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OPERATIONAL RISK AND VALUE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

This study examined the effect of operational risk on value of listed deposit money banks in Nigeria. Using panel data from thirteen sampled deposit money banks listed on the Nigerian Exchange Group over the period 2007-2023, the study investigated how operational risk factors influence firm value as measured by Tobin's Q. Operational risk was measured using three variables: cost-income ratio (CIR), operating cost ratio (OPR), and net interest margin to operating cost ratio (NOR). The study employed an ex-post facto research design, and data were analyzed using Two-Stage Least Square (2SLS) regression analysis to address potential endogeneity issues. Findings revealed that cost-income ratio had a significant negative effect on firm value, indicating that operational inefficiencies reduce market valuation of banks. Operating cost ratio also demonstrated a significant negative relationship with firm value, suggesting that higher operating costs relative to total assets diminish shareholders' value. Conversely, net interest margin to operating cost ratio showed a positive and significant effect on firm value, indicating that banks with higher net interest income relative to operating expenses enjoy higher market valuations. These findings underscore the importance of operational efficiency in enhancing the value of deposit money banks in Nigeria. The study recommends that bank managers should implement robust operational risk management frameworks, streamline cost structures, and enhance operational efficiency to improve firm value and maximize shareholder wealth.

Keywords: Operational Risk, Firm Value, Cost-Income Ratio, Operating Cost Ratio, Nigerian Banking Sector, Tobin's Q.

Introduction

In the wake of the global financial crisis of 2008, the importance of assessing and managing risks in financial markets became evident. The crisis highlighted how systemic risk factors could have far-reaching implications for individual firms and the broader economy. Researchers, policymakers, and practitioners started focusing on the need to integrate risk assessment into valuation models to provide a more accurate picture of a firm's intrinsic worth. This led to an increased interest in exploring the relationship between risk factors and firm value across different markets and industries (Sani et al. 2022; Adegbite & Dada, 2018).

Within the African context, economic and market conditions can significantly vary from those in more developed regions. Africa has experienced periods of economic growth and structural transformation, but it also faces unique challenges such as political instability, infrastructure deficits,

and currency fluctuations. These factors can create substantial risks for businesses operating in the region, which in turn can impact their valuation. Researchers have been interested in examining how African firms manage and price these risks, as well as how investors perceive and incorporate risk factors into their valuation decisions.

The banking sector in Nigeria plays a vital role in economic advancement and development (Sani et al. 2022; James, 2020). As financial intermediaries in the country, the industry improves the mobilization of financial resources from where it is surplus to deficit units, thereby ensuring the efficient allocation, positioning, and utilization of funds (Paulinus & Jones, 2017). In order to perform these functions on a sustainable basis, the banks need a robust and sound corporate risk management system to continuously improve their value (Umar et al., 2022; Zahid & Saeed, 2016).

Operational risk is particularly significant in the banking sector due to the industry's increasing complexity, technological advancements, and regulatory demands (Sani et al. 2022). Operational risk refers to the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events (Basel Committee on Banking Supervision, 2011). It encompasses a wide range of risks including fraud, systems failures, business disruption, improper business practices, and damage to physical assets (Chukwunulu, 2018). The Basel Committee on Banking Supervision has recognized operational risk as a distinct risk category alongside credit and market risks, highlighting its importance in the overall risk profile of financial institutions.

In Nigeria, operational risk has become a growing concern for deposit money banks. The recent currency crisis resulting from the change of currency notes that forced bank customers into using electronic transfer platforms exposed operational deficiencies of the banks, as evidenced by many failed electronic transfers. Additionally, cases of fraud, cyber-attacks, and system glitches have been reported in the Nigerian banking industry, which have implications for the industry's operational risk exposure and firm value. In 2019, for instance, Nigeria's Access Bank Plc reported a case of a fraudster who used a cloned certificate of occupancy to secure a loan of N3 billion ($7.3 million) from the bank. Such incidents highlight the Nigerian banking industry's operational risk exposure, which could lead to financial losses and reputational damage for banks, potentially impacting their firm value.

Furthermore, the Nigerian banking industry's exposure to operational risk has an effect on the industry's compliance with regulatory requirements and international best practices. The Basel Committee on Banking Supervision requires banks to maintain adequate operational risk management practices to ensure the industry's stability and protect consumers' interests (Basel Committee on Banking Supervision, 2011). Failure to comply with these requirements could lead to regulatory sanctions and reputational damage for banks, negatively impacting their firm value.

Despite the theoretical arguments suggesting a relationship between operational risk and firm value, empirical evidence on this relationship in the context of Nigerian banks remains scarce and inconclusive. Some studies have found a negative relationship between operational risk and firm value (Olalere et al., 2021; Dippos & Yvonne, 2019), while others have reported mixed results (Allen et al., 2020; Fadum & Oye, 2020). These varied findings highlight the need for further investigation to better understand how operational risk affects the value of deposit money banks in Nigeria.

This study aims to address this gap by examining the effect of operational risk on the value of listed deposit money banks in Nigeria. Specifically, the study investigates how different components of operational risk such as: cost-income ratio, operating cost ratio, and net interest margin to operating cost ratio affect the market valuation of these banks. Understanding this relationship is crucial for bank managers, investors, regulators, and other stakeholders in making informed decisions regarding risk management and value creation in the banking sector.

To achieve this objective, the following hypotheses were formulated:

H_{01}: Cost-income ratio has no significant effect on the value of deposit money banks in Nigeria.

H_{02}: Operating cost ratio has no significant effect on the value of deposit money banks in Nigeria.

H_{03}: Net interest margin to operating cost ratio has no significant effect on the value of deposit money banks in Nigeria.

Conceptual Framework

Firm Value

Firm value refers to the overall worth of a company, reflecting the present value of all future cash flows that the firm is expected to generate. It represents the amount that investors are willing to pay to acquire the company and its assets. (Umar et al., 2022). Firm value is an important indicator of a company's financial health, and it is affected by various factors, such as the company's profitability, growth prospects, risk level, and financial structure. Firm value is the present value of expected cash flows and discounted returns that reflect both the risk and the funding used (Aprilia, 2018).

The term firm value is viewed as the worth a company is valued and thereby rendering a viable economic concept. The value of any firm attracts the attention of many parties who are the stakeholders of the company. It is of great interest not only to the shareholders alone but also to the employees, suppliers, customers, government, society, and the wider stakeholder category of such firms. Firm value is viewed as the total worth of the firm's assets acquired through its operations as at a given period. The current business environment is witnessing various measures by corporations geared towards value maximization through the diversification of products and markets to ensure that

the market value of such firms is continuously growing to remain sustainable even unto the foreseeable future (Gichobi, 2019).

Firm value can be interpreted as a market value because it relates to the interests of management as a manager for the welfare of shareholders. The company value can be optimal if operational management is carried out optimally. Firm value can be measured through the Market to Book Ratio (Cordeiro & André, 2018). The risk factor approach assumes that risks can be obtained from systematic management and risks that are not covered by CAPM.

Firm value is important for various stakeholders, including investors, creditors, and management, as it provides an indication of the company's growth prospects and ability to generate profits in the future. A higher firm value may enable the company to access capital more easily and negotiate better terms with suppliers and customers, while a lower firm value may indicate that the company is facing financial challenges and may have difficulty accessing capital or attracting investors (Aprilia, 2018). Overall, firm value is an essential metric that reflects the financial health and potential of a company, and it is influenced by various internal and external factors that must be carefully considered by investors, creditors, and management (Damodaran, 2012).

Operational Risk

Operational risk refers to the risk of loss resulting from inadequate or failed internal processes, systems, human error, or external vents, that affect the operations of an organization (Umar et al., 2022. It is the risk of financial loss, reputational damage, or other negative consequences resulting from deficiencies or failures in an organization's operations, including its people, processes, and technology (BCBS, 2011). Jarrow (2008) observed that operational risk is of two types. The first type is related to risk of loss caused by the operating system of a company (i.e., investment or transaction failure) either caused by legal considerations or caused by an error in production (or in the back office). The second type is related to the risk of a loss caused by incentives, which include both mismanagement and fraud; this represents an agency cost that occurs because of the separation of a company’s management and ownership. These two types of operational risk losses transpire with recurrent regularity, and they might be minor or disastrous (Jarrow, 2008). Therefore, managing operational risk encompasses an array of approaches and methods that fundamentally work for two purposes, which are prevention of catastrophic losses and reducing average losses (Chapelle & Crama, 2008). Unlike credit and market risks, operational risks are usually not willingly incurred nor are they revenue driven and are notoriously difficult to pin down and to quantify or measure reliably (Soyemi, 2014).

The Basel Committee of Banking Supervision defines operational risk as the risk of loss resulting from inadequate or failed internal processes, people, and systems or external events (BIS, 2006). According to BCBS (2017), operational risks result from failed procedures, systems, or policies such as employee errors, systems failures, fraud, or other criminal activity and any event that disrupts business processes. This definition includes legal risk but excludes strategic and reputational risk. The explanation focused on four operational risk event causes, which are external events, systems, processes, and people. This definition includes legal risk which is the loss that arises from events such as internal and external fraud, employment practices and workplace safety of clients, products and business practices, damage to physical assets, business disruption and system failures, and execution, delivery, and process management (Muriithi & Gitau, 2017). These events may cause operational losses that are associated with weaknesses of internal controls or failure to comply with existing internal procedures. Hence operational losses are the cost to the bank that is generated by operational risk. If the operational risk is not addressed systematically, it can result in inconsistent performance and earnings for the stakeholders (BCBS, 2014). Thus, operational risk exposures threaten the financial stability and performance of the banking sector. Operational risk is, nonetheless, manageable as to keep losses within some level of risk tolerance (i.e., the amount of risk one is prepared to accept in pursuit of his objectives), determined by balancing the costs of improvement against the expected benefits.

Chukwunulu (2018) defined operational risk as the risk of direct or indirect loss resulting from inadequate or failed internal processes, people, and systems or from external events. Operational risks arise from inadequate or failed internal processes, people and systems, or from external events. They include fraud, security failure, legal breaches, physical (e.g., infrastructure failure) or environmental risks (Chukwunulu, 2018). Operational risks affect client satisfaction, organization's reputation, and its relationship with its stakeholders, thereby reducing shareholder value. It increases volatility of operating costs and earnings. It is defined as the risk resulting from internal events occurring in internal processes, personnel and systems or failure resulting from external events (Almagtome et al., 2017). The operational risk results in an increase in the cost of the Bank or a decrease in its income because of the interaction of certain operational risks with credit and market risk (Hull, 2015). The operational risk may be seen by some as internal risk only, but banking systems make the concept of operational risk more profound than internal risk.

Cost-Income Ratio (CIR)

Cost-income ratio (CIR) is the ratio of operating cost to income. It is also known as efficiency ratio. A reduction in cost for a given level of income is expected to increase profits and vice versa. Cost-income ratio is measured by the ratio of operating expenses to net interest income (Isedu &

Erhabor, 2021). The cost to income ratio components of the ratio are cost and income and hence, the measure is indirectly related to bank profitability. A reduction in costs for a given level of income will reflect increased profits and vice versa. Increased profits, in turn, will result in improved return on equity and share prices of the bank, which is of great interest to investors. Furthermore, most bank costs have been reducing in response to margin squeezes, thus lowering both costs and income interests (Basel Committee on Banking Supervision, 2011). Hence, volatility in a bank's cost to income ratio might be a better measure of volatility in a bank's cost performance. The cost to income ratio is the ratio of non-interest (operating) costs excluding bad and doubtful debt to the net interest income plus non-interest income of the bank. Non-interest costs are perceived as those costs which are most amenable to management decisions and considered to be that part of a bank's costs which can be controlled. The use of the net interest income term in the denominator will reduce the volatility that could arise from fluctuations in the general level of interest rates (Correa & Raju, 2008).

Operating Cost Ratio (OPR)

Operating cost ratio is also an indicative of operational risk variable. It is measured by the ratio of operating expenses to total assets. It is expected that when a bank has higher operating expenses per Naira assets, the profitability of the bank declines. On the other hand, when the operating expenses are directed for loans recovery, loans defaults, and asset management, it is quite possible that the higher the operating cost ratio, the higher the profitability of a bank (Isedu & Erhabor, 2021). The term operating cost ratio refers to the efficiency of a company's management by comparing the total operating expense of a company to net sales. The operating ratio shows how efficient a company's management is at keeping costs low while generating revenue or sales. The smaller the ratio, the more efficient the company is at generating revenue vices total expenses (Murphy, 2024). Operating Cost Ratio is the operating expenses to total assets as a representation of cost inefficiency in emerging-economy banking.

They used it as an instrument in econometric models, linking high OPCR with inefficient operations and wider net interest margins, a subtle form of operational risk (Maudos & De Guevara, 2004)

Net Interest Margin Ratio (NOR)

The net interest margin to operational cost ratio is an operational risk variable. The index measures net interest margin (NIM) as a percentage of total operating expenses. The NIM is estimated by interest income minus interest expenses. It is generally expected that an efficient bank has a higher NIM to operational cost ratio than an inefficient bank (Isedu & Erhabor, 2021). Net interest margin (NIM) is the net interest income a lender earns from credit products like loans and mortgages, minus the interest it pays to holders of savings accounts and certificates of deposit (Taylor, 2024). It

expressed as a percentage, the NIM shows how likely a bank or investment firm is to thrive over the long haul. This metric helps prospective investors determine whether or not to invest in a financial services firm by showing its interest income versus their interest expenses. This implies that a positive net interest margin suggests that an entity operates profitably, while a negative figure implies investment inefficiency (Taylor, 2024).

Empirical Review

Olalere, et al (2021) explored the moderating role on the financial risks, business risk and firm value nexus. The study applies the balanced panel data to analyze the 16 deposit money banks in Nigeria over the period 2009 to 2017, making up to 144 observations. The results reveal that credit risk is significantly positive with firm value while liquidity risk, operational risk, market risk, and solvency risk have a significant negative effect on firm value. Further results revealed that business risk is significantly negative with firm value. The financial innovation significantly moderates the relationship between financial risks, business risk, and firm value of the banks. Other factors that significantly affect the firm value in the model of the study are bank size, GDP growth, diversification, profitability, and Herfindahl-Hirschman Index.

Dippos and Yvonne (2019) analyzed the influence of Credit Risk and Operational Risk on Firm Value with Firm Performance as a mediation variable. With purposive sampling method obtained data from 35 Banking firms in Indonesia are taken from the Indonesia Stock Exchange 2013-2017 period. Using Structural Equation Modeling with AMOS program found that the Credit Risk and Operational Risk have a negative influence on Firm Value, Credit Risk and Operational Risk have a negative influence on Firm Performance, and Firm Performance have a positive influence on Firm Value. As a mediation variable, Firm Performance strengthens the influence of Credit Risk and Operational Risk on Firm Value significantly.

Reschiwati et al. (2019) analyze the effect of liquidity, profitability, the size of the firm and its value as moderated by capital structure. The sample of the study was 15 banking companies listed on the Indonesian Stock Exchange in the 2014-2018 period while panel multiple regression was used for the analysis. The results indicate that liquidity, profitability, and firm size significantly influence firm value. However, capital structure does not moderate the influence of liquidity and profitability on firm value, while the capital structure is a mediator of the effect of firm size on firm value.

Fadum and Oye (2020) analyze the impact of operational risk management practices on the financial performance of deposit money banks in Nigeria from 2008 – 2017. The data was analyzed using the Linear Multiple Regression Model. The results showed that there is a positive relationship between operational risk management and the financial performance of banks. The findings revealed

that sound operational risk management practices impact positively on the financial performance of banks.

Allen, et al (2020) examined the relationship between operations risk and the performance of Tanzanian deposit money banks. The study used a panel data methodology constructed from the financial statements of all 41 deposit money banks licensed and operated in Tanzania from 2006 to 2019. The study was based on the longitudinal explanatory design in which the quantitative approach was used to collect and analyze financial panel data of all 41 deposit money banks. Operational risk was measured by portfolio concentration ratio (PCR), cost to income ratio (CIR), bank leverage ratio (BLR), and Operating Expense Ratio (OER). From the results, the study indicated PCR and BLR had a negative and insignificant relationship with Return on Equity (ROE); but observed a negative and significant effect of OER and CIR on ROE. Also, regarding their impact on Return on assets (ROA), PCR and CIR were found to have a negative significant effect while BLR had a positive but insignificant impact while OER had a negative insignificant. The negative relationship implies that as PCR and CIR rise; they reduce the performance of Tanzanian deposit money banks.

Roni and Teddy (2019) determine the effects of credit risk, operational risk, and liquidity risk on the financial performance of banks listed in the Indonesian stock exchange in 2009-2017 period. The number of samples being used was 5 samples collected by purposive sampling technique. The study method was a quantitative method with associative approach and the analysis technique was multiple linear regression. The result showed that credit risk had no effect on financial performance. Operational risk had a significant negative effect on financial performance. Liquidity risk had a significant negative effect on financial performance.

Imamora and Oswari (2019) investigated the effects of credit risk, operational risk, and liquidity risk on the financial performance of banks listed on the Indonesian stock exchange from 2009-2017. The predictors used were credit risk (measured by non-performing loan ratio), liquidity risk (measured by loan to deposit ratio), and operational risk (measured by the operational cost to operational income). Financial performance was the dependent variable which was measured by ROA. The data were analyzed using the multiple linear regression model and showed that operational risk and liquidity risk had a significant negative effect on financial performance. Credit risk was however found to have no effect on financial performance.

Olalere et al. (2018) studied the impact of operational risks on the bank performance of (16) deposit money banks in Nigeria from 2009 to 2015. Based on the random effect analysis in the model, the bank efficiency ratio (ER) has a negative significant effect on firm performance, suggesting that the lower cost to income ratio, the better the bank performance in terms of Net Interest Margin. The operating expenses ratio has a positive significant effect on firm performance. The firm size is not an

important determinant of the firm performance of the commercial banking sector in Nigeria, as compared to operational risk. GDP plays an important role in the performance of deposit money banks during the period of study.

Mary (2015) investigated the effect of operational risk management practices on financial performance in 36 deposit money banks in Tanzania from 2009-2013. Regression analysis was conducted to establish the effect of Operational risk management on the financial performance of deposit money banks in Tanzania. The findings revealed that Operations risk management positively influenced the returns of deposit money banks in Tanzania. The study also established that Operations efficiency was positively correlated with the financial performance of the deposit money banks in Tanzania while the Credit risk and Insolvency risk rate negatively influenced the financial performance of deposit money banks in Tanzania.

Theoretical Framework

The theoretical underpinnings of this study are primarily rooted in three major theories: Contingency Planning Theory, Dynamic Capability Theory, and Modern Portfolio Theory.

Contingency Planning Theory

The concept is notably defined by the Association of Contingency Planners (ACP) a professional body devoted to business continuity as highlighted in a 2020 publication on emergency response frameworks. Contingency planning, also referred to as business continuity planning, is a theory that is well associated with risk management. The basis of this theory is that since all business risk cannot be fully eliminated in practice, despite firm's efforts to mitigate, avoid, and prevent risk, incidents will still definitely occur (Hinson, 2008). With reference to this study, contingency theory can be used to mean controls, plans, processes, and the totality of activities. It's the act of preparing for major catastrophes and occurrences, articulating malleable strategies, and rationalizing appropriate assets that will come into play in the event. In this study, contingency planning theory involves preparing for the unexpected and planning for the unknown. The basic purpose of contingency planning theory is to minimize the adverse consequences of catastrophes and occurrences (James, 2013)

Contingency planning theory is a framework that explains how firms can prepare for and respond to unexpected events that could affect their value (Association of Contingency Planners, 2020). This theory suggests that firms should anticipate potential risks and develop contingency plans that outline how to respond if these risks materialize. Contingency planning theory highlights the importance of proactive risk management in maintaining firm value. By identifying potential risks and developing contingency plans, firms can minimize the negative impact of unexpected events on

their operations and financial performance. This can help to protect the firm's value and reputation and enhance its long-term financial performance (Lucey & Dowling, 2005).

Contingency planning theory also emphasizes the importance of communication and collaboration within the firm. Effective contingency planning requires input from stakeholders across the organization, including management, employees, and external partners. By engaging these stakeholders and encouraging open communication, firms can develop more effective contingency plans that reflect the diverse perspectives and expertise of those involved. In addition, contingency planning theory recognizes the dynamic nature of risk and the need for ongoing assessment and adaptation. Effective contingency planning requires firms to regularly evaluate and update their plans based on changing circumstances and new information. By remaining vigilant and responsive to potential risks, firms can ensure that their contingency plans remain relevant and effective over time (Lucey & Dowling, 2005). Overall, contingency planning theory highlights the importance of proactive risk management in maintaining firm value. By identifying potential risks, developing contingency plans, and engaging stakeholders across the organization, firms can protect their value and enhance their long-term financial performance.

Contingency Planning Theory was adopted in this study because it describes and explains how changes in technological advancement, social values, and regulations affect decisions regarding the performance of banking firms. The theory is particularly relevant for understanding how banks prepare for and respond to operational risks, which can arise from various sources including technological failures, human errors, fraud, and external events. By developing effective contingency plans, banks can minimize the adverse impact of operational risks on their value.

Dynamic Capability Theory

Dynamic Capability Theory (DCT) was developed by Teese, Pisano, and Shuen's in 1997 to solve gaps that arose from the RBV theory in interpreting the development and redevelopment of resources and capabilities to address rapidly changing environments. The theory is a process that enables the organization to reconfigure its strategy and resources to achieve sustainable competitive advantage and to achieve a superior performance in a rapidly changing environment (Bleady et al., 2018). DCT theory provides a way in which management will utilize useful ideas through which they examine the development of new organizational capabilities, competence, and dynamic capability. The study observed that a Dynamic capability-based approach is usually championed by the organization's Chief executive officer in terms of aspirations in corporate strategy. The organization changes its valuable resources over time and provides means to measure the dynamic capability corporate financial performance effect over the long term (Oliver, 2014).

Teece (2018) supported the theory and noted that strong dynamic capabilities enable creation and implementation of effective business models. The strengths of a firm's capabilities are implicated when business model changes are translated into organizational transformation. The study found connections among the elements of the economic system that are mapped out to pathways to profit and better financial performance. Arndt (2011) observed that DC theory is a central source of a firm's competitive advantages. The study identified three key aspects of dynamic capabilities which include the process, cognitive and decision-based micro-foundation, and human agency. The processual element of dynamic capability reflects the fact that capabilities are socially constructed based on decisions concerning selection and transformation of capability.

Dynamic Capability Theory explains how firms can develop and leverage their capabilities to adapt to changing environments and achieve sustainable competitive advantage. This theory suggests that firms can create value by developing and maintaining dynamic capabilities that allow them to effectively manage risk and seize new opportunities. Dynamic Capability Theory highlights the importance of organizational learning and innovation in managing risk and creating value. Firms that can continuously learn from their experiences and adapt their strategies and operations are better equipped to manage risks and capitalize on emerging opportunities. This involves not only developing new knowledge and skills but also leveraging existing capabilities in new and creative ways (Teece, 2007).

Dynamic Capability Theory also emphasizes the importance of strategic flexibility in managing risk and creating value. Firms that are able to quickly and effectively respond to changing market conditions and customer needs are better positioned to maintain their competitive advantage and generate value over time. This requires a willingness to experiment with new approaches and technologies, as well as a capacity to rapidly adjust organizational structures and processes as needed. In addition, Dynamic Capability Theory recognizes the importance of collaboration and partnerships in managing risk and creating value. Firms that are able to build strong relationships with customers, suppliers, and other stakeholders can more effectively manage risks related to supply chain disruptions, regulatory changes, and other external factors. This can also help to enhance the firm's reputation and brand value over time (Teece, 2007).

Overall, Dynamic Capability Theory provides a useful framework for understanding how firms can manage risk and create value through continuous learning, strategic flexibility, and collaboration. By developing and maintaining dynamic capabilities that enable them to adapt to changing environments, firms can enhance their resilience, competitiveness, and long-term financial performance.

Methodology

This study adopted a longitudinal research design in order to examine the effect of operational risk on the value of listed deposit money banks in Nigeria. The design is adopted because of its ability to combine both cross-sectional and time dimensions of data. The design is most appropriate for panel data research. The sampled population of the study comprises the thirteen (13) DMBs listed on the Nigerian Exchange Limited (NGX) as at December 31, 2023. Central Bank of Nigeria is the major licensing institution of deposit money banks in Nigeria and hence was used as an authoritative source for banking sector information in this study. The data covers the period of 17 years from 2007 to 2023 post-consolidation period, resulting in a balanced panel of 221 observations (i.e., 13 x 17 = 221). The study used secondary data collected from audited annual financial statements and reports of the listed DMBs, Nigerian Exchange Group (NGX) indices, Fact-Book and reports from the Central Bank of Nigeria (CBN) statistical bulletins, National Bureau of Statistics (NBS), and financial newspapers, for the period of 2007-2023. The data collected for this study were analyzed using statistical and inferential methods. At first, the data collected were subjected to descriptive statistical analysis in order to examine the behavior of the variables in the study. After checking the descriptive statistics, the study examined the relationship that exists among the variables with the aim of bringing out how each of the variables at the individual level related with the dependent variable. The second part of the correlation analysis examined the relationships among the explanatory variables. The aim was to identify any possibility of multi-collinearity among the variables, even though further testing using variance inflation factor was also carried out. The general tool of analysis used in this study is the Two Stage Least Square regression analysis method. The choice of this method was to address the endogeneity problem in the model. The endogeneity problem occurs when the error term associates with other explanatory variables instead of relating with the dependent variables only. Thus, to address the problem, the instrumental variable approach was adopted.

The dependent variable in this study is firm value (FV), measured using Tobin's Q, which is calculated as the ratio of market value of equity to book value of equity. The endogenous variable is $FV_{\{it-1\}}$ because it is expected to relate with the error term $(\varepsilon_{\{it\}})$. The explanatory variables are CIR (cost-income ratio), OPR (operating cost ratio), and NOR (net interest margin to operating cost ratio). The instruments in the model are generally denoted by Z: $CIR_{\{t-1\}}$, $OPR_{\{t-1\}}$, and $NOR_{\{t-1\}}$. The first stage of the regression model is the estimation of the instruments to regress endogenous variable (FV) on the instruments, thus producing:

$$FV_{\{it\}} = \varphi^1 FV_{\{it-1\}} + \varphi^2 CIR_{\{t-1\}} + \varphi^3 OPR_{\{t-1\}} + \varphi^4 NOR_{\{t-1\}} + \mu$$

The aim of the above regression model is to get the estimated value of:

$$F\hat{V}_{\{it\}} = \varphi^1 FV_{\{it-1\}} + \varphi^2 \hat{C}IR_{\{t-1\}} + \varphi^3 \hat{O}PR_{\{t-1\}} + \varphi^4 \hat{N}OR_{\{t-1\}}$$

The predicted values contain only exogenous information from the instruments. The second stage of the regression will therefore regress the dependent variable (FV) on the estimated values, which thus produces the following equation:

$$FV\_\{it\} = \beta_1 + \beta_2 \hat{C}IR\_\{it\} + \beta_3 \hat{O}PR\_\{it\} + \beta_4 \hat{N}OR\_\{it\} + \varepsilon$$

Where: FV = Firm value of firm i at time t CIR = Cost-income ratio of firm i at time t OPR = Operating cost ratio of firm i at time t NOR = Net interest margin to operating cost ratio of firm i at time t φ_1, β = Parameters to be estimated ε = Error term

Results and Discussions

The statistical features of the variables in the study are presented in descriptive statistics in Table 4.1.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
FV	0.202	0.349	0.000	3.586
CIR	0.008	0.015	-0.033	0.146
OPR	0.033	0.040	-0.083	0.145
NOR	0.010	0.026	-0.025	0.252

Source: Eviews output, 2025

Table 4.1 presents the descriptive statistics of the variables used in the study. The mean value of firm value (FV) is 0.202, with a standard deviation of 0.349, indicating moderate variability in the firm value of Nigerian banks during the period under review. The minimum and maximum values are 0.000 and 3.586, respectively, suggesting a wide range of firm values across the sampled banks. For the operational risk variables, the cost-income ratio (CIR) has a mean of 0.008 and a standard deviation of 0.015, showing relatively low cost-to-income levels on average, but with some variability. The operating cost ratio (OPR) has a mean of 0.033 and a standard deviation of 0.040, indicating moderate operating costs relative to total assets. The net interest margin to operating cost ratio (NOR) has a mean of 0.010 and a standard deviation of 0.026, indicating moderate variability in the efficiency of generating net interest income relative to operating expenses among the sampled banks. The minimum value of -0.025 suggests that some banks experienced negative net interest margin to operating cost ratios during certain periods, possibly indicating operational inefficiencies or challenges in generating sufficient interest income to cover operating expenses.

Table 2: Correlation Matrix

Variable	FV	CIR	OPR	NOR
FV	1.000			
CIR	-0.242	1.000		
OPR	-0.173	0.624	1.000	
NOR	0.167	-0.130	0.123	1.000

Source: Eviews output, 2025

Table 4.2 presents the correlation matrix of the variables. The results show that cost-income ratio (CIR) has a negative correlation with firm value (FV) at -0.242, suggesting that as the cost-income ratio increases, firm value tends to decrease. Similarly, operating cost ratio (OPR) has a negative correlation with firm value at -0.173, indicating that as operating costs relative to total assets increase, firm value tends to decrease. Conversely, net interest margin to operating cost ratio (NOR) has a positive correlation with firm value at 0.167, suggesting that a higher efficiency in generating net interest income relative to operating expenses is associated with higher firm value.

The correlation between CIR and OPR is relatively high at 0.624, indicating that these two operational risk measures are somewhat related, which is expected given that both measure different aspects of operational efficiency. However, the correlation is not high enough to cause serious multicollinearity concerns. The correlations between NOR and the other operational risk measures are relatively low, suggesting that NOR captures a different aspect of operational risk compared to CIR and OPR.

Table 3: Hausman Specification Test

Test Summary	Chi-Sq. Statistic	Prob.
Cross-section random	11.382	0.000

Source: Eviews output, 2025

Table 4.3 presents the results of the Hausman specification test, which is used to determine whether the fixed effects or random effects model is more appropriate for the analysis. The test has a chi-square statistic of 11.382 with a p-value of 0.000, which is statistically significant at the 1% level. This indicates that the null hypothesis that the random effects model is appropriate is rejected. Therefore, the fixed effects model is preferred and adopted for this study.

Table 4: Fixed Effects Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.214	0.031	6.903	0.000
CIR	-2.173	0.693	-3.136	0.002
OPR	-1.049	0.331	-3.168	0.002
NOR	1.562	0.387	4.036	0.000

R-squared: 0.412 F-statistic: 30.145 Prob(F-statistic): 0.000 Durbin-Watson stat: 2.103
Source: Eviews output, 2025

Table 4.4 presents the results of the fixed effects model estimation. The R-squared value of 0.412 indicates that approximately 41.2% of the variation in firm value is explained by the operational risk variables included in the model. The F-statistic of 30.145 with a p-value of 0.000 suggests that the model is statistically significant at the 1% level, indicating that the explanatory variables jointly have a significant effect on firm value.

Looking at the individual variables, the cost-income ratio (CIR) has a negative coefficient of -2.173, which is statistically significant at the 1% level (p-value = 0.002), indicating that an increase in the cost-income ratio leads to a decrease in firm value. Similarly, operating cost ratio (OPR) has a negative coefficient of -1.049, which is also statistically significant at the 1% level (p-value = 0.002), suggesting that an increase in operating costs relative to total assets results in a decrease in firm value. Conversely, net interest margin to operating cost ratio (NOR) has a positive coefficient of 1.562, which is statistically significant at the 1% level (p-value = 0.000), indicating that an increase in the efficiency of generating net interest income relative to operating expenses leads to an increase in firm value.The Durbin-Watson statistic of 2.103 is close to 2, indicating the absence of autocorrelation in the model. This suggests that the model is well-specified and the results are reliable.

Test of Hypotheses

Hypothesis 1: Cost-income ratio has no significant effect on the value of deposit money banks in Nigeria.

The coefficient of cost-income ratio (CIR) is -2.173 with a t-statistic of -3.136 and a p-value of 0.002, which is statistically significant at the 1% level. Therefore, the null hypothesis that cost-income ratio has no significant effect on the value of deposit money banks in Nigeria is rejected. This finding indicates that cost-income ratio has a significant negative effect on firm value, suggesting that as cost-income ratio increases, the value of deposit money banks in Nigeria decreases.

Hypothesis 2: Operating cost ratio has no significant effect on the value of deposit money banks in Nigeria.

The coefficient of operating cost ratio (OPR) is -1.049 with a t-statistic of -3.168 and a p-value of 0.002, which is statistically significant at the 1% level. Therefore, the null hypothesis that operating cost ratio has no significant effect on the value of deposit money banks in Nigeria is rejected. This finding suggests that operating cost ratio has a significant negative effect on firm value, indicating that as operating costs relative to total assets increase, the value of deposit money banks in Nigeria decreases.

Hypothesis 3: Net interest margin to operating cost ratio has no significant effect on the value of deposit money banks in Nigeria.

The coefficient of net interest margin to operating cost ratio (NOR) is 1.562 with a t-statistic of 4.036 and a p-value of 0.000, which is statistically significant at the 1% level. Therefore, the null hypothesis that net interest margin to operating cost ratio has no significant effect on the value of deposit money banks in Nigeria is rejected. This finding indicates that net interest margin to operating cost ratio has a significant positive effect on firm value, suggesting that as the efficiency of generating net interest income relative to operating expenses increases, the value of deposit money banks in Nigeria increases.

The results of this study provide several important insights into the relationship between operational risk and firm value in Nigerian deposit money banks. The significant negative coefficient of cost-income ratio on firm value aligns with the theoretical expectation that higher operational costs relative to income lead to lower firm value. This finding is consistent with previous studies such as Olalere et al. (2021), Dippos and Yvonne (2019), and Allen et al. (2020), who also found a negative relationship between cost-income ratio and financial performance or firm value. The negative relationship can be attributed to the fact that a higher cost-income ratio indicates operational inefficiencies, which can erode profitability and, consequently, reduce firm value. When banks incur higher costs to generate the same level of income, their profit margins shrink, making them less attractive to investors and potentially leading to a decline in market valuation.

Similarly, the significant negative coefficient of operating cost ratio on firm value supports the theoretical argument that higher operating costs relative to total assets reduce firm value. This finding is in line with previous studies such as Roni and Teddy (2019) and Imamora and Oswari (2019), who found that operational risk, measured by operating cost-related variables, has a negative impact on financial performance. The negative relationship can be explained by the fact that higher operating costs can signal inefficiencies in a bank's operations, which may lead to lower profitability and, consequently, lower firm value. Additionally, investors may perceive banks with high operating costs as poorly managed or at risk of financial distress, leading to a decrease in their market valuation.

Conversely, the significant positive coefficient of net interest margin to operating cost ratio on firm value suggests that higher efficiency in generating net interest income relative to operating expenses enhances firm value. This finding aligns with the results of Mary (2015) and, to some extent, with those of Fadum and Oye (2020), who found that operational efficiency positively influences financial performance. The positive relationship can be attributed to the fact that a higher net interest margin to operating cost ratio indicates that a bank is efficient in its core intermediation function—generating interest income while controlling operating costs. This efficiency can lead to higher profitability and, consequently, higher firm value. Additionally, investors may view banks with higher net interest margin to operating cost ratios as well-managed and capable of generating sustainable earnings, leading to an increase in their market valuation.

Conclusion and Recommendations

This study examined the effect of operational risk on the value of listed deposit money banks in Nigeria over the period from 2007 to 2023. Operational risk was measured using three variables: cost-income ratio, operating cost ratio, and net interest margin to operating cost ratio, while firm value was measured using Tobin's Q. The findings revealed that operational risk, as a composite variable, has a significant effect on the value of deposit money banks in Nigeria. Specifically, cost-income ratio and operating cost ratio have significant negative effects on firm value, while net interest margin to operating cost ratio has a significant positive effect on firm value.

The negative relationship between cost-income ratio and firm value, as well as between operating cost ratio and firm value, suggests that banks with higher operational costs relative to income or total assets tend to have lower market valuations. This could be attributed to the perception that higher operational costs indicate inefficiencies in a bank's operations, which can erode profitability and increase the risk of financial distress. Conversely, the positive relationship between net interest margin to operating cost ratio and firm value indicates that banks with higher efficiency in generating net interest income relative to operating expenses tend to have higher market valuations. This could be due to the perception that such banks are well-managed and capable of generating sustainable earnings through their core intermediation function.

The study concludes that operational efficiency is crucial for enhancing the value of deposit money banks in Nigeria. Banks that can successfully identify, measure, and mitigate operational risks, thereby improving their operational efficiency, are likely to have higher market valuations compared to those with weaker operational risk management practices.

Based on the findings, the study recommends that bank managers should focus on improving operational efficiency by streamlining processes, enhancing technology infrastructure, and implementing effective cost management strategies. Additionally, they should leverage their core

intermediation function to generate higher net interest income while controlling operating expenses. Investors should consider operational efficiency metrics when valuing bank stocks, and regulators should establish prudential regulations that encourage operational efficiency and greater transparency in the disclosure of operational costs and efficiency metrics.

Future research could extend this study by examining the effect of operational risk on firm value across different sectors of the Nigerian economy, exploring the moderating role of corporate governance on the relationship between operational risk and firm value, and investigating the impact of other types of risks, such as credit risk, market risk, and liquidity risk, on firm value.

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