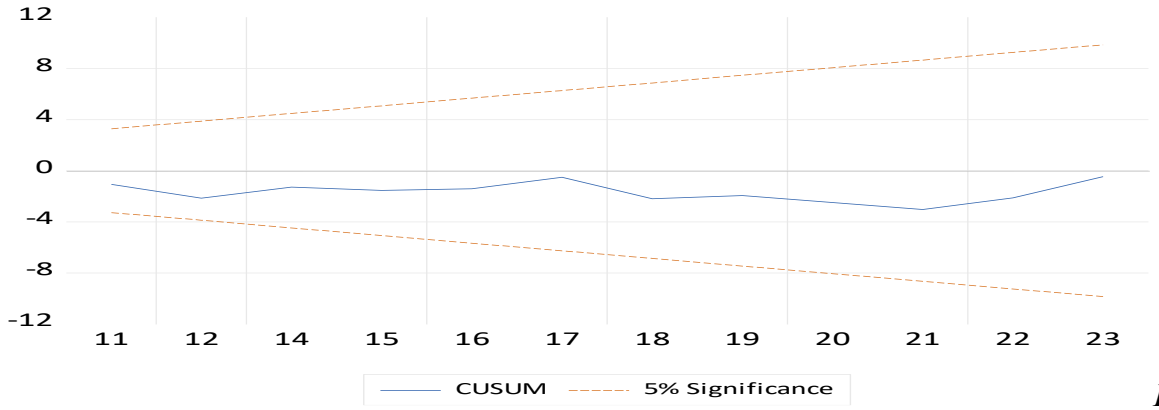

Fig. 2: *CUSUM Text*

Source: *E-views 12.0 version data output*

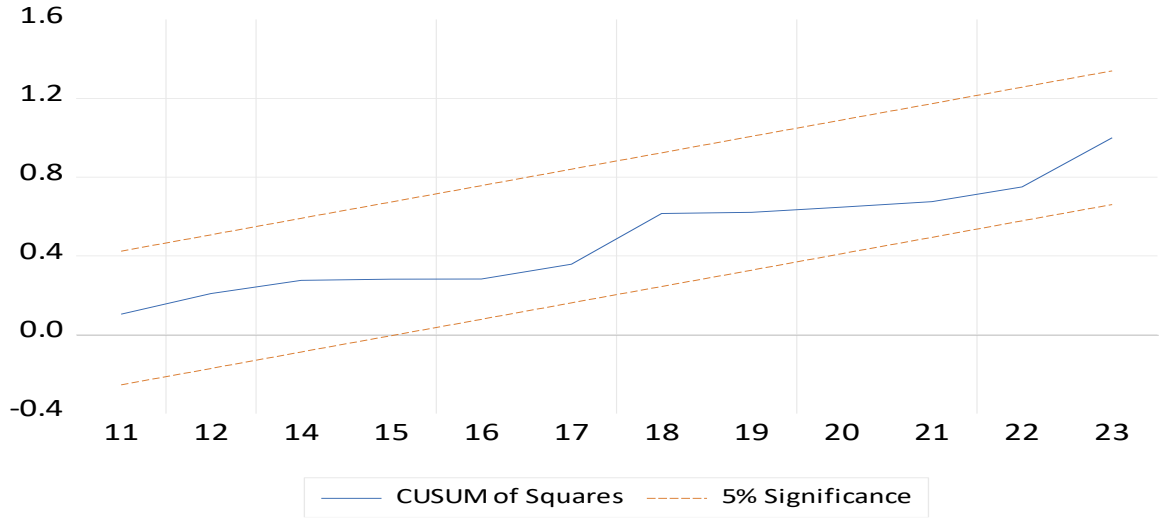

Fig. 3: *CUSUM Squares Text*

Source: *E-views 12.0 version data output*

Test of Hypotheses

Restatement of Hypotheses

H_{o1}: Credit risk has no significant effect on the return on assets of deposit money banks in Nigeria.

H_{o2}: Liquidity risk has no significant effect on the return on assets of deposit money banks in Nigeria.

H_{o3}: Market risk has no significant effect on the return on assets of deposit money banks in Nigeria.

H_{o4}: Capital risk has no significant effect on the return on assets of deposit money banks in Nigeria.

Table 5 Ordinary Least Square

Dependent Variable: ROA
Method: Least Squares
Date: 08/24/25 Time: 18:32
Sample (adjusted): 2001 2023
Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA(-1)	-0.890156	0.187268	-4.753370	0.0005
CR	0.127979	0.068572	1.866326	0.0866
LR	-0.029377	0.053416	-0.549960	0.5924
CAPR	0.790435	0.150395	5.255742	0.0002
MR	0.043933	0.035397	1.241151	0.2383
C	-8.687825	3.293390	-2.637958	0.0217
R-squared	0.794040	Mean dependent var		1.413333
Adjusted R-squared	0.708223	S.D. dependent var		2.945433

S.E. of regression	1.591016	Akaike info criterion	4.027824
Sum squared resid	30.37598	Schwarz criterion	4.324615
Log likelihood	-30.25042	Hannan-Quinn criter.	4.068748
F-statistic	9.252744	Durbin-Watson stat	1.972545
Prob(F-statistic)	0.000837		

Source: *Author's E-view 12*

Model Assessment

The model statistics reveal that the explanatory variables—credit risk, liquidity risk and capital risk, market risk—collectively explain a substantial proportion of the variation in return on assets (ROA), as shown by the R-squared value of 0.7940 and the adjusted R-squared of 0.7082, indicating strong explanatory power and robustness even after adjusting for sample size. The Durbin-Watson statistic of 1.97 suggests the absence of serial correlation in the residuals, strengthening the reliability of the model. Furthermore, the F-statistic of 9.2527 with a probability value of 0.000837 ($p < 0.05$) confirms that the model is statistically significant, demonstrating that the independent variables jointly exert a meaningful impact on the profitability of deposit money banks in Nigeria.

The coefficient of the constant (C) is -8.6878 with a probability value of 0.0217 (< 0.05), indicating that when all independent variables are held at zero, ROA takes a negative value. Ideally, the constant serves as the baseline effect, and in this case, its significance implies weak performance in the absence of the explanatory factors.

Summary of Findings

The findings from the specific objectives of this study are as follows:

- Credit risk has positive and insignificant effect on the return on assets of deposit money banks in Nigeria.
- Liquidity risk has negative and insignificant effect on the return on assets of deposit money banks in Nigeria.
- Market risk has positive and no significant effect on the return on assets of deposit money banks in Nigeria.
- Capital risk has a positive and significant effect on the return on assets of deposit money banks in Nigeria.

Recommendations

- Strengthening Credit Risk Management: Deposit money banks should strengthen their credit appraisal systems by adopting advanced credit scoring models, proper borrower risk profiling, and effective post-disbursement monitoring units to ensure that loans granted are efficiently utilized and repaid. They should also diversify their loan portfolios across various sectors to minimize exposure to sector-specific shocks.
- Improving Liquidity Management: Banks should improve their liquidity management practices by implementing reliable liquidity forecasting models to anticipate shortfalls and surpluses. They should also increase investment in liquid but income-yielding assets such as treasury bills and government bonds, while strengthening contingency funding plans and diversifying funding sources beyond customer deposits.
- Enhancing Market Risk Management: Market risk management should be enhanced by employing robust hedging strategies such as derivatives (swaps, futures, and options) to mitigate interest rate and foreign exchange exposures. Banks should also establish real-time monitoring frameworks to anticipate shocks, adjust their asset holdings accordingly, and train risk managers on advanced techniques to improve decision-making.
- Prioritizing Capital Risk Management: Capital risk management should remain a top priority by ensuring compliance with Basel III capital adequacy requirements and Central Bank of Nigeria regulations. Banks should retain a greater proportion of earnings to strengthen equity, and also explore innovative capital-raising mechanisms such as rights issues, subordinated debt instruments, or hybrid capital securities to maintain a strong capital base.

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