Analysis of Risk, Size, and Performance of the Banking Industry : A South Asian Perspective

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Abstract

Purpose : The article examined the correlation between risk factors, performance, capital regulation, and the banking industry, particularly emphasizing the moderating effect of size. It aimed to differentiate between healthy and hazardous companies and assess the financial stability of enumerated Asian banks, accounting for 60% of the global development.

Methodology : The acceptability of the data for additional analysis was determined by the study using variance inflation factors, correlation analysis, and unit root tests. A two-stage least squares study of 25 universities was carried out using a panel dataset with unbalanced variables spanning the years 2014 to 2021.

Findings : The study showed that, out of capital sufficiency, credit risk, and liquidity concerns, credit risk had the greatest impact on bank profitability (ROE). ROE was positively impacted by additional independent factors such as TCTA, LE, and AGE. Furthermore, a significant moderating effect of bank size on the relationship between risk and profitability was found, which had a negative impact on ROE for all risk categories.

Practical Implications : Effective risk management is essential for the Asian financial sector in order to reduce losses, boost operational efficiency, guarantee regulatory compliance, and build confidence. Policymakers in Asian countries ought to establish a stable financial environment by providing incentives for interest rates to lower the amount of non-performing loans. To survive commercially in a highly competitive environment, one must have a strong position of liquidity. By broadening the field of inquiry, this work opens up possibilities for future researchers.

Originality : An innovative model was developed to analyze the correlation between bank size and risk and performance within the financial sector of South Asia, using control variables, bank-specific measurements, and accounting-based metrics.

Keywords : **capital regulation, liquidity risk, risk of financing, performance, Basel III**

JEL Classification Codes : M40, M41, M42

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Asian economies are frequently characterized by capital markets and financial systems dominated by banks, with venture capital markets, in particular, being underdeveloped. As a consequence, banks serve as the primary providers of financing. Despite substantial advancements in banking system stability since the Asian financial crisis of 1997/98, financial institutions have exhibited prudence in extending business loans despite these sectors constituting a substantial portion of overall economic activity (Yoshino & Taghizadeh-Hesary, 2019). Banking industries in both developed and developing countries have shown more caution when offering loans to more insecure sectors in the wake of the subprime mortgage crisis and the global financial crisis. In contrast, one typically notices a greater nonperforming loans (NPL) ratio of loans when looking at the structure

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of NPLs in the majority of Asian countries. This ratio disproportionately impacts small businesses since they have consistently faced obstacles. During the crisis, many of these businesses even filed for bankruptcy (Vijaykumar & Tripathi, 2022).

By facilitating the mobilization of monetary resources across many locations, depository institutions play a crucial role in promoting economic growth and monetary stability on a worldwide level. As intermediaries, banks attempt to improve their financial performance (FP) by issuing loans; as a result, banks are highly exposed to credit risk. The primary cause of banking industry failures is credit risk. Occasionally, this results in the collapse of the entire financial system (Siddique et al., 2022). According to regional statistics compiled by the World Bank, NPLs are present virtually in every region.

Notwithstanding this, South Asia has a relatively high proportion of NPLs compared to other areas. Thus, the investigation is carried out in the South Asian region. In this research, the capital adequacy ratio (CAR) and NPLs are proxies for credit risk. Additionally, bank-specific factors are also incorporated into the study.

In the last two decades, many banking crises have increased regulators' apprehension regarding the banks' financial stability framework. Scholars, researchers, and regulatory bodies have identified numerous elements that contribute to maintaining economic stability and have advocated for stringent prudential oversight (Siddique et al., 2022). Bank performance requirements supersede other techniques that regulators may suggest when it comes to prudential issues. When comparing expediency with alternative approaches suggested by authorities, hazards and capital sufficiency show up as important considerations. As a result, there is growing concern regarding the inquiry into the correlation between capital regulation, risk, and the outcomes are not unexpected. A perplexity is acknowledged concerning bank capital regulation, bank risks, and bank performance. In addition, the literature contains contradictory findings regarding the link.

This study endeavors to ascertain the responses to the following inquiries by considering the abovementioned information. What effect does bank capital regulation have on Bangladesh's banks' performance? What impact do bank risks have on banks' performance? And does bank size have a moderating role between bank risk and performance?

Initially implemented in 1988, the Basel Capital Accord, or Basel I, aimed to maintain stability in the global funding system. It was established to ensure two primary objectives: (a) ensuring that institutions have adequate capital and (b) leveling the competitive playing field. Basel II was implemented in 2004 to address the deficiencies identified in Basel I. The main goals of the Basel Accord are risk mitigation and strengthening financial institutions' capital positions. Since the global economic crisis of 2008, a growing body of academic research has emerged with the goal of critically analyzing the effectiveness of the Basel Capital Accord. Basel III was instituted by the Basel board in 2010 to regulate the banking sector in response to a financial emergency. Ensuring adequate capital and liquidity to recover unforeseen losses are significant objectives of Basel III. Banks are required under Basel III standards to keep enough capital. Regulators implement Basel III gradually in most countries by using different timelines and approaches. For instance, on June 15, 2015, India and South Africa jointly released a press release about the implementation of Basel III. Basel I and II were approved by Bangladesh in 1996 and 2010, respectively.

Banks encounter many risks, encompassing credit, liquidity, operations, foreign exchange, interest rates, and markets (Mainrai & Mohania, 2023). Credit and liquidity risks pose the greatest challenges for financial institutions, as they are the most difficult for banks to manage. Thus far, just these two have been discussed. Credit risks lead to unexpectedly large losses for performing banks. When loan repayments are made after the specified period, credit risk exists. Credit risk is the most difficult to mitigate within the financial sector. If a financial institution cannot meet its current obligations, it is called liquidity risk. To ensure their sustained viability, banks must effectively manage liquidity risk. A financial institution that needs more liquidity can procure funds from loans or modify resources at a reasonable rate (Chen et al., 2018). A potential decline in profitability may ensue as

illiquidity rises. For instance, contradictory evidence exists regarding the correlation between liquidity risk and profitability (Chen et al., 2018; Islam & Nishiyama, 2016). Banks and financial institutions that offer financial services for profit have also been found to produce the same results. The banks act as mediators in the majority of situations, receiving deposits from depositors and lending them to borrowers in order to make a profit margin from the difference between lending and borrowing rates while having deposits fund it.

Performance denotes the exertion required to execute plans, accomplish objectives, complete specific duties, or meet obligations (Jain et al., 2023; Santhi et al., 2024). Consequently, "bank performance" indicates how the institution employs its capital to achieve its objectives (Kumar & Kar, 2021). Moreover, assessing a bank's performance necessitates the application of various metrics to gauge its standing and, to some extent, capacity to accomplish its goals. An organization's financial performance serves as a metric to evaluate its capacity to generate profits using the capital it has allocated to sustain its fundamental business activities. Commercial banks assess their performance and failure by employing the terms "financial performance" and "profitability" interchangeably.

Furthermore, evaluating banks' performance necessitates the application of numerous metrics to illustrate their state and, in a sense, their capability to achieve the desired objectives. The profitability capacity of banks is a metric used in the business world to gauge their success or failure (Amin et al., 2014). Corporate administrators have been pondering the question, "What drives performance?" to comprehend how to enhance performance. Scholars are in pursuit of operational details to respond to this inquiry. Ensuring profitability measurement is an essential prerequisite to addressing this subject matter (Robin et al., 2018). Authors frequently utilize a return on equity (ROE) to evaluate banking institutions' profitability in empirical research. The following are the definitions of these ratios: To assess the bank's profitability, one utilizes the ROE, computed as (profit after tax/equity) multiplied by 100. This metric represents the return on investment produced by the proprietors' capital. But, the ROE serves as a metric to evaluate the managerial effectiveness of a financial institution. ROE is a metric that assesses the effectiveness of management in managing shareholders' funds relative to total equity. Overall, supervision of the financial industry falls under the central bank's purview.

For this reason, the central bank oversees, regulates, directs, and coordinates the activities of all listed institutions. On occasion, licenses have been granted to banks operating per the Bank Company Act of 1991 to improve the sector's efficiency and effectiveness and the quality of financial services provided to the public. The central bank monitors all the bank's operations (Kalsoom & Khurshid, 2016). To begin with, this is the first study to simultaneously investigate the effects of capital regulation and banking industry performance. This study is unique in that it employs capital adequacy ratio calculations.

Furthermore, the research incorporates an assortment of risks, including loan and liquidity risks. Moreover, prior investigations have established a correlation between capital regulation and performance and bank hazards and performance. However, this analysis expands upon these findings by incorporating control variables and bank-specific factors associated with bank performance. This study analyses an asymmetrical panel data set of about 25 South Asian institutions from 2014 to 2021. To analyze the relationship between profitability, capital requirements, and bank risks, this study utilizes equation modeling in conjunction with the two-stage least squares (2SLS) regression method to assess correlation.

In conclusion, recommendations regarding the effect of risk and capital regulation on the profitability of commercial banks have been attempted in this article. Consequently, the objectives are to identify bank-specific metrics influencing bank performance and investigate potential variations in these pertinent factors across different bank segments. The outcome will assist stakeholders in formulating appropriate policies or focusing on efficiently managing internal matters to enhance the organization's financial performance or societal obligations. The scarcity of scholarly investigations supports the rationale for choosing this topic, which considers South Asian countries, including Pakistan, India, and Bangladesh.

In the past, considerable effort has been devoted to this subject in developed nations. Capital regulation is the major research focus of my topic. Any bank that lacks capital cannot anticipate exceptional performance. A bank must maintain sufficient capital and comply with capital regulations to attain outstanding financial performance. Risk is an additional critical component of this research; attaining satisfactory performance becomes arduous when the level of risk is high. This article aims to provide an overview of empirical and theoretical research and studies about bank capital regulation, bank risks, bank-specific factors, control variables, and bank performance.

Research Questions

On the above backdrop, the point of the article is to obtain the responses to the subsequent inquiries:

- ***RQ1.*** To what extent does the regulation of bank capital impact the operational performance of banks in Bangladesh?
- ***RQ2.*** What effect do bank risks have on Bangladesh's banks' performance?
- ***RQ3.*** Does the size of a bank moderate the relationship between bank performance and risk?

Literature Review

The performance is used to measure their day-to-day operations and overall financial health and find out cash position, capital sufficiency, and service level (Umar & Kurawa, 2019). Profitability and performance reflect how it uses its resources to achieve its objectives. Alshatti (2016) claimed that capital sufficiency can drive performance. Likewise, Robin et al. (2018) mentioned that efficiency and liquidity management are imperatives for bank performance. Generally, banks that primarily support credit expansion with core deposits perform better. Saleh et al. (2020) argued that profitability is adversely affected by liquidity and credit concerns, whereas capital can positively influence performance. In another study, Munangi and Sibindi (2020) revealed the same findings as Saleh et al. (2020). If liquidity is increased, credit risk is reduced, resulting in a stable capital position that lessens bankruptcy risk (Saleh et al., 2020).

Similarly, Diamond and Rajan (2001) contended that liquidity risk leads banks to financial crises in the long run, which impacts profitability. Liquidity risk is particularly severe in banks with low capital ratios and high credit risk. Additionally, the risk exhibited by banks has a substantial adverse impact on performance (Sharma & Dhiman, 2023). Therefore, we can understand that credit and liquidity risks are associated with capital, and all of these can be performance drivers. In addition, Uddin et al. (2022) carried out a study and demonstrated that capital regulation significantly influences profitability. Majumder and Li (2018), in a study, revealed that bank capital regulation exerts a substantial impact on the performance of banks while exhibiting a negative correlation with risk. On the other hand, Moudud-Ul-Huq et al. (2023) agreed that all types of risk have an important effect on financial success, and this study mainly highlighted non-performing loans that adversely impact profitability. According to Hunjra et al. (2021), liquidity risk was found to be a negative driver of performance. Apart from these hazards, attributes like the bank's CAR and SIZE have a significant impact on profitability (Abbas et al., 2019). Empirical results have revealed that the statistically important relationship between non-performing loans and performance and a significant correlation between performance and capital sufficiency align with anticipated theoretical outcomes.

Return on Equity Ratio

ROE indicates the efficiency with which a company converts its investment capital into profits (Yao et al., 2018).

An increased ratio signifies enhanced performance as well as increased profit growth. As measured by ROE, profitability derived from personal capital is assessed. Investors could utilize this model to forecast earnings and identify potentially vulnerable equities.

Credit Risk

The inverse relationship between credit risk and performance has been demonstrated in numerous research. Gatsi et al. (2016) and Saleh et al. (2020), for example, contended that NPLs had a detrimental effect on return on equity. It has no appreciable effect on ROE and yields comparable results for NPLs (Ekinci & Poyraz, 2019; Noor et al., 2018). A similar result was also found by Nsiah (2017) that a statistically significant correlation exists between NPLs and profitability. On the contrary, Munangi and Sibindi (2020) and Hunjra et al. (2021) established that credit risk had a substantial influence on the financial performance of institutions.

Liquidity Risk

Banks are typically concerned regarding liquidity risk, which pertains to the potentiality that the quantity of cash demanded may exceed the amount of money held in vaults due to the erratic nature of cash demand (Lithin et al., 2023). Moreover, individuals with credit line agreements may abruptly withdraw a substantial amount of their funds (DeYoung & Jang, 2016). Moreover, this illustrates that banks' risk-taking behavior is significantly influenced by financing liquidity risk since reduced funding against liquidity risk leads to increased bank risk (Dahir et al., 2018).

Loan to Deposit Ratio (LTD)

It measures the lending quantity about the amount deposited, making it an additional liquidity factor. To optimize profits, banks convert deposits into lending (Tabassum & Pande, 2021). A high ratio indicates enhanced profitability, whereas a low ratio restricts liquidity and reduces earnings. One argument that the LTD ratio has a negative and significant effect on an institution's financial performance is presented by Marozva (2015). Reputable loans are the main source of income for commercial organizations. Consequently, the consistent profitability of commercial banks is contingent on their ability to convert deposits into loans of standard quality. Conversely, banks incur operational expenses when they accept deposits without transforming them into high-quality loans; this does not contribute to profitability. Accordingly, recent studies suggest that LTD should be greater than zero (Abbas et al., 2019).

Capital (Capital Adequacy Ratio) (CAR)

Constituting the preponderance of bank capital (CAR) are funds acquired via the issuance of shares and retained earnings. This finding indicates that increasing the capital ratio until a specific threshold increases profitability while increasing it beyond that threshold decreases profitability. CAR-based regulatory capital is capital exposed to risk. Within the industry, the regulatory capital ratio—also referred to as the CAR (Tier-I capital + Tier-II capital) to risk-weighted assets (CAR)—is universally accepted. According to various recent studies, this ratio serves as a capital indicator (Zheng et al., 2017). Higher CAR values may not always translate into better performance results ; 10% is considered to be the average CAR (Khatun & Siddiqui, 2016).

Capital Ratio

Capital ratios show how resilient a financial organization is against losses brought on by low-quality assets. Research indicates that a higher capital ratio boosts profitability by reducing the need for outside funding (Cahyono & Chawla, 2021; Robin et al., 2018). The capital ratio influences ROE positively and robustly (Ekinci & Poyraz, 2019; Takouda et al., 2022).

Labor Efficiency

Labor efficiency (LE) is determined by dividing net profit per employee after taxes (Zheng et al., 2017). The increased LE ratio serves as an indicator of the bank's performance in addition to its streamlined management (Alam et al., 2020). Thus, a positive correlation exists between the performance of banks and LE. The ratio of LE to administration competence will increase firms' performance in direct proportion (Majumder & Li, 2018).

Control Variables

Bank Size

A bank's size can be calculated by calculating the natural logarithm of all of its assets (Takouda et al., 2022). A bank's assets grow together with its size. According to a number of studies (Mule et al., 2015; Zheng et al., 2017), there is a negative association between a bank's capital and its size. Notwithstanding this, extremely big banks may experience size with a negative correlation to profitability due to external financing, the cost of bureaucratic processes, and other expenses associated with administering large enterprises. Ekinci and Poyraz (2019) and Takouda et al. (2022) discovered that profitability (ROE) and bank size (SIZE) were positively correlated.

Bank Age

To determine a bank's age, the natural logarithm of its age (AGE) is used. It has been observed that older banks perform better because of their extended periods of operation, which afforded them the opportunity to not only cultivate a favorable reputation but also acquire a clientele. Fernandes et al. (2021) demonstrated that the age of a bank can impact its profitability. The age of a bank is typically a determining factor in how the public perceives it; historically, elder banks have cultivated stronger relationships with their customers. On the other hand, newly established institutions place a premium on expanding their market share via productivity. Coffie et al. (2018) found that Bank AGE and ROE were significantly correlated.

Methodology

This empirical investigation focuses on a single dependent variable. Indicators for assessing bank risk include credit and liquidity risk, whereas ROE is utilized to evaluate outcomes. Several bank-specific variables, including LE and CAR, have been incorporated, along with two control variables: bank size and age. The analysis is based on 25 institutions chosen from Bangladesh, India, and Pakistan, three South Asian countries, for the years 2014–2021. This study used unstructured panel data and included 25 banks in its sample, with 10 of the commercial institutions coming from Bangladesh, 10 from Pakistan, and 5 from India. To accurately represent the population, simple random sampling methods were considered. The secondary sources of information included data from banks' scope databases (www.bvdinfo.com), annual financial statements, and bank websites.

Table 1. ***A Synopsis of the Variables***

Variables	Symbol	Measurement	References	Expected Sign
Dependent Variables				
Performance	*ROE*	Return on equity (ROE) = Profit after Interest and tax (PAIT)/Equity (EQ)	(Umar & Kurawa, 2019)	Not applicable
Bank Risk : Independent Variables				
Credit risk	*NPL*	Credit risk = Non-performing loans/ total loans	(Uddin et al., 2022)	–
Liquidity risk	*LTD*	Loan to deposit ratio = Loans/deposits	(Marozva, 2015)	–
Bank Specific : Independent Variables				
Capital adequacy ratio	*CAR*	CAR = (Tier-I capital + Tier-II capital) / Risk-weighted assets	(Ardekani et al., 2020)	+
Capital ratio	*TCTA*	Capital ratio = Total capital/ total assets	(Robin et al., 2018) (Al-Matari, 2019)	+
Labor efficiency	*LE*	Labor Efficiency = Net profit after tax /per employee	(Majumder & Li, 2018 ; Moudud-Ul-Huq et al., 2018)	+
Control Variables				
Bank size	*SIZE*	Size = Natural logarithm of total assets	(Al-Matari, 2019 ; Munangi & Sibindi, 2020 ; Zheng et al., 2017)	–
Bank age	*AGE*	AGE = Natural logarithm of bank age since incorporation	(Fernandes et al., 2021)	+

Additionally, supplementary information was obtained from the relevant stock exchange website. A 2SLS estimator was employed with EViews 12 software to evaluate robustness. Table 1 represents the synopsis of the variables.

A number of factors, such as ROE, CAR, LE ratio, LTD ratio, NPL ratio, and capital ratio, influence the performance of the South Asian financial sector. As control variables, bank size and age are also relevant. Gaining insight into these elements can help South Asian institutions operate better.

$$ROE = \beta_0 + \beta_1 CAR + \beta_2 TCTA + \beta_3 LE + \beta_4 SIZE + \beta_5 AGE + \varepsilon \ldots\ldots\ldots\ldots (1)$$

$$ROE = \beta_0 + \beta_1 NPL + \beta_2 TCTA + \beta_3 LE + \beta_4 SIZE + \beta_5 AGE + \varepsilon \ldots\ldots\ldots\ldots (2)$$

$$ROE = \beta_0 + \beta_1 LTD + \beta_2 TCTA + \beta_3 LE + \beta_4 SIZE + \beta_5 AGE + \varepsilon \ldots\ldots\ldots\ldots (3)$$

where,
Dependent variables (ROE),
Independent variables (NPL, LTD, CAR, TCTA, and LE),
Control variables (SIZE and AGE),
Coefficient β and Error term ε.

Analysis and Results

The outcomes of the Augmented Dickey–Fuller test equation-based unit root test, which determines whether the data are stationary or non-stationary, are presented in Table 2. Consequently, these findings exhibit statistical

Table 2. ***Unit Root Test Results***

Variables	At level	
	***t*-statistics**	***p*-value**
ROE	–3.111372	0.0273
NPL	–5.025992	0.0000
LTD	–6.721321	0.0000
CAR	–4.620509	0.0002
TCTA	–3.733715	0.0043
LE	–5.669480	0.0000
SIZE	–3.354995	0.0138
AGE	–4.638163	0.0002

significance with a confidence level of 95%. Consequently, the data are adequate to conduct subsequent analyses and derive practical conclusions from the regression analysis.

Table 3 highlights variance inflation factors (VIF) to assess the data's quality; multicollinearity was identified by implementing a unit root test employing the Augmented Dickey–Fuller and VIF tests. All explanatory variables have VIF values less than 10, which is acceptable. Both evaluations provide indications that the data is appropriate for preprocessing and deriving practical conclusions from the regression analysis.

Table 4 shows the results of descriptive analysis of all studied variables. Performance variable ROE is

Table 3. ***Variance Inflation Factors (VIF)***

Variable	Centered VIF
C	NA
NPL	1.307484
LTD	1.286060
CAR	2.624139
TCTA	3.740024
LE	1.616936
SIZE	2.300610
AGE	1.642863

Table 4. ***Descriptive Analysis***

	Mean	Median	Maximum	Minimum	Std. Dev.
ROE	0.1171	0.1085	1.0000	–0.0878	0.1004
NPL	0.1556	0.0480	1.0000	0.0000	0.2816
LTD	0.8932	0.9023	1.1278	0.6170	0.0964
CAR	9.4077	13.0911	131.5822	–137.413	26.3696
TCTA	0.0415	0.0764	0.3219	–1.0407	0.1964
LE	0.7397	0.7217	2.4305	–1.0013	0.4940
SIZE	5.3016	5.4075	6.2140	2.7476	0.4490
AGE	1.3303	1.3424	1.7482	0.0000	0.2779

Table 5. ***Correlation Analysis***

	ROE	*NPL*	*LTD*	*CAR*	*TCTA*	*LE*	*SIZE*	*AGE*
ROE	1							
NPL	–0.1202	1						
LTD	–0.0572	–0.2801	1					
CAR	**0.1222**	–0.3510	0.2835	1				
TCTA	0.1209	–0.4316	0.3034	**0.7850**	1			
LE	0.1598	–0.2729	0.3283	0.4564	0.5702	1		
SIZE	0.4262	–0.3936	0.3979	0.4149	0.5270	0.3568	1	
AGE	–0.1079	–0.0315	0.1563	–0.1372	–0.1650	–0.1855	0.4027	1

moderately high, with banks showing robust stability and risk profiles, with NPL and LTD values of 0.1556 and 0.8932, respectively. The CAR in financial institutions is 9.4077%, below the Basel-III minimum threshold. The CAR is –137.413%, indicating that many financial institutions are not meeting the 10% minimum capital requirements. However, many banks meet these requirements, as shown by the TCTA and CAR. The NPL and LTD risk measures show greater variations, suggesting a change in risk or an increase in financial stability. A positive NPL value of "0" indicates no NPL in any sample, indicating a positive indication of economic stability.

Table 5 represents the output of the Pearson correlation matrix. A positive correlation was observed between ROE and TCTA, LE, and CAR, while negative correlations were observed between ROE and NPL, LTD and SIZE, and AGE. However, LTD was positively correlated with CAR, TCTA, LE, SIZE, and AGE, indicating a strong relationship between these variables.

Table 6 displays the results of a regression analysis to determine whether or not the CAR significantly impacts the dependent variable. The significance levels for this relationship are 1%, 5%, and 10%. CAR and bank profitability (ROE) exhibit a positive correlation that lacks statistical significance. At the 1% significance level, the regression model indicates that TCTA, LE, and AGE have significant and positive associations with ROE, respectively. On the contrary, SIZE significantly and negatively affects the correlation between financial institution risk and performance. Labor efficiency (LE) denotes reduced labor engagement, which results in diminished profitability and performance. Greater profitability and efficacy are attributes of established, larger banks. The quantification of revenue is utilized to assess the magnitude of a bank. A greater bank size results in increased customer lending, amplifying the portfolio of non-performing loans and thereby introducing heightened credit and financial risk.

Table 6. ***Regression Model***

Variable	**Coefficient**	**Std. Error**	***t*-statistic**	**Prob.**
CAR	0.000292	0.000315	0.927569	0.3548
TCTA	0.256126	0.049934	5.129304	0.0000***
LE	0.056143	0.012958	4.332608	0.0000***
SIZE	–0.223013	0.016874	–13.21651	0.0000***
AGE	0.158332	0.023565	6.718853	0.0000***
C	1.033939	0.073681	14.03266	0.0000
R-squared	0.491955	**Prob. (*F*-statistic)**		0.000000
Adjusted *R*-squared	0.478861	***J*-statistics**		0.000000

Note. Here.* Significant level = 0.1, ** Significant level = 0.05, *** Significant level = 0.01.

Table 7. *Regression Model*

Variable	Coefficient	Std. Error	*t*-statistic	Prob.
NPL	-0.083567	0.019877	–4.204264	0.0000***
TCTA	0.251366	0.037213	6.754840	0.0000***
LE	0.055409	0.012434	4.456402	0.0000***
SIZE	-0.235331	0.016458	–14.29878	0.0000***
AGE	0.159085	0.022609	7.036318	0.0000***
C	1.114734	0.073189	15.23093	0.0000
R-squared	0.532314	**Prob. (*F*-statistic)**		0.000000
Adjusted *R*-squared	0.520260	***J*-statistics**		3.07E–37

Note. Here.* Significant level = 0.1, ** Significant level = 0.05, *** Significant level = 0.01.

The results indicate that the bank's scale moderates the relationship between bank risk and performance. The R^2 value of 0.491955, as determined by regression analysis, demonstrates that all independent variables explain 49.196% of the variance in ROE. R^2 has been adjusted to 0.478861. A positive correlation has been observed between capital regulations and performance, as indicated by multiple researchers (Kofarmata et al., 2016; Zheng et al., 2017). It is supported that the size or scope of a financial institution has a substantial and negative impact on its profitability by Al-Homaidi et al. (2020). The adjusted R^2 value of 0.520260, as presented in Table 7, indicates that the outcome can be considered reliable. The *F*-statistic value of 0.000000 indicates a statistically significant relationship between the independent and dependent variables at a significance level of 5%. Based on the information provided in Table 7, a statistically significant inverse correlation (–0.083567) can be observed between NPL and profitability (ROE). The NPL ratio negatively affects financial performance in this instance. This supports the conclusion that a significant number of NPLs could negatively affect performance, which is consistent with the research of Hunjra et al. (2021). This implies that credit risk plays a pivotal role in determining performance, and financial institutions should be vigilant by implementing preventative measures to safeguard loans against credit risk, thereby ensuring improved performance.

Table 7 shows the findings of a regression study to ascertain whether NPL significantly affects the dependent variable at the 1%, 5%, and 10% significance levels. In order for developing country banks to turn a profit, they need to be able to efficiently oversee loan repayment on schedule. The regression model reveals that TCTA, LE, and AGE have significant and positive associations with ROE at the 1% significance level. An increase in labor productivity (LE) signifies intensified operational efficiency within a bank, culminating in increased revenue. Efficient labor can complete the designated task perfectly within the specified time frame, increasing output. The analysis is corroborated by the results of Alam et al. (2020) and Zheng et al. (2017).

Established banks have amassed a substantial customer base, thereby reducing their advertising expenditures. The age of the bank has a positive effect on ROE by lowering operating expenses and increasing revenues. Conversely, SIZE exerts a substantial yet adverse influence on ROE. The volume of a bank's sales determines the measure of its magnitude. A greater bank size results in increased customer lending, amplifying the portfolio of NPL and thereby introducing greater credit and financial risk. Once more, credit and financial risk reduce performance. Therefore, the size of a bank is negatively but substantially correlated with its performance.

Table 8 shows the regression findings used to assess if the LTD significantly affects the dependent variable. This association has significance values of 1%, 5%, and 10%. Table 8 illustrates the positive but not statistically significant association between bank profitability (ROE) and LTD. A high ROE indicates that the bank lacks the necessary liquidity to meet unforeseen fund demands. On the other hand, when ratios are low, the bank could be able to produce a manageable amount of money that it couldn't have otherwise. The regression model indicates a

Table 8. *Regression Model*

Variable	Coefficient	Std. Error	*t*-statistic	Prob.
LTD	0.013056	0.059990	0.217641	0.8279
TCTA	0.285938	0.037937	7.537206	0.0000***
LE	0.055737	0.013252	4.206028	0.0000***
SIZE	–0.223524	0.017173	–13.01604	0.0000***
AGE	0.157501	0.023736	6.635654	0.0000***
C	1.027900	0.080627	12.74887	0.0000
R-squared	0.489827	**Prob. (*F*-statistic)**		0.000000
Adjusted *R*-squared	0.476678	***J*-statistics**		6.15E–38

Note. Here.* Significant level = 0.1, ** Significant level = 0.05, *** Significant level = 0.01.

substantial positive correlation between ROE and TCTA, LE, and AGE. On the other hand, SIZE and ROE have a substantial but unfavorable association.

The findings indicate a statistically significant and positive correlation between ROE and the capital ratio (TCTA), which means that banks with adequate capital implement sound investment strategies and generate greater profits. The idea that banks with enough capital require less outside funding means that funding costs are decreased and revenues are increased. With an R^2 value of 0.489827 from the regression analysis, it can be concluded that the independent variables in this model represent a variation in ROE of 48.98%. Moreover, the corrected R^2 value of 0.476678 indicates reliability.

Conclusion

The study presents empirical support for a significant and reciprocal relationship, encompassing both positive and negative aspects, between bank performance (ROE) and credit risk (NPL). Hence, we examine the impact of two distinct categories of risks—liquidity and credit risks—on the financial institution's profitability. The effect of credit risk on the performance of banks is significantly greater than that of LTD. The bank should demonstrate awareness of the client's capacities and project preferences. This discovery is consistent with the resource-based theory. As determined by this examination, specific institutions neglected to uphold the minimum capital requirements by BASEL III, and, more specifically, inadequate provisions were made for risk disclosures.

To optimize profitability and mitigate risk, banks' minimum capital levels are mandated by BASEL standards. To ensure compliance with these standards, the central bank must exercise prudence in its decision-making process. On the contrary, the scale of the bank is inversely related to ROE. A greater bank size increases customer lending, amplifying the portfolio of NPL, thereby introducing raised credit and financial risk. This provides insights into the moderating effect of size. Therefore, the size of a bank is negatively but substantially correlated with its performance. Moreover, the findings suggest a substantial and positive relationship between the bank capital ratio (TCTA) and ROE, suggesting that banks with higher capitalization generally exhibit superior performance.

The results indicate a positive correlation between LE and bank performance (ROE) regarding the bank-specific variables in the performance equation. Financial companies prioritize labor productivity (LE) over least effective people recruiting and training since LE is necessary to achieve maximum efficiency and higher profitability. Enhanced performance is a direct result of managing bank risk factors in accordance with BASEL policy and initiatives and the regulations regulating how banks implement BASEL guidelines. The study's

conclusions have consequences for both the creation of public policy and the application of knowledge. It is advised that politicians, central banks, and stock exchanges prioritize strategic reforms in light of the findings.

Policy Implications

BASEL regulations are crucial for banks to maintain sufficient capital, as some failed to do so. Since some banks failed to keep adequate capital, BASEL regulations are essential. In accordance with these requirements, banks must publish capital adequacy. By improving capital accumulation and capital development funding, lowering liquidity risk, minimizing profit inefficiency concerns, and fostering the development of risk-averse, performance-enhancing investment strategies, a high capital ratio can boost profitability. South Asian banks, particularly in Bangladesh, should consider all risks, including credit and liquidity risks, to maintain and improve performance and avoid failure. Clear guidelines by upper management are crucial for risk managers to oversee credit risk effectively. Bank administration should monitor long-term debtors promptly to prevent credit risk and ensure punctual loan repayment. Transparent regulations governing loan issuance and repayment by borrowers are also recommended. Bank management must regularly monitor liquidity to maintain sufficient assets and mitigate liquidity risk. This will improve the liquidity situation of banks.

Further research is needed to compare risks in developed and emerging countries. In order to preserve economic stability, international banking system strengthening has been advocated by worldwide governing entities as a result of the global financial crisis that occurred between 2007 and 2009. Only developing countries are the subject of this article. Improving capital positions while simultaneously reducing risk is the main goal of the Basel Agreement. Bank policymakers, therefore, need to apply Basel III as soon as possible and strictly. To strengthen capital holdings, therefore, governmental authorities need to establish robust corporate structures. In the end, it is expected that this investigation's findings will significantly advance scholarship and be crucial for future scholars and decision-makers.

Limitations of the Study and Future Research Directions

Because they rely on annual reports and the perception of a less robust regulatory framework in developing nations, the study's statistics on banks may need to accurately reflect their circumstances. The data was collected during eight years, from 2014 to 2021, and could be enhanced with additional research. The study has implications for financial stability and banking system regulations. Future research should take these and other risk indicators into account as well as bank- and industry-specific and macroeconomic aspects.

Author's Contribution

Brishti Chakraborty utilized EViews 12 to comprehensively analyze relevant articles, organize data, and implement analytical approaches. She wrote the whole manuscript.

Conflict of Interest

The author certifies that she has no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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References

Abbas, F., Iqbal, S., & Aziz, B. (2019). The impact of bank capital, bank liquidity and credit risk on profitability in postcrisis period: A comparative study of US and Asia. *Cogent Economics & Finance*, *7*(1), Article 1605683. https://doi.org/10.1080/23322039.2019.1605683

Alam, S. M., Akter, S., & Ahmed, M. H. (2020). Explaining firms' behavioral intention towards environmental reporting in Bangladesh: An application of theory of planned behavior. *Journal of International Business and Management*, *3*(2), 1–12. https://doi.org/10.37227/JIBM-2019-04-24

Al-Homaidi, E. A., Tabash, M. I., & Ahmad, A. (2020). The profitability of Islamic banks and voluntary disclosure: Empirical insights from Yemen. *Cogent Economics & Finance*, *8*(1), Article 1778406. https://doi.org/10.1080/23322039.2020.1778406

Al-Matari, E. M. (2019). Do characteristics of the board of directors and top executives have an effect on corporate performance among the financial sector? Evidence using stock. *Corporate Governance*, *20*(1), 16–43. https://doi.org/10.1108/CG-11-2018-0358

Alshatti, A. S. (2016). Determinants of banks' profitability - The case of Jordan. *Investment Management and Financial Innovations*, *13*(1), 84–91. https://doi.org/10.21511/imfi.13(1).2016.08

Amin, M. A., Sanusi, N. A., Kusairi, S., & Abdallah, Z. M. (2014). Inverse relationship of financial risk and performance in commercial banks in Tanzania. *Investment Management and Financial Innovations*, *11*(4), 279–291.

Ardekani, A. M., Distinguin, I., & Tarazi, A. (2020). Do banks change their liquidity ratios based on network characteristics? *European Journal of Operational Research*, *285*(2), 789–803. https://doi.org/10.1016/j.ejor.2020.02.011

Cahyono, S. B., & Chawla, A. S. (2021). Capital structure among secondary sectors of Indonesian firms: Does business scale matter? *Indian Journal of Finance, 15*(10), 8–27. https://doi.org/10.17010/ijf/2021/v15i10/166509

Chen, Y.-K., Shen, C.-H., Kao, L., & Yeh, C. - Y. (2018). Bank liquidity risk and performance. *Review of Pacific Basin Financial Markets and Policies, 21*(1), 1850007. https://doi.org/10.1142/S0219091518500078

Coffie, W., Aboagye-Otchere, F., & Musah, A. (2018). Corporate social responsibility disclosures (CSRD), corporate governance and the degree of multinational activities: Evidence from a developing economy. *Journal of Accounting in Emerging Economies*, *8*(1), 106–123. https://doi.org/10.1108/JAEE-01-2017-0004

Dahir, A. M., Mahat, F. B., & Ali, N. A. (2018). Funding liquidity risk and bank risk-taking in BRICS countries: An application of system GMM approach. *International Journal of Emerging Markets*, *13*(1), 231–248. https://doi.org/10.1108/IJoEM-03-2017-0086

DeYoung, R., & Jang, K. Y. (2016). Do banks actively manage their liquidity? *Journal of Banking & Finance*, *66*, 143–161. https://doi.org/10.1016/j.jbankfin.2015.11.013

Diamond, D. W., & Rajan, R. G. (2001). Liquidity risk, liquidity creation, and financial fragility: A theory of banking. *Journal of Political Economy, 109*(2), 287–327. https://doi.org/10.1086/319552

Ekinci, R., & Poyraz, G. (2019). The effect of credit risk on financial performance of deposit banks in Turkey. *Procedia Computer Science*, *158*, 979–987. https://doi.org/10.1016/j.procs.2019.09.139

Fernandes, G., dos Santos Mendes, L., & de Oliveira Leite, R. (2021). Cash holdings and profitability of banks in developed and emerging markets. *International Review of Economics & Finance*, *71*, 880–895. https://doi.org/10.1016/j.iref.2020.10.018

Gatsi, J. G., Anipa, C. A., Gadzo, S. G., & Ameyibor, J. (2016). Corporate social responsibility, risk factor and financial performance of listed firms in Ghana. *Journal of Applied Finance & Banking*, *6*(2), 21–38.

Hunjra, A. I., Hanif, M., Mehmood, R., & Nguyen, L. V. (2021). Diversification, corporate governance, regulation and bank risk-taking. *Journal of Financial Reporting and Accounting*, *19*(1), 92–108. https://doi.org/10.1108/JFRA-03-2020-0071

Islam, M. S., & Nishiyama, S.-I. (2016). The determinants of bank net interest margins: A panel evidence from South Asian countries. *Research in International Business and Finance*, *37*, 501–514. https://doi.org/10.1016/j.ribaf.2016.01.024

Jain, S., Kaur Dhillon, L., Aggarwal, R., & Bagga, T. (2023). Corporate governance mechanism, ownership structure, and firm performance: Evidence from India. *Indian Journal of Finance, 17*(9), 25–40. https://doi.org/10.17010/ijf/2023/v17i9/173182

Kalsoom, A., & Khurshid, M. K. (2016). A review of impact of interest rate spread on profitability. *Research Journal of Finance and Accounting*, *7*(11), 23–26.

Khatun, M., & Siddiqui, S. (2016). Size, equity backing, and bank profitability: A case study using panel data from Bangladesh. *Journal of Applied Finance & Banking*, *6*(1), 1–14.

Kofarmata, Y. I., Applanaidu, S. D., & Hassan, S. (2016). Determinants of demand for credit: A conceptual review. *Asian Journal of Economics and Empirical Research*, *3*(1), 6–10. https://doi.org/10.20448/journal.501/2016.3.1/501.1.6.10

Kumar, V. P., & Kar, S. (2021). Measuring efficiency of selected Indian commercial banks: A DEA-based MPI approach. *Indian Journal of Finance, 15*(5–7), 44–60. https://doi.org/10.17010/ijf/2021/v15i5-7/164492

Lithin, B. M., Chakraborty, S., & Nikhil, M. N. (2023). Are liquidity and credit risk key determinants of corporate credit spreads (CCS) in India? *Indian Journal of Finance*, *17*(6), 8–26. https://doi.org/10.17010/ijf/2023/v17i6/172773

Mainrai, G., & Mohania, S. (2023). Redefining risk: Indian sterling bank's journey to mitigate concentration risk. *Indian Journal of Finance*, *17*(11), 40–49. https://doi.org/10.17010/ijf/2023/v17i11/173326

Majumder, M. T., & Li, X. (2018). Bank risk and performance in an emerging market setting: The case of Bangladesh. *Journal of Economics, Finance and Administrative Science*, *23*(46), 199–229. https://doi.org/10.1108/JEFAS-07-2017-0084

Marozva, G. (2015). Liquidity and bank performance. *International Business & Economics Research Journal (IBER)*, *14*(3), 453–562. https://doi.org/10.19030/iber.v14i3.9218

Moudud-Ul-Huq, S., Zheng, C., & Gupta, A. D. (2018). Does bank corporate governance matter for bank performance and risk-taking? New insights of an emerging economy. *Asian Economic and Financial Review*, *8*(2), 205–230. https://doi.org/10.18488/journal.aefr.2018.82.205.230

Moudud-Ul-Huq, S., Zheng, C., Gupta, A. D., Hossain, S. K., & Biswas, T. (2023). Risk and performance in emerging economies: Do bank diversification and financial crisis matter? *Global Business Review, 24*(4), 663–689. https://doi.org/10.1177/0972150920915301

Mule, R. K., Mukras, M. S., & Nzioka, O. M. (2015). Corporate size, profitability and market value: An econometric panel analysis of listed firms in Kenya. *European Scientific Journal*, *11*(13), 376–396. https://repository.maseno.ac.ke/handle/123456789/75

Munangi, E., & Sibindi, A. B. (2020). An empirical analysis of the impact of credit risk on the financial performance of South African banks. *Academy of Accounting and Financial Studies Journal*, *24*(3), 1–15.

Noor, M. A., Das, P. C., & Banik, B. P. (2018). Impact of credit risk management on financial performance of banks: A study on major state-owned commercial banks in Bangladesh. *The Cost and Management*, *46*(1), 12–19.

Nsiah, R. (2017). Assessing the effectiveness of credit risk management processes and its impact on financial performance of credit unions in Ghana. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3077209

Robin, I., Salim, R., & Bloch, H. (2018). Financial performance of commercial banks in the post-reform era: Further evidence from Bangladesh. *Economic Analysis and Policy*, *58*, 43–54. https://doi.org/10.1016/j.eap.2018.01.001

Saleh, I., Abu Afifa, M., & Alsufy, F. (2020). Does earnings quality affect companies' performance ? New evidence from the Jordanian market. *The Journal of Asian Finance, Economics and Business, 7*(11), 33–43. https://doi.org/10.13106/jafeb.2020.vol7.no11.033

Santhi, P., Sasirekha, P., & Anija, J. (2024). A causal linkage between corporate sustainability performance and financial performance of select IT & ITeS companies in India. *Indian Journal of Finance, 18*(2), 43–59. https://doi.org/10.17010/ijf/2024/v18i2/173520

Sharma, P. K., & Dhiman, B. (2023). Impact of non-performing assets on financial performance of selected merged Indian public sector banks. *Indian Journal of Finance*, *17*(7), 54–69. https://doi.org/10.17010/ijf/2023/v17i7/172829

Siddique, A., Khan, M. A., & Khan, Z. (2022). The effect of credit risk management and bank-specific factors on the financial performance of the South Asian commercial banks. *Asian Journal of Accounting Research*, *7*(2), 182–194. https://doi.org/10.1108/AJAR-08-2020-0071

Tabassum, & Pande, S. (2021). A study of determinants and their impact on bank debt restructuring in Indian banks. *Indian Journal of Finance, 15*(9), 8–23. https://doi.org/10.17010/ijf/2021/v15i9/166318

Takouda, P. M., Dia, M., & Ouattara, A. (2022). Financial inclusion in West African economic and monetary union's economies: Performance analysis using data envelopment analysis. *Journal of Risk and Financial Management, 15*(12), 605. https://doi.org/10.3390/jrfm15120605

Uddin, M. J., Majumder, M. T., Akter, A., & Zaman, R. (2022). Do the diversification of income and assets spur bank profitability in Bangladesh? A dynamic panel data analysis. *Vilakshan - XIMB Journal of Management*,*19*(2), 177–194. https://doi.org/10.1108/XJM-01-2021-0023

Umar, U. H., & Kurawa, J. M. (2019). Business succession from an Islamic accounting perspective. *ISRA International Journal of Islamic Finance*, *11*(2), 267–281. https://doi.org/10.1108/IJIF-06-2018-0059

Vijaykumar, N. V., & Tripathi, A. (2022). A revised paradigm for calculating the NPA percentage in banks. *Indian Journal of Finance*, *16*(11), 40–55. https://doi.org/10.17010/ijf/2022/v16i11/172463

Yao, H., Haris, M., & Tariq, G. (2018). Profitability determinants of financial institutions: Evidence from banks in Pakistan. *International Journal of Financial Studies*, *6*(2), 53. https://doi.org/10.3390/ijfs6020053

Yoshino, N., & Taghizadeh-Hesary, F. (2019). A comprehensive method for the credit risk assessment of small and medium-sized enterprises based on Asian data. In, *Unlocking SME finance in Asia* (pp. 55–71). Routledge.

Zheng, C., Moudud-Ul-Huq, S., Rahman, M. M., & Ashraf, B. N. (2017). Does the ownership structure matter for banks' capital regulation and risk-taking behavior? Empirical evidence from a developing country. *Research in International Business and Finance*, *42*, 404–421. https://doi.org/10.1016/j.ribaf.2017.07.035

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