UMYU Journal of Accounting and Finance Research. Vol.8 No.1 June 2025, pp 035-049.
https://doi.org/10.61143/umyu-jafr.8(1)2025.003
ISSN: 2795-3831
E-ISSN: 2795-3823

RISK-TAKING BEHAVIOUR AND PROFIT EFFICIENCY AMONG NIGERIAN LISTED DEPOSIT MONEY BANKS

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Abstract

This study explores the influence of risk-taking behaviour on profit efficiency among Nigerian banks. It utilized a longitudinal research design and drew on secondary data from the audited annual accounts of selected banks between 2008 and 2023. The population included 14 publicly quoted Deposit Money Banks (DMBs) in Nigeria, and a sample of 11 DMBs was chosen using a purposive sampling technique. Random effect regression was applied to the data, showing that capital risk has a positive and significant influence on the profit efficiency of listed banks. This indicates that well-capitalized banks tend to have higher profit efficiency because they face fewer constraints when expanding their outputs. Additionally, the study found that insolvency risk negatively affects profit efficiency and that liquidity risk also has a significant negative effect. This suggests that high liquidity risk can create challenges in managing cash flows. In conclusion, the study determined that risk-taking behavior significantly impacts the profit efficiency of Nigerian listed Deposit Money Banks. It recommended that Nigerian banks reassess their credit risk management strategies to improve profitability and create a more stable banking environment.

Keywords: *Capital risk, liquidity risk, profit efficiency, risk-taking behaviour.*

INTRODUCTION

Profit efficiency is a valuable concept for assessing overall performance, as it considers the impact of a firm's operations on both costs and revenues and how these elements interact. This notion accurately reflects the objective of profit maximization, as highlighted by Arbelo et al. (2021). In this study, measuring the profit efficiency of banks is essential. By using efficiency estimates, banks can assess how effectively they are managing their resources and achieving their goals. This understanding is particularly important for evaluating the efficiency of Nigerian banks Cost efficiency, or cost minimization, measures how closely a business's costs align with those of best-practice companies producing the same output (Battese & Coelli 2014). However, this concept has two main drawbacks (Pilar et al., 2018). First, it is assessed at a specific output level, which often does not match the optimal scale of production. As a result, a business may be cost-efficient at its current production size but not at its ideal output level.

Profit efficiency effectively combines managers' goals of cost minimization and revenue maximization. Unlike cost efficiency, it considers variations in output quality, recognizing that higher quality may incur additional costs that should not be viewed as inefficiency (Pilar et al. 2018). It measures the gap between a company's current profit and its optimal profit frontier. Profit efficiency, which considers both input and output faults, is a superior measure of overall

ISSN: 2795-3831
E-ISSN: 2795-3823

business performance compared to cost efficiency (Pilar et al., 2018). It is defined as overall efficiency, indicating that a business efficient in earnings will also be efficient in expenses and production scale (Fitzpatrick & McQuinn, 2008). As a result, bank managers prioritize predicting profit efficiency over the partial insights provided by cost efficiency analysis. Arbelo-Pérez et al. (2017) provide empirical evidence showing that, in certain industries, levels of profit inefficiency are significantly higher than levels of cost inefficiency. Okanya (2012) defines a bank's risk-taking behavior as its tendency to engage in activities that increase risk exposure. Generally, there is a belief that higher investment risks can lead to greater potential returns. A bank's operations can often indicate its risk appetite, which may vary from risk-averse to risk-loving.

Several factors influence a bank's risk-taking behavior, including both external elements beyond the bank's control and bank-specific factors. A key question is, "What influences a bank's risk-taking behavior?" According to Rustambekov (2012), various compensation plans for top management, such as stock ownership and managers' direct ownership stakes, significantly impact corporate risk-taking decisions. Additional factors influencing corporate risk-taking include the behavior of board members, the availability and capability to process information, and the roles of audit and risk management committees (Brown et al., 2009). Torre et al. (2021) argued that Nigerian banks focused too much on financial results while disregarding other aspects of business, which led to the banks' failure and seriously damaged their reputation and profit inefficiency. Banks have attempted to recoup this damaged reputation and profit inefficiency and restore trust by implementing risk taking and competitive advantage strategies.

Risk-taking strategies are vital for balancing environmental sustainability, societal benefits, and economic performance, ultimately enhancing profitability. The recent wave of bank failures and the subsequent mergers and acquisitions reveal significant flaws in the banking sector's strategies (Onuoha & Olori, 2017). The takeover of Skye Bank's operations by the Apex bank exemplifies a concerning lack of awareness regarding effective risk-taking behaviors in these institutions. Without a strong grasp of these strategies, the sector faces ongoing instability and inefficiency. Variations in risk-taking among banks are thought to be influenced by their market share position, with those at the lower end more inclined to take risks to increase market presence. This dynamic is particularly worth exploring in the Nigerian banking sector (Mishi et al, 2016). According to Okanya (2012), while global studies on bank risk-taking behavior are plentiful, developing economies like Nigeria have seen limited research, especially concerning credit, liquidity, capital, and insolvency risks. These internal risks significantly impact a bank's performance and exposure to them increases the likelihood of financial crises. Rising default risk can lead to more problem loans and higher loan loss provisions, ultimately contributing to bank instability. If poorly managed, these risks can severely affect profitability and potentially lead to bank failures (Aruwa & Musa, 2014).

Several studies have carried out in developed and developing countries including Nigeria on the relationship between risk taking behaviour and profit efficiency (Abbas, et al., 2021; Mishi, et al., 2016; Rustambekov, 2012; Torre et al., 2021, Obadire & Obadire 2023). The above studies have reported mixed results on the effect of risk-taking behaviour on profit efficiency as some reported a significant relationship while others failed to find a significant impact. In addition, the studies focusing on the link between risk management and profitability, while some focusing on SMES in Nigeria context have largely focused on risk taking behaviour which firms are now shifting to is underexplored. Against this backdrop, this study filled the vacuum by examining the effect of risk-taking behaviour on profit efficiency among Nigerian deposit

ISSN: 2795-3831
E-ISSN: 2795-3823

money banks within the range from 2008-2023. To adequately address the issues raised above, the following research question was raised: To what extent do profit efficiency of banks differ among Nigerian banks? What is the effect of risk-taking behaviour on profit efficiency among Nigerian banks? The specific objectives are to: analyze profit efficiency among Nigerian listed deposit money banks; and investigate the effect of risk- taking behaviour on profit efficiency among Nigerian banks. The objective of this research is to advance knowledge of risk-taking behaviour aimed at enhancing the profit efficiency among Nigerian banks. The study will afford management more information on risk taking behaviour with essential information on the desirability, based on the consequence of the practice on profit efficiency of banks.

This study grouped into five sections. Section one showed the introductory part of the study. Section two focused on the literature review. Section three presented the research methodology employed in the study. Section four was dedicated to discusses the relevance of the research findings and result while section five covered the conclusion as well as recommendations.

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Profit Efficiency

Profit efficiency is a vital measure of a firm's ability to manage resources and generate valuable economic outputs. It examines both input and output discrepancies, offering insight into operational efficiency and untapped profit potential. As a more compelling indicator than traditional financial metrics, profit efficiency helps firms reveal their true performance and identify areas for growth.

Profit efficiency is a key concept that connects the generation of higher value outputs with cost reduction (Peteraf & Barney, 2003). According to Arbelo et al. (2021), it is the most effective measure for assessing overall performance, as it considers how a firm's operations influence both costs and revenues and their interplay, thus aligning with the goal of maximizing profit. Therefore, evaluating profit efficiency as a performance metric accounts for variations in resource utilization (cost efficiency) and responses to relative product prices (revenue efficiencies). Literature distinguishes between standard and alternative profit efficiency based on the assumption of perfect competition in input and output markets (Arbelo et al., 2021). Unlike traditional financial metrics, profit efficiency not only measures a firm's efficiency but also indicates the potential additional profit it could achieve under optimal conditions (Han et al., 2012). Standard profit efficiency measures a company's proximity to maximum profit under the assumption of perfect competition in input and output prices. This indicates that the business optimizes input and output levels to maximize profit, treating prices as fixed. Therefore, the typical profit function can be expressed as:

$$\pi = (p, w)\ exp(v_\pi)\ exp\ (-u_\pi) \quad \ldots\ldots 1$$

where π is the profit variable, p is the price vector of the variable outputs, w is the price vector of the variable inputs, u_π represents the inefficiencies found that reduce profit, and v_π represents random error. Perfect competition often doesn't hold in many industries, as firms can influence output prices through market power. In such cases, standard profit efficiency is inappropriate, and alternative profit efficiency is more suitable. This measure assesses how close a firm is to its maximum profit potential at a given output level (Arbelo et al., 2021), focusing on its ability to optimize profits based on current production (Berger & Mester, 1997).In this way, we define the alternative profit function as

ISSN: 2795-3831
E-ISSN: 2795-3823

$\pi = (y, w)\ exp(v_\pi)\ exp\ (-u_\pi)$…… (2)

where the variables are defined as in (1), and y is the vector of variable output quantities. Based on equation (2), the alternative profit efficiency of firm b (E_π^b) is the ratio of its current profit to the maximum profit attainable at peak efficiency (u_π =0),that is,

$E_\pi^b = \frac{\pi^b}{\pi^{max}} = \frac{f(\ y^b, w^b) exp\ (v_\pi{}^b) exp\ (-u_\pi{}^b)}{(\ y^b, w^b) exp\ (v_\pi{}^b)} = exp\ (-u_\pi{}^b\ )$ ……(3)

Therefore, profit efficiency is simply defined as the proportion of the maximum profit obtained by a firm; thus, the closer the value of E_π is to one, the greater the profit efficiency is. For instance, a profit efficiency ratio of 0.70 would indicate that, due to excessive costs and/or inadequate revenue, a firm is losing approximately 30% of its maximum potential profit.

2.1.1.2 Measurement of Profit Efficiency

In this study, the dependent variable is profiting efficiency, with the stochastic frontier approach (SFA) employed to assess this efficiency. Fries and Taci (2005) argued that in efficiency studies within underdeveloped nations, where measurement errors and unstable economic conditions can be prevalent, the SFA is preferable to data envelopment analysis (DEA). Consequently, SFA is used here to evaluate cost efficiency in Nigeria's banking sector. By utilizing the commonly used trans logarithmic functional form for the cost function, we can determine the level of efficiency. While the cost function will follow the structure of equation (1), an additional equation will be introduced to separate the error term into two distinct components.$\boldsymbol{\varepsilon_{it} = v_{it} + u_{it}}$**……3**

The error term $\boldsymbol{\varepsilon_{it}}$ equals $\boldsymbol{v_{it}} + u_{it}$. The first term $\boldsymbol{v_{it}}$ the random disturbance, which is assumed to be normally distributed, it represents the measurement errors and other uncontrolled factors, i.e. $\boldsymbol{v_{it}}$~N $(0, \sigma_v^2)$. The second term u_{it} captures the technical and allocative inefficiency, both under managerial control, and it is assumed to be half-normally distributed, i. e. $\boldsymbol{u_{it}}$~N^+ (u_{it}, σ_u^2). Higher stability inefficiency indicates higher risk while lower stability inefficiency means the risk is lower.

2.1.2 Risk Taking Behaviour

In the context of finance, risk often refers to the variability of returns associated with an investment and the potential for financial loss. In another way, risk can encompass any uncertainty in achieving desired outcomes, whether in business, health, environmental factors, or personal decisions (Moriarty & McCarthy, 2021). Therefore, risk taking behaviours refers to the propensity of a bank to undertake activities or actions that would clearly increase its risk exposure (Okanya, 2012). Risk-taking behavior refers to the actions or decisions made by individuals or organizations that involve exposure to potential losses or adverse outcomes in pursuit of rewards. This behavior can manifest in various contexts, including financial investments, business decisions, and personal life choices. Risk-takers may seek out opportunities with higher payoffs but also face greater chances of failure or loss (Guiso & Jappelli, 2021).

The resource-based view argues that a valuable, rare, inimitable and non -substitutable set of resources provides a sustained competitive advantage for a company (Rustambekov, 2012). In turn, particular corporate risk-taking practices send a positive signal to the market and can attract more resources in the form of investment to the company (Wang et al., 2003). However, this current study used relevant four types of risk such as credit risk, liquidity risk, capital risk and insolvency risk.

ISSN: 2795-3831
E-ISSN: 2795-3823

Credit risk: The risk of loss due to a borrower's failure to repay a loan or meet contractual obligation. Credit risk refers to the potential that a borrower or counterparty will fail to meet their obligations in accordance with agreed terms. This type of risk is primarily faced by lenders and investors as it can lead to financial losses if a borrower defaults on a loan or bond (Miu & Ozdemir 2015). Credit risk can arise from various sources, including individual loans, corporate bonds, and derivatives. The credit risk is measured as ratio of non-performing loans to total loans. This is consistent with previous literature of Liang et al. 2013, Fang *et al*, 2020).

Liquidity risk: This is the risk that an entity will not be able to meet its short-term financial obligations due to an inability to convert assets into cash quickly without incurring a significant loss. This can occur for various reasons, including market conditions, operational challenges, or funding mismatches. Liquidity risk is critical for banks, as a lack of liquidity can lead to financial distress or bankruptcy (Basel Committee on Banking Supervision, 2021). Effective liquidity management involves ensuring that there are sufficient liquid assets or access to funding to meet immediate obligations while considering the potential impact of market conditions (Chen, & Wu, 2020). Managing liquidity means strategically adjusting funds in the market to maintain an ideal level of short-term reserves without compromising the bank's profitability (Olagunju et al., 2021). Liquidity risk measures as the ratio of Current assets to current liability, this is consistent with previous literature of Olagunju et al, 2021; Fang et al, 2020)

Capital reserve risk: This refers to the risk associated with a bank's ability to maintain adequate capital reserves to absorb losses and support ongoing operations. This type of risk becomes significant during times of financial stress, where the bank may not have sufficient capital to cover unexpected losses, which can lead to insolvency or reduced creditworthiness (Hakenes & Schnabel, 2021). Capital reserves are crucial for regulatory compliance and to ensure that the institution can continue operating during downturns. Managing capital reserve risk involves careful planning and analysis of the capital structure, regulatory requirements, and the market environment. Institutions typically hold capital reserves as a buffer against economic downturns, credit losses, and operational risks (Acharya & Steffen, 2015). This is consistent with previous literature of (Hakenes & Schnabel, 2021; Fang et al, 2020) the capital risk measures as the total regulatory capital ratio.

Insolvency risk: This refers to the danger that a bank will be unable to meet its financial obligations as they come due, ultimately leading to bankruptcy or liquidation. This scenario occurs when total liabilities exceed total assets or when cash flow is insufficient to cover debts (Rivas, 2021). Insolvency can arise from various factors, including poor financial management, declining revenues, rising expenses, or external economic conditions. This is consistent with previous literature of (Rivas, 2021; Fang *et al*, 2020) insolvency risk is measured by using the accounting ratio, namely the Z-score

2.2 Theoretical Framework

The resource-based view (RBV) theory supports this study by recognizing risk management as a strategic asset that can enhance competitive advantage and business performance. The RBV suggests that when companies possess similar resources, management differences—such as in risk management—become the key factors determining sustainable competitive advantage (Oghojafor et al., 2014; Peteraf, 1993). Therefore, this study reinforces the RBV theory as a foundational principle in risk management. According to the RBV, a firm's resources, both in quantity and type, will shape its diversification strategy. The resource-based view (RBV)

ISSN: 2795-3831
E-ISSN: 2795-3823

explains diversification strategy best when focusing on a company's resource base—such as labor, technology, and financial capital—rather than just product-market participants. It also highlights limits to corporate growth, indicating that managerial talent and available resources can restrict market entry and growth opportunities. Moreover, the RBV serves as a framework for analyzing joint ventures and alliances, either directly or through a knowledge-based perspective.

2.3 Empirical Review

Rustambekov (2012) investigates the factors driving corporate risk-taking in U.S. investment banks, revealing that excessive risk is influenced by both internal and external elements. The regulatory environment, or the lack of it, stands out as a crucial external factor. Internally, aspects such as executive aspirations, corporate diversification, knowledge base, interlocking directorships, board size, insider-to-outsider ratios, and board members' stock ownership all contribute to risk-taking. However, the study's focus on the U.S. limits its applicability to contexts like Nigeria, and the absence of robust diagnostic checks questions the reliability of its conclusions.

In another study, Tan et al. (2017) examined the relationship between competitiveness, cost-effectiveness, and risk in Chinese commercial banks from 2003 to 2013. Using stochastic frontier analysis, their findings reveal that cost efficiency has minimal impact on profitability, while various forms of risk and competitiveness show a strong correlation with financial success. Mpofu and Nikolaidou (2018) investigated macroeconomic factors influencing credit risk in 22 Sub-Saharan African nations from 2000 to 2016. Using dynamic panel data, they found that a rise in real GDP growth significantly decreases the proportion of non-performing loans (NPLs). Additionally, NPLs were positively affected by the 2008/2009 global financial crisis, trade openness, inflation, and domestic bank credit to the private sector.

Fagge (2019) applied non-parametric data envelopment analysis (DEA) to assess the efficiency of deposit money institutions in Nigeria from 2010 to 2017. The study revealed high allocative efficiency scores and moderate consistency between cost and technical efficiency. It concluded that improved financial depth enhanced the sector's ability to support economic activity, though technological inefficiency remained a significant barrier, indicating a need for managerial improvements. Fang et al. (2020) investigated the impact of efficiency on profitability in banks from 2003 to 2017, focusing on varying levels of risk-taking and competition. They found increased competition in Chinese banking markets between 2003-2005 and 2014-2017. The study revealed strong correlations between bank profitability, size, cost and profit efficiency, and inflation. Importantly, the positive effect of cost efficiency on profitability was more pronounced when banks engaged in higher risk and faced greater competition.

Abbas et al. (2021) used a two-step GMM approach to analyze the relationship between bank capital and risk-taking in U.S. commercial banks from 2002 to 2019. Their findings confirmed the regulatory hypothesis, showing a positive link between risk-taking and the traditional capital ratio. This correlation was consistent across various capitalization and liquidity categories. However, when evaluated through risk-based capital ratios, a negative association emerged, aligning with the moral hazard hypothesis. Results remained stable across categories, except for banks with poor liquidity and strong capitalization. Additionally, findings were consistent when risk was measured by loan loss provisions.

In a pivotal study utilizing panel data from 2010 to 2019 across 45 listed African banks, Obadire

ISSN: 2795-3831
E-ISSN: 2795-3823

and Obadire (2023) revealed crucial insights into the determinants of banks' risk-taking behaviors. They identified minimum capital requirements, capital buffer premiums, and profitability as significant influences, with minimum capital requirements emerging as the most critical factor. While extensive research has examined the relationship between risk-taking behavior and profit efficiency in both developed and developing countries, including Nigeria (Abbas et al., 2021; Okanya, 2012; Torre et al., 2021), findings remain inconsistent. Some studies indicate a significant link, while others do not. To address this gap, the current study investigates the impact of risk-taking behavior on profit efficiency among Nigerian listed deposit money banks during the post-consolidation era, marking the first exploration of this issue in Nigeria over a 16-year period (2008-2023). This research aims to enhance our understanding of the evolving risk-taking behaviors of firms and their implications for the Nigerian banking sector's resilience and performance.

DATA AND METHODOLOGY

Table 1: Measurement of Variables

Variables	Type of Variable	Variable Labels	Measurement	Expected sign	Source
Profit efficiency	Dependent	PE	Derived from Stochastic frontier analysis (SFA)		(Arbelo et al., 2021). Tan et al. (2017)
credit risk	Independent	CRR	non-performing loans / total loans	-	Fang *et al*, 2020
liquidity risk	Independent	L1R	current assets / current liabilities	±	Chen, & Wu, 2020
capital risk	Independent	CAR	total regulatory capital ratio	±	Hakenes & Schnabel, 2021
insolvency risk	Independent	ISR	Derived from Z-score	-	Rivas, 2021
Firm size	Control	FSZ	Natural log of total assets	+	Obadire and Obadire (2023)
Firm age	Control	FAG	The number of years since the firm is listed on the Nigeria Exchange	±	Obadire and Obadire (2023)

Source: Authors Compilation (2025)

This study employed a longitudinal research design to achieve the objectives of the study being suitable for time order assessment of variables, which in this case measured the effect of independent variables on a given dependent variable. The suitability of this choice was based on the panel design's ability to enable researchers to investigate the time lag of the variables based on logical considerations. The population of the study consists of Fourteen (14) listed

ISSN: 2795-3831
E-ISSN: 2795-3823

Nigerian Deposit Money Banks. Out of 14 banks, eleven (11) were selected as a sample size using purposive sampling. The required data were gathered from the audited annual financial reports and accounts of 11 sampled banks from 2008 to 2023. The data collected on all variables were analyzed using descriptive and inferential statistic. The inferential statistics adopted was a static panel regression technique under which the three alternative panel regression methods namely; pooled Ordinary Least Square (POLS), fixed effect panel regression and random effect panel regression were estimated, using Hausman test to determine appropriate one.

Model Specification

This model was adapted from previous work of (Fang et al, 2020) which is specified below:

$$PE_{it} = \delta_0 + \delta_1 CAR_{it} + \delta_2 CRR_{it} + \delta_3 LIR_{it} + \delta_4 ISR_{it} + \delta_5 FSz_{it} + \delta_6 FAG_{it} + \varepsilon_{it}$$

Where PE =Profit efficiency measured by input variable and output variables using SFA

Input; x_1= Total cost (interest expenses and non-interest expenses); x_2= Price of funds (the ratio of interest expenses over total deposits); x_3= Price of capital (the ratio of non-interest expenses over fixed assets). Output;y_1= Total loans; y_2= Securities; y_3 =non-interest income β_0, intercepts, β_1- β_6 are estimated coefficients, PE = Profit Efficiency, CRR =Credit risk, CAR = Capital risk, LIR = liquidity risk, ISR = Insolvency risk, FIS= Firm size, FAG =Firm age, ε = Error terms, "it". i = firm , t = time

RESULTS AND DISCUSSION

Table 2: Summary of Descriptive Statistics of Variable

	PE	CAR	CRR	LIR	ISR	FSZ	FAG
Mean	0.5712	13.7971	0.6542	1.2420	3.5552	21.2609	25.3714
Median	0.5550	12.0000	0.6130	1.2400	3.5600	20.9485	23.0000
Maximum	1.0000	27.5000	3.6230	1.7550	3.9900	26.9231	51.0000
Minimum	0.0267	1.0000	0.0830	0.3490	3.0100	21.0000	2.0000
Std. Dev.	0.2866	10.0488	0.3689	0.1572	0.2191	2.4499	14.6211
Skewness	0.1181	-0.1661	5.9413	-1.7685	-0.3124	-2.9906	0.1737
Kurtosis	1.7798	1.4246	48.3246	14.4307	2.5889	34.7588	1.7334
Jarque-Bera	11.2619	18.9016	16009.01	1043.957	4.0793	7615.393	12.5786
Probability	0.0035	0.00008	0.0000	0.0000	0.1301	0.0000	0.00186
Sum	99.9667	2414.500	114.4815	217.3539	622.1700	3720.660	4440.000
Sum Sq. De	14.2919	17570.05	23.6919	4.29995	8.3549	1044.416	37196.86
Obs	175	175	175	175	175	175	175

Note: Variable definitions: PE =Profit efficiency CAR =Capital risk, CRR =credit risk, LIR =Liquidity risk , ISR= Insolvency risk ; FSZ= Firm size, FAG= Firm age
Source: Authors Computation (2025)

The results of the descriptive analysis are summarized in Table 2. The average profit efficiency of the listed banks in Nigeria is 0.5712 which suggests that Nigerian bank's profit efficiency is slightly above average. By implication, the rate at which Nigerian banks transform input to output is average. In addition, the average capital reserve risk is 13.79 percent with minimum and maximum values of 1 and 27.5 percent and a standard deviation of 10.048, indicating that there is a wide in variation of CAR in the study. The average of credit risk is 0.6541 which implies that about 65% of the selected banks have non-performing loans to total loans. The

ISSN: 2795-3831
E-ISSN: 2795-3823

average insolvency risk showed a value of 3.55, which indicates that there is no indication that any bank is to be bankrupt is the average is more than the threshold of 1.81. The minimum and maximum value of insolvency risk is 3.01 and 3.99 respectively

Also, the estimated average liquidity risk is 1.2420, indicating liquidity ratio of banks were not encouraging. The minimum and maximum of liquidity risk is 0.3490 and 1.7550 which implies that some selected banks have more liquid assets than total assets while its corresponding standard deviation of 0.1572 implies no wide variation in the liquidity of Nigerian sampled banks. The firm size and age of the firms are on average 21.2609 and 25.37 years respectively. Based on the estimated Jarque-Bera statistics and p-values for each parameter, the null hypothesis cannot be accepted at the 5% level of significance. Therefore, the normal distribution hypothesis is rejected across the entire period at the traditional 5% level

4.2 Correlation Analysis

Table 3 Correlation Matrix

	PE	CAR	CRR	LIR	ISR	FSZ	FAG
PE	1.0000						

CAR	0.1815	1.0000					
	(0.0162)	----					
CRR	-0.0581	-0.0215	1.0000				
	(0.4453)	(0.7781)	---				
LIR	-0.1189	-0.0188	0.1102	1.0000			
	(0.1168)	(0.8048)	(0.1464)	----			
ISR	-0.1058	0.1985	0.0924	0.2152	1.0000		
	(0.1633)	(0.0085)	(0.2236)	(0.0042)	----		
FSZ	-0.2184	0.2539	-0.0558	-0.1556	0.0906	1.0000	
	(0.0037)	(0.0007)	(0.4667)	(0.0397)	(0.2331)	-----	
FAG	-0.1028	0.2998	-0.2519	-0.3142	-0.0087	0.4749	1.0000
	(0.1760)	(0.0001)	(0.0008)	(0.0000)	(0.9086)	(0.0000)	-----

Note: Variable definitions: Same as Table 2
Source: Authors Computation (2025)

The results in Table 3 revealed a weak positive and significant association between profit capital reserve risk given the correlation coefficient of 0.1815 respectively. Furthermore, the results reveal a weak negative relationship between the credit risk, and liquidity risk and profit efficiency given the estimated correlation coefficient of -0.0581 and -0.1189 respectively. The results also reveal a weak negative relationship between insolvency and firm size and profit efficiency given the estimated correlation coefficient of -0.1058 and -0.2184 respectively. In addition, the results further reveal weak relationship among the explanatory variables as the correlation coefficient among the explanatory variables is relatively low with none of them even

ISSN: 2795-3831
E-ISSN: 2795-3823

up to 0.5. The implication is that the problem of multicollinearity may not arise in the study due to none of the variables above threshold of 0.5

Table 4: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.1501	368.096	NA
CAR	4.7506	3.3836	1.1684
CRR	0.0033	4.4991	1.0812
ISR	0.0095	294.9530	1.1099
LIR	0.0195	75.0001	1.1759
FSZ	8.6905	97.5899	1.2716
FAG	2.9106	6.1088	1.4947

Source: Authors Computation (2025)

The study used the Variance Inflation Factor (VIF) to assess multicollinearity among explanatory variables. According to Wooldridge (2009), a VIF over 10.0 indicates strong multicollinearity. Table 4 reveals that all VIFs range from 1.0812 to 1.4947, confirming no multicollinearity in the model

Level of Profit Efficiency Among Nigerian Listed Deposit Money Banks

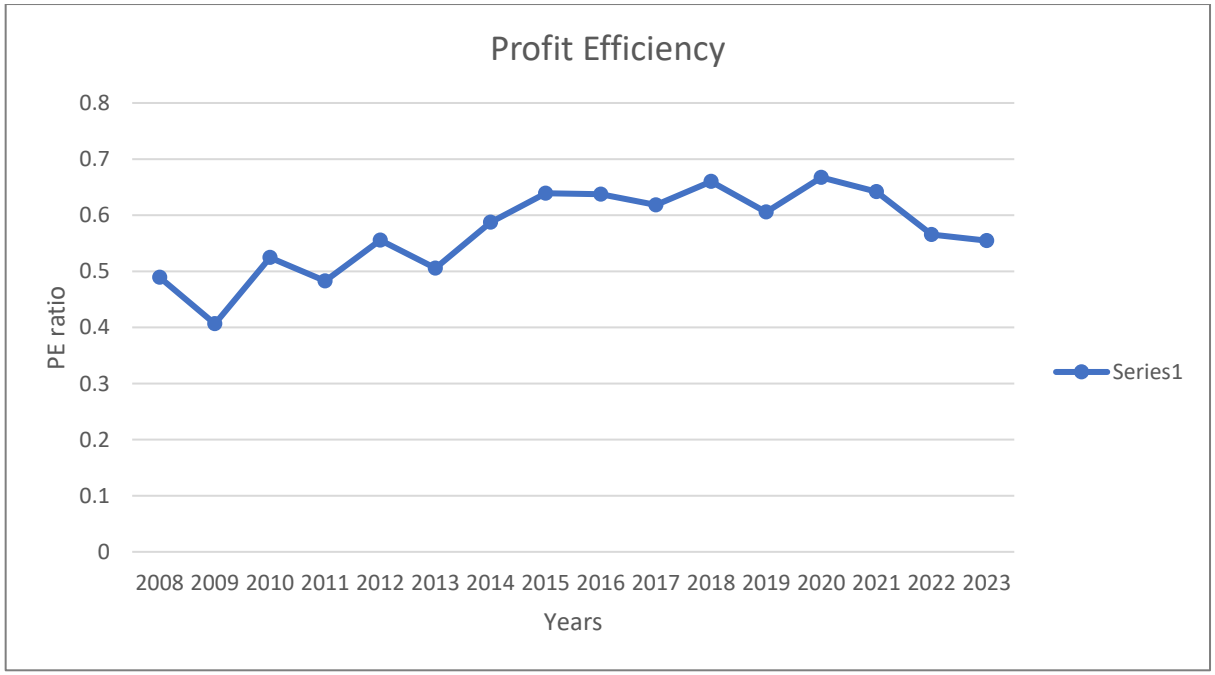

Figure 1: Trend in Profit Efficiency Among Nigerian Listed Deposit Money Banks
Source: Authors Computation (2025)

The results regarding the profit efficiency of Nigerian listed deposit money banks are illustrated in Figure 1. The trend of profit efficiency reveals that it was 0.489 in the year 2008, decreased to 0.406 in 2009, and then reached a peak of 0.555 in 2012. This efficiency gradually improved, peaking at 0.639 and 0.637 in 2015/2016, which may be attributed to the recovery phase of the

ISSN: 2795-3831
E-ISSN: 2795-3823

economy following the economic downturn. However, the profit efficiency peaked again in 2018 before nosediving to lower levels of 0.565 and 0.554 in 2021 and 2022, possibly due to the impact of the Covid-19 pandemic, in addition to increasing in number of wallet banking with a further decline noted in 2023

4.3 Panel Regression Results

Table 5: Random Effect Regression Result
Dependent Variable: PE
Method: Panel EGLS (Cross-section random effects)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Aster
C	2.8598	0.4406	6.4913	0.0000	***
CAR	0.0086	0.0022	4.0073	0.0001	***
CRR	-0.0666	0.0592	-1.1259	0.2619	--
ISR	-0.2972	0.1085	-2.7399	0.0069	***
LIR	-0.3284	0.1424	-2.3062	0.0224	**
FSZ	-0.0331	0.0098	-3.3805	0.0009	***
FAG	-0.0030	0.0017	-1.7284	0.0859	*
Diagnostics Test					
R-squared	0.3777				
Adjusted R-squared	0.3146				
F-statistic	5.9924				
Prob(F-statistic)	0.0000				
Hausman Test	4.4005				
Prob	0.6226				
Wald Test X^2	17.3201				
Prob-val.	0.0006				
Heteroskedasticity Test	0.6511				
Prob-val.	0.6892				

P-val<0.10*, P-val<0.05**, P-val<0.01***
Source: Authors Computation (2025)

The study's findings, which are displayed in Table 5., indicated that the random effect was the most preferred estimation method, as indicated by the P-value of the Hausman Test of 0.6226. As displayed in Table 5. The model is fit and significant at the 5% level of significance, and the variables were appropriately chosen and mixed, as indicated by the probability value of less than 0.05 and the F-statistic of 5.9924. This suggests that the sampled Nigerian banks profit efficiency was influenced by explanatory variables. The R^2 explanatory variables account for about 38% of the total variation of PE while the stochastic error term accounts for the remaining 62% of the variation that is not explained. Table 5. revealed the result of heteroscedasticity indicated there was no existence of heteroscedasticity exists in the study. The p-value for the Wald Tests X^2 was 0.0006 <0.05, indicating that the explanatory variables were included in the components that determined the profit efficiency.

In addition, the results obtained revealed that capital risk exerts positive influence which is

ISSN: 2795-3831
E-ISSN: 2795-3823

significant at 1% (t=6.4913; p<0.01) on the profit efficiency of Nigerian listed Deposit Money Banks. This suggests that a well-capitalized banks have higher profit efficiency because they face less constraint to expand outputs. At the same time, well-capitalized banks tend to set more demanding conditions on the supply of loans due to a more cautious attitude towards output expansion. Credit risk showed the negative and insignificant effect on profit efficiency (t-stat=-1.1259; p>0.05, suggesting that banks may not be effectively managing their credit risks, leading to higher default rates on loans. This can impair profit efficiency as losses from bad debts can erode the bank's profits.

In addition, insolvency risk had a negative and significant influence on profit efficiency (t-stat-2.7399; p<0.01). this implies that higher insolvency risk directly impacts a bank's ability to operate efficiently and profitably. This may lead to increased scrutiny on operational practices and financial managements. Liquidity risk had a negative and significant effect on profit efficiency (t-stat-2.3062; p<0.05), implies that high liquidity risk can lead to difficulties in managing cash flows. Banks may struggle to meet their short-term obligations, which can increase operational stress and reduce overall profitability.

On the side of control variables, firm size had a negative and significant effect on profit efficiency given the estimation (t=-3.3805; p<0.01). This implies that larger banks may face difficulties in effectively allocating resources and managing various business units. This can result in inefficiencies where some branches or divisions underperform, dragging down overall profit. The age of bank (t=-1.7284; p<0.10) had a negative and significant on profit efficiency, implying that older banks may develop complex organizational structures that slow down decision-making processes and reduce their ability to respond quickly to market opportunities, negatively affecting profit efficiency.

4.4. Discussion of Findings

The study examines the effect of risk-taking behaviour on profit efficiency. The study found that capital risk exerts positive and significant on the profit efficiency of Nigerian listed Deposit Money Banks. A strong capital risk ratio suggests that banks are well-capitalized, allowing them to take on profitable ventures while mitigating risks. This can lead to improved profit margins and overall profitability. At the same time, banks that maintain a strong capital risk ratio may have a competitive edge over those with lower ratios. This can allow them to offer better interest rates on loans and savings, improving their market position and attracting more customers. This corroborated with Abbas et al. (2021).

Credit risk showed the negative and insignificant effect on profit efficiency. This indicates that the costs associated with managing credit risk (such as provisions for loan losses) may outweigh the revenue generated from lending activities, reducing overall profit efficiency. Insignificant results may also imply that banks are not addressing potential risks adequately, which can deter potential investors. Insolvency risk had a negative and significant influence on profit efficiency. This implies that when insolvency risk is high, banks may face substantial financial distress, incurring costs related to restructuring, increased borrowings, or potential bankruptcies. These financial burdens can significantly diminish profit margins and overall profit efficiency. Liquidity risk had a negative and significant effect on profit efficiency This suggests that when liquidity risk is high, banks may be forced to rely on expensive short-term borrowing to manage liquidity needs. These increased costs can eat into profit margins, making it difficult to maintain profit efficiency. Similar result found (Obadire & Obadire 2023).

ISSN: 2795-3831
E-ISSN: 2795-3823

CONCLUSION AND RECOMMENDATIONS

The study concluded that risk taking behaviour had significant effect on profit efficiency. The study found that capital risk exerts positive and significant on the profit efficiency of while other variables such as credit risk capital reserve risk and insolvency risk have negative and significant effect on profit efficiency of Nigerian listed Deposit Money Banks. The study recommended that; Banks should maintain a strong capital risk ratio to have a competitive edge over those with lower ratios. This can allow them to offer better interest rates on loans and savings, thereby improving their market position and attracting more customers. Nigerian banks need to reevaluate their credit risk management strategies to enhance profitability and foster a more stable banking environment. The bank should engage in effective liquidity management and operational strategies to enhance profitability and ensure financial stability. There is a need for banks to reassess their risk management strategies, focusing on enhancing their financial resilience, improving capital structures, and addressing factors contributing to insolvency risk. This study contributes to the existing body of knowledge not only by using a stochastic frontier approach (SFA) estimation technique to obtain more reliable results regarding profit efficiency but also by attempting to evaluate the potential interrelationships among these variables. This approach makes a significant contribution to the banking literature as a whole. Additionally, this study broadens our understanding on how different forms of risk affect the profit efficiency of banks.

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