DOI: https://doi.org/10.4038/ijabf.v12i1.193

International Journal of Accounting & Business Finance
Vol.12, No.1, June 2026 Issue. pp: 102-129

THE RELATIONSHIP BETWEEN CREDIT RISK AND PROFITABILITY WITH THE MODERATING EFFECT OF REGULATORY COMPLIANCE: EVIDENCE FROM THE BANKING SECTOR OF SRI LANKA

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Received: 22 January 2026 Revised: 13 June 2026 Accepted: 24 June 2026

Abstract

This study aims to examine the relationship between credit risk and the profitability of banks in Sri Lanka, with a moderating effect on regulatory compliance. Using a quantitative approach, secondary data collected from audited annual report from 11 listed banks covering the period from 2014 to 2024 were analyzed. Credit Risk was measured through the Non-Performing Loan (NPLR) and Loan to Deposit Ratio (LDR), while Profitability was represented through Return on Assets (ROA). Regulatory Compliance was operationalized using the Compliance indicator aligned with Basel III guidance. Random Effects regression was used following the Husman Specification test. Regulatory compliance significantly moderates the NPLR & ROA and LDR & ROA relationship, reducing the negative impact of low credit quality and boosting the benefit of sound lending practices. This study provides empirical insight into how the Compliance Framework affects the Risk-return Dynamic in banks within emerging markets. The findings offer insights. for bank managers, Policymakers, and regulators to enhance credit risk practice and align compliance mechanisms to support stable and sustainable profitability.

Keywords: Bank Profitability, Credit Risk, Non-Performing Loan, Loan to Deposit Ratio, Regulatory Compliance.

1. Introduction

Credit risk and bank profitability can be identified as decisive factors affecting the performance and viability of the banking sector in the modern financial system. Banks play an important role in the national economy by collecting deposits and providing necessary credit facilities for productive industries. However, this intermediation can also increase credit risk as a counter-effect, as banks' profitability can decline as borrowers become more reluctant to borrow, (Abdelaziz et al., 2022). Credit risk can be seen as an essential factor for the resilience of the entire financial system, not limited to the sustainability of a single bank. As past crises have shown, credit risk can undermine investor confidence and thereby

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create long-term systemic vulnerabilities (Bank for International Settlements, n.d.). ROA can generally be cited as a criterion that indicates the financial sustainability of a bank. Abbas et al. (2019) identified negative relationship between non-performing loans and Bank profitability in the U.S and Asia, while Siddique et al. (2022) observed no significant impact in South Asian Context. These differing outcomes indicate that factors such as macroeconomic conditions, regulatory frameworks, and internal risk management affect bank performance and bank credit risk (Fedun & Silwimba, 2023). In Sri Lanka, the banking sector contributes more than 60% of financial assets, which has a significant value on the national economy. (Central Bank of Sri Lanka, n.d.). By 2024, Sri Lanka's licensed commercial and specialized banks had assets of nearly Rs. 20 trillion, accounting for about 80% of GDP (Goyal et al., 2025). However, the banking sector came under pressure from credit risk due to the deepening economic turmoil, currency devaluation, and rising non-performing loans. The NPL ratio hit 10.7% in 2024, much higher than in previous years, leading to lower ROA and ROE levels (Thavapalakumar, 2024). Local studies show mixed results regarding the relationship between credit risk and profitability. While Bara et al. (2021) and Mithila and Kengatharan (2024) found negative relationships, while Arun and Balagobei (2023) and Gunaratne and Buddhika (2025) reported different results depending on the data measurement method and the periods studied. Despite significant global research, previous literature has shown mixed results on how credit risk affects profitability (Gisaoui et al., 2015; Abbas and Jawad, 2023). There is no clear consensus on credit risk in Sri Lanka. This situation can be exacerbated by increasing non-performing loan ratios, stricter regulatory requirements, and reduced capital buffers. Furthermore, global studies suggest that credit risk can be affected and the impact of regulatory compliance on the banking system has not been well investigated (Mohammad et al., 2024).

A significant gap has emerged in understanding the interplay between credit risk, profitability, and regulatory standards in Sri Lanka's evolving financial landscape. Given these issues, this study focuses on two main research questions: (1) exploring the relationship between credit risk, measured by the Non-Performing Loan Ratio (NPLR) and the Loan-to-Deposit Ratio (LDR), and the profitability of Sri Lankan banks, and (2) determining whether regulatory compliance affects this relationship. The following sections of this article present a literature review, research methods, empirical results, discussion, and conclusions with implications for policy and practice.

1.2 Knowledge Gap

Despite numerous studies highlighting the interplay between credit risk and profitability in the banking industry, most studies are concentrated in developed countries or on regional markets in general, rather than specifically on the Sri Lankan market context. Studies conducted in Sri Lanka in the past, namely by Bara et al. (2021), Arun and Balagobei (2023), and Kapilarathne and Weligamage (2023), were primarily concerned with establishing the direct effect of credit risk or separate risk factors on the profitability metric without giving special consideration to the effect of regulatory compliance in mediating these relationships. However, resources found in various parts of the world including Abdelaziz et al. (2022) and Abbas et al. (2019) incline to verify that compliance in the market enhances resilience and reduces risks linked to the fluctuation and uncertainty of the market

Moreover, the literature that has been in place has seen compliance with regulations as an independent variable and has not seen it as a means that converts credit risk to making of profits. Therefore, there is a vast amount of knowledge gap in this area especially in the emerging country of Sri Lanka where various institutions have different regulatory frameworks that have different compliance costs. Consequently, the research will researchers in introducing the gap in knowledge by evaluating this moderating impact of adherence to regulations on credit risk and profitability among banks in Sri Lanka.

These contributions provide theoretical insights into the risk-return dynamics of banking, providing practical implications for bank managers, regulators, and policymakers seeking to strengthen credit risk control and compliance mechanisms in the Sri Lankan financial system. also will provide a new perspective on the resilience of banks for the banking system in an emerging economy recovering from a financial crisis and provide insights into how to effectively deal with economic fluctuations.

2. Literature Review

2.1 Credit Risk

Credit risk is the risk that borrowers will fail to meet their contractual loan repayment obligations, which can result in financial losses for the bank (Abdelaziz et al., 2022). This situation can be pointed out as one of the main risks affecting the resilience and profitability of commercial banks worldwide. In this research, two key indicators of credit risk can be

pointed out as non-performing loan ratio (NPLR) and loan-to-deposit ratio (LDR). NPLR measures the percentage of loans that are near or close to default, indicating asset quality problems. (Gizaw et al., 2015). A high NPLR value suggests poor credit management, weaknesses in supervision, and deteriorating economic conditions, which can reduce bank profitability. (Abbas et al., 2019). LDR indicates how much a bank lends in relation to customer deposits. While a high LDR value can lead to higher interest income, it can also increase credit risk by leading banks to liquidity problems by providing too much lending relative to deposits (Fadun & Silwimba, 2023).

Research has shown that credit risk is a major cause of bank instability, particularly in developing countries. In particular, economic shocks, weak governance, and unstable markets increase the risk of default (Ghosh, 2015). In South Asia, rising credit exposure, deteriorating credit quality, and uncertain economic conditions have led to high levels of non-performing loans, and credit risk has become a major concern for policy and research (Thavapalakumar, 2024). As a result, credit risk is seen as an important factor affecting bank profitability and financial stability

2.2 Profitability

A bank's profitability can be considered a key indicator that measures a bank's financial health, operational efficiency, and long-term performance. ROA is widely used because it indicates how well a bank manages its assets (Bara et al., 2021). Previous research has shown that profitability can be affected by many internal factors, such as risk management, operational efficiency, capital structure, and governance. In addition, it has been shown that profitability can be affected by external factors, including the regulatory framework and the prevailing economic situation. (Goyal et al., 2025).

The existing literature provides conflicting evidence on the impact of credit risk and profitability. For example, Abbas et al. (2019) reported a negative relationship between non-performing loans (NPL) and profitability in US and Asian banks.

In contrast, Siddique et al. (2022) found no significant effect in the South Asian region. Similarly, in emerging markets, the strength and direction of this relationship depend on economic conditions, bank size, risk tolerance, and institutional frameworks. These differences highlight the need for context-specific analysis, especially in countries such as Sri Lanka, which are undergoing economic restructuring and regulatory changes.

2.3 Regulatory Compliance

Regulatory compliance is defined as the state of compliance with banking supervisory standards, particularly prudential regulations such as Basel III capital adequacy, liquidity coverage ratios, leverage ratios, and risk control requirements. Increased transparency through compliance frameworks will reduce bank risk and enhance the resilience of the financial system. Several studies have suggested that strict compliance can reduce risk-taking behavior, thereby reducing credit risk. Internal use of compliance and good valuation can maintain investor confidence.

On the other hand, the practical application of regulatory compliance can create high operational costs that can reduce short-term profitability. There has been a great deal of debate about the benefits of compliance and the costs of compliance in developing economies, where financial institutions have limited resources and high exposure to macroeconomic volatility. In this context, there is an opportunity to understand regulatory compliance as a key driver of credit risk and bank profitability, highlighting additional importance for Sri Lanka.

2.4 Theoretical Perspective

Credit risk and regulatory compliance are modeled using a set of three theories. Risk-return trade-off theory: According to the theory, risk is proportional to the return on investment. Although risk is positively related to the return on investment, credit risk is positively related to profitability only when default rates are low (Sharp, 1964). Stakeholder theory: According to the stakeholder theory, banks should carefully balance credit risk exposure with credit risk management. Banks exist in a stakeholder system consisting of other institutions such as regulators, depositors, investors, and customers. A proper compliance system helps ensure that everything is transparent with minimal harm to the interests of shareholders, therefore increasing the chances of a company's success (Freeman, 1984). According to Straughan and Albers (1997) of RDT, no organization stands alone but relies on external resources for its success. A proper compliance system helps improve access to bank resources with stakeholder credibility while having minimal impact on profitability (Pfeffer & Salancik, 2003).

These theories provide a comprehensive understanding of how credit risk-profitability is affected by compliance.

2.5 Basel Accord Framework

The Basel Accord Framework, developed by the Basel Committee on Banking Supervision, has functioned as an efficient tool in making standardized norms in risk management and ensuring the sustainability of the banking sector. This bank observance tool serves as a general rule guiding the lenders in the manner of replacing the bank capital adequately, better the bank liquidity, as well as in the manner of implementing effective strategies of risk management (Shetty and Bhat, 2024). The different stages of the bank supervisory instrument: Basel I, II, and III, hugely lay stress on credit risk management, bank adequacy prerequisites, and bank adherence in the aspect of banking sustainability (Thomas et al., 2023). Following Basel III bank compliance enables this to be possible, as the sustainability of banks during a downturn economic environment will be improved, thus making sure that banks are profitable, as proposed by Yamin et al. (2025). Based on the works of scholars like Kadek (2022) and Oyeniyi et al. (2021), it was assumed that Basel Framework theoretically has the bases to offer information about the moderation effect of compliance on the relationship between credit risks and bank profitability. Basel Framework mandates the banks to embrace critical requirements in assessing risks weighted assets and ensuring that appropriate loan procedures are followed whilst optimising the bank profitability. To fully stabilise the performance of bank profitability, Gulati (2023) affirmed the argument that under an environment of bank compliance, efficient operation, and confidence on the market. According to the setting of the Sri Lankan market, the policies surrounding the Basel Framework implementation allowed banking organisations to incorporate the best practises in the process related to internal control management, especially regarding the increased risk of credits in the industry (Ranaweera, 2022).

2.6 Empirical Study on Credit Risk and Profitability

Regional studies show that a high NPL ratio generally reduces bank profitability, and LDR has inconsistent effects: some studies find positive relationships due to increased interest income, while others highlight liquidity risks associated with aggressive lending. This seems to show mixed results. According to the empirical evidence of Gizaw et al. (2015) and Bara et al. (2021), a high NPL ratio generally reduces bank profitability. On the other hand, LDR has inconsistent effects. The results of studies in Sri Lanka also show considerable variation.

For example, Bara et al. (2021) and Mithila and Kengatharan (2024) reported negative effects of credit risk on profitability, while Arun and Balagobei (2023) concluded mixed findings based on the use of different risk variables. Taking a similar view, Gunaratne and Buddhika (2025) also found differences based on macroeconomic fluctuations and bank-specific characteristics. Such inconsistencies further justify the need for an updated empirical analysis in the Sri Lankan context.

2.7 Empirical Study on Regulatory Compliance as a Moderate Effect

Recent studies have highlighted the potential of regulatory compliance to moderate the relationship between credit risk and profitability. As Koutoupis and Malisiovas (2023) revealed, effective compliance frameworks are a factor in reducing risky behavior and reducing non-performing loans. Similarly, Mohamed et al. (2024) showed how compliance increases resilience to credit shocks and improves bank performance. As these findings are limited to global and regional settings, no specific evidence can be identified from the South Asian or Sri Lankan contexts. In Sri Lanka, with its high non-performing loan rates and a gradually evolving regulatory environment, examining compliance as a moderating variable is a significant research gap.

03. Methodology

3.1 Research Design

Adopting a quantitative, positive and deductive research design to examine the relationship between credit risk and bank profitability, the moderating effect of regulatory compliance is also assessed. As in many previous studies investigating risk-return dynamics in banking, for example, Abbas et al. (2019), and Gisaew et al. (2015), a panel data approach is applicable here. This study uses secondary data obtained from audited annual reports, financial statements and official regulatory disclosures of listed commercial banks covering the years 2014–2024. Such a time frame can capture the dynamics that have occurred in the Sri Lankan economic landscape and therefore provides a comprehensive view of shifts in risky behavior and performance.

3.2 Population and Sample

The population consists of all licensed commercial banks in Sri Lanka, 24 of which were operating as of 2024 (Central Bank of Sri Lanka, n.d.). Using a purposive sampling method, the study selected 11 listed commercial banks due to the consistent availability of annual data and adherence to reporting standards required for empirical analysis. Listed banks were chosen because they exhibit higher disclosure transparency and compliance with regulatory reporting guidelines issued under the Banking Act Directions No. 01 of 2016 (Central Bank of Sri Lanka, 2016).

3.3 Hypotheses Development and Conceptual Framework

H1: There is a significant relationship between credit

risk and profitability.

H1a: There is a significant relationship between NPL and Profitability.

H1b: There is a significant relationship between the LDR and Profitability.

H2: The relationship between credit risk and profitability is moderated by regulatory compliance.

H2a: Regulatory compliance significantly moderates the relationship NPL and the profitability of banks in Sri Lanka.

H2b: Regulatory compliance significantly moderates the relationship between the LDR and the profitability of banks in Sri Lanka

3.4 Conceptual Framework

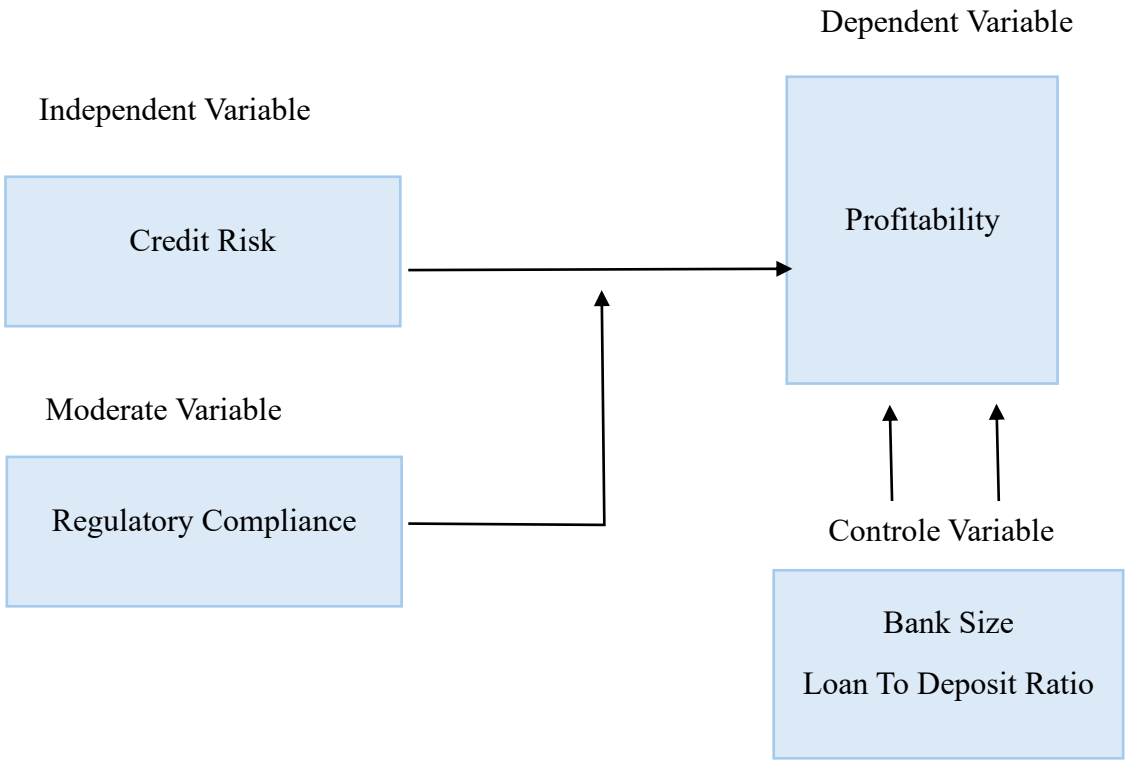


Figure 1 Conceptual Framework

3.5 Variable and Measurement

Table 1 Variable and Measurement

Variables	Measurement
Profitability (ROA)	Profit After Tax / Total Assets
Non-Performing Loan Ratio (NPLR)	Non-Performing Loans / Total Loans
Loan-to-Deposit Ratio (LDR)	Total Loans / Total Deposit
Moderating Variable	(TCR) + (LCR)+(LR) + (NSFR) / 4
Bank Size (FSIZE)	Ln (Total Assets)

3.6 Model Specification

The study applied panel regression models to examine the direct and moderating effects.

Model 1: Direct Relationship

$$ROA_{i,t} = \beta_0 - \beta_1 NPL_{i,t} + \beta_2 LDR_{i,t} + \beta_3 FSIZE_{i,t}$$

Model 2: Moderating Effect of Regulatory Compliance

$$ROA_{i,t} = \beta_0 - \beta_1 NPL_{i,t} + \beta_2 LDR_{i,t} - \beta_3 Regulatory_{i,t} + \beta_4 NPLREG_{i,t} + \beta_5 LDRREG_{i,t} + \beta_6 FSIZE_{i,t}$$

3.7 Hausman Test

The Hausman test is a commonly used statistical procedure for determining whether a fixed-effects or a random-effects model is more appropriate for a panel data set. Under the null hypothesis, the random-effect model adequately captures the data, rendering the fixed-effects model unnecessary. The alternative hypothesis posits that the random-effect model fails to adequately capture the data, necessitating a fixed-effect model. When the p-value of the Hausman test statistic is below 0.01, the fixed-effect model is preferred, leading to rejection of the null hypothesis. (Hausman J., 1978).

4. Result & Discussion

4.1 Introduction

After reviewing the objectives of the research, this chapter explores the empirical findings and debate, revealing the complicated nature of the relationship between Credit risk and bank Profitability and simultaneously examining the moderating effect of regulatory compliance in the context of the banking industry of Sri Lanka, from 2014 to 2024, the report thoroughly examined a number of Credit Risk and bank Profitability metrics across commercial bank in sri Lanka. To ensure the regression results were reliable, a rigorous procedure of winsorizing and outlier detection was carried out before the regression analysis. Key variables, including ROA, NPL, LDR, Regulatory Compliance, FSIZE were outlined by the descriptive analysis. Then, to verify that the data met the assumptions required for a thorough regression analysis, tests such as multicollinearity, unit root tests, normality tests, and correlation matrices were used to assess the data's validity and

reliability. To assess whether the fixed or random effects model is best suited for the panel regression analysis, the Hausman test was employed.

Significant p-values and chi-square values supported the results, which demonstrated the superiority of Random effects models. Regression analysis was then used to investigate the relationship between Credit Risk and Bank Profitability. Additionally, an examination was conducted into the moderating effect of Regulatory Compliance on the relationship between Credit Risk and Bank Profitability.

4.2 Descriptive Analysis

Table 2 Descriptive Analysis

Variables	Min	Max	Mean	Median
ROA	0.013	0.172	0.011	0.010
NPL	0.004	0.138	0.069	0.072
LDR	3.595	5.757	4.528	4.481
REG	3.000	5.000	4.000	4.000
FSIZE	10.641	15.316	12.982	13.105

Note(s): ROA: Return on Assets, NPL: Non-Performing Loan, LDR: Loan to Deposit Ratio, REG: Regulatory Compliance, FSIZE: Total Assets

Stata Output

The study provided important new insights into important operational and financial aspects through its retrospective investigation of Sri Lanka's banking industry. Among the sample banks, the average ROA was 1%, as demonstrated by the mean ROA of 0.010. The range of 1.3% to 1.72% showed performance variability, highlighting a modest level of asset efficiency. NPLs range from 0.4% to 13.8%, with a mean of 6.9% and a median of 7.2%. The closeness of the mean and median indicates a symmetric distribution of credit risk across the sample; however, the wide span from very low NPLs to over 13% reveals meaningful cross-bank differences in asset quality. An average NPL of around 6.9% suggests a non-trivial level of credit risk that could exert downward pressure on profitability if not adequately provisioned or managed. LDR values range from 3.595 to 5.757, with a mean of 4.528 and a median of 4.481. The small difference between mean and median signals a balanced distribution of lending intensity across banks. The observed range

indicates variation in lending strategies: some banks are relatively conservative (lower LDR) while others are more aggressive in deploying deposits into loans (higher LDR). These differences in maturity/asset deployment behavior are likely to influence interest margins and, thus, ROA. Regulatory compliance is reported on a 3 - 5 scale, with a minimum of 3 and a maximum of 5, and both mean and median equal to 4.0. This central value indicates that, on average, banks in the sample demonstrate a solid level of regulatory compliance. The limited spread (only 3 to 5) suggests moderate variation across banks, which makes regulatory compliance a plausible and measurable moderator in the relationship between credit risk (NPL) and profitability (ROA). FSIZE spans 10.641 to 15.316, with a mean of 12.982 and a median of 13.105. The closeness of the mean and median implies a symmetrical distribution of bank sizes in the sample. The span shows a mixture of smaller and larger banks, with most banks clustering near the mean, while larger outliers also exist. Size is therefore a meaningful control variable; larger banks may have diversification or scale advantages that affect both risk and profitability.

4.3 Normality Test

Skewness and Kurtosis tests were used to determine if the data were normal, as shown in above table. Following commonly accepted thresholds (skewness between -2 and +2; kurtosis between -7 and +7) (Blanca, Arnau, López-Montiel, Bono, & Bendayan, 2013; Yusoff & Wah, 2012; Yamada, Romer, & Richards, 2022), all variables fall well within these limits. For example, ROA shows a skewness of -0.215 and a kurtosis of 2.571, NPL has skewness -0.039 and kurtosis 1.771, LDR has skewness 0.200 and kurtosis 1.809, REG has skewness 0.000 and kurtosis 1.663, and FSIZE has skewness -0.102 and kurtosis 1.901. Because each variable's skewness and kurtosis values lie comfortably inside the accepted ranges, the

The normality assumption is reasonably satisfied for the sample. Respecting normality assumptions improves the robustness and reliability of the statistical analyses that follow, providing a strong basis for interpreting the results of this research.

Table 3 Normality Test

Labels	Normality	
	Skew.	Kurt.
ROA	(0.215)	2.571
NPL	(0.039)	1.771

LDR	0.200	1.809
REG	0.000	1.663
FSIZE	(0.102)	1.901

Note(s): ROA: Return on Assets, NPL: Non-Performing Loan, LDR: Loan to Deposit Ratio, REG: Regulatory Compliance, FSIZE: Total Assets

4.4 Unit Root Test

As panel-data empirical work is sensitive to non-stationarity because non-stationary series can produce spurious regression results and autocorrelation problems (Gujarati, 2003), utilizing the Levin, Lin, and Chu tests, the Unit Root test was used to evaluate the panel data's stationarity. According to the LLC test, the null hypothesis assumes that the series is non-stationary due to the presence of a unit root test. while the alternative hypothesis (H1) asserts stationarity. The finding results are reported in the above Table, clearly showing that the Levin, Lin, and Chu test is statistically significant at 1%. This indicates that stationarity is present in the panel data from 2014 to 2024, confirming the analytical framework's resilience and dependability.

Table 4 Unit Root Test

Labels	Levin-Lin-Chu Adjusted t	Process
ROA	-5.7276 (0.0000***)	Stationary
NPL	-5.6179 (0.0000***)	Stationary
LDR	-3.2400 (0.0000***)	Stationary
REG	-4.6452 (0.0000***)	Stationary
FSIZE	-5.6032 (0.0000***)	Stationary

Note(s): ROA: Return on Assets, NPL: Non-Performing Loan, LDR: Loan to Deposit Ratio, REG: Regulatory Compliance, FSIZE: Total Assets

4.5 Multicollinearity Test

The Variance Inflation Factor (VIF) was used to evaluate collinearity among the variables. Gujarati (2003) states that a VIF greater than 10 indicates multicollinearity (Easy Stats, 2021). According to the findings in the above table, the VIF values are all below 10. Hence, it can be concluded that the multicollinearity problem does not exist.

Table 5 Multicollinearity Test

Labels	Multicollinearity Test
	VIF test
LDR	1.058
NPL	1.056
REG	1.024
FSIZE	1.004
Mean VIF	1.036

Note(s): LDR: Loan to Deposit Ratio, NPL: Non-Performing Loan, REG: Regulatory Compliance, FSIZE: Total Assets

Source – Stata Output

4.6 Correlation Matrix

The correlation matrix sheds light on the direction and strength of the correlations among the variables this study examined. Even if the relationships are not particularly strong, some significant findings may be made. moderate negative correlation between ROA and NPL, suggesting that higher credit risk is correlated with lower profitability. LDR exhibits virtually no correlation with ROA, indicating that lending intensity has little to no direct relationship with profitability, and a little positive relationship with REG, suggesting that variations in lending intensity, firm size, and regulatory compliance explain little of the variation in ROA in this sample. NPL is weakly positively correlated with LDR.

Table 6 Correlation Matrix

Variables	ROA	NPL	LDR	REG	FSIZE
ROA	1.000				
NPL	-0.480	1.000			
LDR	-0.008	0.210	1.000		
REG	0.052	-0.118	-0.116	1.000	
FSIZE	-0.012	-0.006	0.053	-0.028	1.000

Note(s): ROA: Return on Assets, NPL: Non-Performing Loan, LDR: Loan to Deposit Ratio, REG: Regulatory Compliance, FSIZE: Total Assets

4.7 Hausman Test

The Hausman test is a commonly used statistical procedure for determining whether a fixed-effects or a random-effects model is more appropriate for a panel data set. Under the null hypothesis, the random-effect model adequately captures the data, rendering the fixed-effects model unnecessary. The alternative hypothesis posits that the random-effect model fails to adequately capture the data, necessitating a fixed-effect model. When the p-value of the Hausman test statistic is below 0.01, the fixed-effect model is preferred, leading to rejection of the null hypothesis. (Hausman J., 1978).

4.7.1 Model 1 Credit Risk and ROA

The Hausman test was applied to Model 01 to assess whether the fixed-effects specification should be preferred over the random-effects specification. The Chi-square test value = 1.16 with a p-value = 0.763. Since the p-value is large, the null hypothesis, which assumes the consistency of the random effects estimator, is not rejected (Hausman, 1978). In practical terms, the result indicates that the random-effects model is considered suitable for Model 01; moreover, the near-identical coefficient estimates from the FE and RE estimators increase confidence in the stability of the main findings.

Table 7 Hausman Test Model 01

Hausman (1978) specification test	Model 01
	Coef.
Chi-square test value	1.16
P-value	0.763

4.7.2 Model 02: Credit Risk and ROA Regulatory Compliance as the Moderating Effect.

The null hypothesis for the Hausman test states that the Random Effects model is consistent and, consequently, more efficient than the fixed effects model. The test results indicate that the random effect model is appropriate for analysis, as it provides consistent and more efficient estimates compared to the fixed effects model.

Table 8 Hausman Test Model 02

Hausman (1978) specification test	Model 02
	Coef.
Chi-square test value	0.808
P-value	0.992

Stata Output

4.8 Regression Analysis

It has been decided to use Random Effect regression as the main estimation technique to assess the proposed hypotheses. This decision provides the methodological basis for resolving two crucial questions: first, is there a significant relationship between Credit Risk and the profitability of Sri Lanka's banking sector? Second, is regulatory Compliance able to moderate the relationship between Credit Risk and banks' Profitability? These problems are methodically addressed by utilizing Random Effect regression, which permits a thorough investigation of the links proposed in the Setting of Sri Lanka's banking industry.

4.8.1 Credit Risk and Profitability

Table 9 Regression Model 01

Variables	Model 1	
	Coef.	p-value
NPL	-1.013	0.000 ***
LDR_ln	0.012	0.197
FSIZE	-0.001	0.811
Constant	0.039	0.575
R^2		0.24
Chi – Square		43.954
Prob > chi2		0.000

It has been decided to use Random Effect regression as the main estimate technique to assess the proposed hypotheses. This decision provides the methodological basis for resolving two

crucial questions: first, is there a significant relationship between NPL and the ROA of Sri Lanka's banking sector? Second, there is a significant relationship between LDR and the ROA of Sri Lanka's banking sector. These problems are methodically addressed by utilizing Random Effect regression, which permits a thorough investigation of the links proposed within Sri Lanka's banking industry. Employing ROA as the dependent variable, the R-square value of model 1 was 0.24, indicating that the independent variables explain 24% of the variability in the dependent variable. The R-squared value for ROA was found to be rather low, at 0.24. Nevertheless, it is important to recognize that R-squared is not necessarily a reliable indicator of model fit for panel data models. The statistical significance of each individual coefficient and the model's overall significance was suggested as the researchers' primary focus instead (Ozili, 2022; Nawaz, 2017). NPL exhibits a significant negative Relationship between ROA, and LDR exhibit an insignificant Relationship between ROA. The NPL coefficient is - 1.01 (SE = 0.15, $p < 0.01$).

$$ROA_{i,t} = 0.04 - 1.01NPL_{i,t} + 0.01LDR_{i,t} + 0.001FSIZE_{i,t}$$

4.8.1.2 Discussion: Direct Relationship Between Credit Risk and Profitability.

The study's findings indicate a significant negative relationship between credit risk and bank profitability in Sri Lanka, as measured by ROA. This negative relationship suggests that banks with higher NPLs tend to experience lower profitability. The correlation coefficient between ROA and NPL ($r = - 0.480$) and the regression coefficient (- 1.01, $p < 0.01$) both confirm the adverse effect of poor asset quality on bank performance. These findings are consistent with the consensus in the banking literature that credit risk directly reduces profitability by increasing loan loss provisions and reducing interest income. These results are consistent with previous studies by Kithinji (2010) and Felix and Claudine (2008), both of whom reported that rising levels of non-performing loans significantly reduce banks' profitability.

Similarly, Epure & Lafuente (2015) found that higher credit risk is associated with lower returns on assets among European banks, suggesting that effective credit risk management is essential to maintaining profitability. These findings are also supported by Makri, Tsagkanos, & Bellas (2014), who noted that NPL rates have a significant negative impact on bank profitability across Eurozone countries, especially after the global financial crisis. Furthermore, the results of this study are consistent with the Sri Lankan banking environment, where Gunasekara (2018) and Fernando (2020) reported that increasing NPL

rates in domestic commercial banks have led to a decline in profitability due to increased provisioning costs and reduced interest margins. These results highlight the sensitivity of profitability to asset quality in Sri Lankan banks, especially amid tightening credit conditions and rising regulatory expectations. Theoretically, these results support the risk-return trade-off theory, which holds that high credit risk is associated with lower returns when risk is poorly managed. The results are also consistent with agency theory: poor supervision and poor lending practices, often driven by misaligned incentives between managers and shareholders, lead to an increase in non-performing loans and a subsequent decline in profitability. Therefore, the study's findings provide empirical support for rejecting the null hypothesis that there is no relationship between credit risk and profitability, and the significant negative coefficient indicates that high levels of credit risk directly impair the financial performance of the Sri Lankan banking industry. This relationship highlights the importance of strengthening credit assessment, continuous credit monitoring, credit productivity, and effective recovery mechanisms as strategic priorities to maintain profitability.

4.8.2 Credit Risk and ROA Regulatory Compliance as the Moderating Effect – Model 02.

Table 10 Regression Model 02

Variables	Model 2		
	Coef.	p-value	
NPL	1.15	0.15	
LDR_ln	-0.08	0.08	
REG	-0.07	0.18	
NPL_REG	0.54	0.01	***
LDR_REG	0.02	0.04	**
FSIZE	0.00	0.88	
Constant	0.31	0.17	
Overall r-squared		0.292	
Chi-square		56.713	
Prob > chi2		0.000	

Stata Output

$$ROA_{i,t} = 0.31 + 1.15NPL_{i,t} - 0.08LDR_{i,t} - 0.07Regulatory_{i,t} + 0.54NPLREG_{i,t} + 0.02LDRREG_{i,t} + 0.00FSIZE_{i,t}$$

The random effects regression in **Error! Reference source not found.** and **Error! Reference source not found.** examines the moderating effect of regulatory compliance on the relationship between credit risk and profitability (ROA) among licensed commercial banks in Sri Lanka. The R-squared value of the model, 0.292, indicates that approximately 29.2% of the variance in profitability is explained by the independent variables and their interactions. Overall, the model is statistically significant, with a chi-squared value of 56.713 ($p < 0.01$) confirming its strong explanatory power. The interaction term NPL_REG (0.54, $p = 0.01$) is positive and statistically significant at the 1% level, confirming that Regulatory Compliance positively moderates the relationship between NPL and ROA. This means that greater regulatory compliance mitigates the negative impact of credit risk on banks' profitability. Adhering closely to regulatory frameworks (such as Basel III requirements) can better manage non-performing loans, leading to improved profitability. The interaction term LDR_REG (0.02, $p = 0.04$) is also positive and significant at the 5% level, indicating that Regulatory Compliance strengthens the positive effect of LDR on profitability. This suggests that when lending activities are conducted under strict compliance, they enhance profitability, implying that regulatory supervision encourages prudent credit allocation and sustainable performance.

4.8.2.2 Discussion: Moderating effect of Regulatory compliance on the relationship between Credit Risk and Profitability.

The results suggest that the proposed hypothesis H2, that regulatory compliance moderates the relationship between credit risk and bank profitability, is accepted. The regression results confirm that the interactions between credit risk indicators and regulatory compliance (NPLREG and LDRREG) are statistically significant. The interaction between NPL and REG (NPLREG) is positive at the 1% level, and the interaction between LDR and REG (LDRREG) is positive and significant at the 5% level. These findings indicate that regulatory compliance significantly moderates the relationship between credit risk and profitability (ROA) for licensed commercial banks in Sri Lanka. Accordingly, banks with higher levels of regulatory compliance will be able to mitigate the adverse impact of credit risk and enhance the positive impact of lending activities on profitability. The findings of this study are consistent with previous empirical evidence showing that strong compliance frameworks improve banks' resilience and strengthen risk management systems. Studies by

Gulati (2023), Koutoupis and Malisiovas (2023), and Ranaweera (2022) found that banks that adhere to strict Basel III and Central Bank of Sri Lanka (CBSL) requirements exhibit improved financial performance, driven by greater transparency and effective risk management. Furthermore, Abdelaziz et al. (2022) and Abbas et al. (2019) highlighted that compliance mechanisms reduce loan defaults and support sustainable profitability by improving the monitoring of loan portfolios. Therefore, the current study reinforces the view that regulatory compliance plays an important moderating role in ensuring prudent management of credit risk in the Sri Lankan banking system. These findings are conceptually aligned. According to these theories, compliance regulations promote disciplined risk-taking by inducing banks to maintain adequate capital buffers and liquidity positions, and as observed in this study, high levels of compliance translate risky lending practices into more efficient and profitable financial intermediaries. This situation also supports the long-term stability of banks. In line with agency theory, regulatory oversight also acts as an external control mechanism, ensuring a high level of shareholder confidence in bank managers' adherence to sound lending and credit assessment standards (Oino, 2021; Gulati, 2023). Finally, the moderated effect of regulatory compliance on the profitability of Sri Lankan banks is supported by evidence suggesting that compliance measures depend not only on credit risk exposure but also on how effectively they are integrated into operations. Higher compliance standards improve credit quality and create a strong foundation of internal control mechanisms, enabling banks to withstand financial stress and maintain profitability. Therefore, the findings contribute empirically and theoretically by highlighting that regulatory compliance acts as a stabilisation mechanism that translates potential credit risk into long-term financial resilience and performance in the Sri Lankan banking sector.

4.9 Summary of Hypothesis

Table 11 Hypothesis

Alternative Hypothesis	P value (ROA Model)	Status of the alternative hypothesis
There is a significant relationship between Non-Performing Loans (NPL) and profitability.	0.000	Accepted
There is a significant relationship between the Loan-to-Deposit Ratio (LDR) and profitability.	0.197	Rejected

Regulatory compliance significantly moderates the relationship between Non-Performing Loans (NPLs) and bank profitability in Sri Lanka.	0.010	Accepted
Regulatory compliance significantly moderates the relationship between the Loan-to-Deposit Ratio (LDR) and bank profitability in Sri Lanka.	0.040	Accepted

5: Conclusion & Recommendation

5.1 Conclusion

This study investigated the relationship between credit risk and bank financial performance and tested whether regulatory compliance moderates that relationship using panel data (143 observations). The Hausman test led to the use of a random-effects estimator. In Model 1, non-performing loans (NPLs) have a negative, highly significant association with ROA. while LDR and bank size (FSIZE) are not statistically significant. In moderated model 02, the interaction term NPL × Regulatory is Positive and significant. The LDR × Regulatory interaction is positive and significant, indicating that stronger regulatory compliance weakens LDR's negative relationship with ROA. Overall, credit Risk (NPL) is a primary determinant of profitability, and the impact of credit and liquidity indicators on ROA is conditioned by the level of regulatory compliance.

5.2 Implication of the findings

For bank management: Reducing NPLs is important, since deterioration in loan quality impairs ROA performance. Prudential credit underwriting, coupled with timely provisioning and effective recovery practices, will secure profitability under tight regulatory supervision. For regulators/supervisors: Stricter compliance increases the immediate profitability costs associated with poor loan portfolios by raising provisioning requirements or tightening enforcement. Regulators should therefore balance prudential objectives against measures that preserve banks' ability to intermediate efficiently. For funding and liquidity strategy: The effect of LDR on profitability depends on regulatory quality; banks operating under stronger compliance regimes can extract more benefit from deposit-funded lending without proportionate risk, implying that sound regulation improves the returns-to-risk of lending activities. For investors and stakeholders: Bank profitability needs to be assessed alongside

both loan-quality metrics and the regulatory environment, as regulatory compliance affects how credit and liquidity ratios translate into reported ROA.

5.3 Limitations of the research

The breadth of the investigation and the generalizability of the findings are the main limitations of the research. The research, although representative of the sector, may not adequately represent the wide range of banking establishments because it concentrated on a sample of 11 banks in Sri Lanka. Additionally, the eleven-year assessment period, spanning 2014 to 2024, may not adequately capture the dynamic nature of Credit Risk and its impact on Bank Profitability.

5.4 Recommendation

Based on the study's findings, banks can further enhance their credit risk management practices through better credit underwriting procedures, enhanced borrower monitoring systems, and the introduction of additional advanced early-warning mechanisms to reduce the level of NPLs. Efficient provisioning and restructuring policies need to be enforced to address potential losses from defaulted loans and ensure bank profitability. Besides, regulatory compliance should not be perceived solely as a legal duty but as a tool that can help make banking operations more efficient and stable. Banks are recommended to incorporate compliance frameworks into their comprehensive risk management and decision-making processes to support sustainable financial performance. Regulators, for their part, are encouraged to balance rigid supervisory policies with those that give banks enough latitude to operate efficiently without sacrificing prudent standards. Transparency enhances investor confidence and promotes better accountability within the sector, so increased transparency of credit risk and compliance information is suggested.

5.5 Suggestions for future research

Future studies should extend the scope and methods of inquiry by using larger and more diverse samples, including specialized, foreign, and smaller banks, or cross-country comparisons and multiple measures of profitability, such as ROE and NIM, as well as micro-level loan or sectoral NPL data to allow for heterogeneity in effects. They should also apply dynamic and causal estimation techniques such as system GMM, difference-in-differences, or natural experiments, to account for endogeneity and identify causal pathways. Complementary mixed methods work interviews or surveys with bank risk officers,

auditors, and regulators would be needed to explain the mechanisms by which regulatory compliance interacts with credit risk and profitability. Other useful extensions would include testing for nonlinear/threshold effects of compliance, examining the moderating roles of fintech adoption and corporate governance, conducting event studies around major regulatory or macroeconomic shocks, and analysing how accounting standards (e.g., IFRS 9) and provisioning rules alter the NPL-profitability relationship.

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