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Exploring the Role of Bank-Specific Factors in Nonperforming Loans: A Study of Islamic Banks in Bangladesh

Asaduzzaman Limon
Department of Business Administration, Shahjalal University of Science and Technology, Bangladesh
E-mail: limon.sust.51@gmail.com
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Abstract - **Nonperforming loans (NPLs) have posed a significant challenge to the banking sector in Bangladesh for decades, particularly within Islamic banks, where little research has been conducted to assess the relationship between agency costs and nonperforming loans. This study explores the role of agency costs and other bank-specific factors in determining nonperforming loans (NPLs) in Islamic banks in Bangladesh. This study employs pooled ordinary least squares (OLS) regression with panel data from Q1 2013-14 to Q4 2023-24 to analyze the relationship between the cost-to-income ratio (as a proxy for agency costs), return on assets (ROA), loan-to-deposit ratio (LDR), capital adequacy ratio (CAR), and NPL ratios. The study confirms that agency costs play a central role in influencing NPLs, alongside other bank-specific factors such as profitability, capital adequacy, and lending practices. The results indicate that a high level of operational inefficiency significantly influences NPLs, whereas ROA and CAR act as mitigating factors for credit risk. Conversely, aggressive lending practices, as indicated by an increased LDR, are associated with higher NPLs. Islamic banks face significant institutional flaws, and agency costs reflect deeper governance issues that cannot be ignored. The study further argues for the need to improve governance, operational efficiency, and prudent lending practices within Islamic banks.**
Keywords: **Nonperforming Loans (NPLs), Agency Costs, Islamic Banks, Operational Efficiency, Capital Adequacy Ratio (CAR)**

I. INTRODUCTION

Non-Performing Loans (NPLs) represent a significant concern for the banking industry, as they are loans that are in default or are at high risk of default (Klein, 2013). Increased NPL ratios can negatively impact a bank's profitability, limit new lending capacities, and threaten the stability of financial institutions (Louzis *et al.,* 2012). A non-performing loan (NPL) is a loan in which the lender is unable to receive the scheduled payment of principal and interest (Anita *et al.,* 2022). While Islamic banks, which operate on Shariah principles that forbid interest (riba), have expanded rapidly in Bangladesh, they also face similar challenges (Bangladesh Bank, 2023).

Several drivers have already been identified in prior research on the influences of NPLs, such as operational efficiency, profitability, and bank size. Increased NPLs are correlated with inefficiencies, as evidenced by a high Cost-to-Income Ratio, a measure of operating expenses in relation to income (Jensen & Meckling, 1976). This ratio serves as a key proxy for agency costs, which may arise due to conflicts of interest between managers and shareholders, potentially leading to suboptimal lending practices (Ang *et al.,* 2000). Moreover, larger banks tend to be more resilient to credit risks due to their diversified loan portfolios (Beck *et al.,* 2013). However, the literature on the determinants of NPLs in Islamic banks is still very limited, particularly in developing countries like Bangladesh.

Although the determinants of NPLs have been primarily examined for conventional banks, little research has been conducted on addressing these factors for Islamic banks, especially in the context of Bangladesh (Beck *et al.,* 2013). Agency costs are commonly examined in the literature, typically through the Cost-to-Income Ratio; however, this has been neglected in Islamic banking studies. Islamic banks operate under distinct frameworks and governance structures based on Shariah principles, and therefore require customized analyses, as opposed to conventional banks (Rahman, 2020). Existing literature either generalizes findings from conventional banking or fails to account for the unique characteristics of Islamic banks (Jensen & Meckling, 1976). The current gap in the literature indicates the need for empirical research that takes agency costs and other variables into consideration to examine their impact on NPLs in Islamic banks in Bangladesh.

Moreover, understanding the major drivers of NPLs for Islamic banks is crucial for financial system stability and sustainable economic growth. While there are many contributing factors, one type of internal inefficiency that contributes to high credit risks is agency costs (Jensen & Meckling, 1976). By analyzing these costs in the context of Islamic banks, this study sheds light on performance-enhancing operational frameworks as well as lending decisions (Ajayi, 2017). In Greece, findings revealed that both macroeconomic factors and entity-specific factors, such as operational inefficiencies, considerably affected NPLs, adding to the relevance of this study in the context of Bangladesh (Louzis *et al.,* 2012). Furthermore, this study contributes to the limited knowledge on Islamic banking, particularly for emerging markets such as Bangladesh, and lays the groundwork for further academic exploration and policy development (Rahman, 2020; Beck *et al.,* 2013). However, this paper attempts to evaluate the effects of agency costs on the NPL ratios of selected Islamic banks in Bangladesh.

The specific objectives are:

1. To analyze the relationship between the cost-to-income ratio (as a proxy for agency costs) and NPL ratios.
2. To assess the influence of control variables - bank size, return on assets (ROA), loan-to-deposit ratio (LDR), and capital adequacy ratio (CAR) - on NPL ratios.
3. To provide recommendations for reducing NPLs through the effective management of agency costs.

II. LITERATURE REVIEW

A. Concepts of Agency Cost and Non-Performing Loans

1. Agency Cost

Agency cost, usually associated with cost inefficiency, is defined by the ratio of normal operating expenses to normal operating income, indicating "bad management" and unethical conduct that could potentially result in the company's failure (Jensen & Meckling, 1976). It stems from the principal-agent relationship, wherein principals (shareholders) empower agents (managers) to act on their behalf (Caers *et al.,* 2006). Disparate interests among these parties can create information asymmetry and inefficient management, thereby increasing agency costs (Eisenhardt, 1989). Minimizing agency costs is a communication issue that cannot be achieved without transparency and alignment (Jensen & Meckling, 1976).

2. Non-Performing Loans (NPLs)

NPLs are the risk of credit associated with a debtor who has failed to pay off loan obligations for two months or more, or who has been delinquent for more than 90 days (Prawira & Wiryono, 2020). Asymmetric information, in this context, results in lenders not fully understanding their borrowers' repayment abilities, which leads to poor credit assessments and increases the risk of NPLs (Stiglitz, 2002). Banks should conduct better debtor analyses, as the lack of one is a major cause of rising NPL ratios, and they need a strong framework for credit management (Laksono & Setyawan, 2019).

B. Determinants of Non-Performing Loans in Islamic Banks

Non-performing loans (NPLs) in Islamic banks are primarily affected by bank-specific characteristics, including the cost-to-income ratio (CIR) as a proxy for agency costs (Khan *et al.,* 2020). A high CIR signals ineffective management of operational costs as a function of revenue, typically resulting from inadequate levels of governance or risk management, and correlates with higher instances of NPLs (Jensen & Meckling, 1976; Ekanayake & Azeez, 2015). Return on assets (ROA), which measures a bank's profitability, is another important metric. Higher NPLs generally imply lower ROA due to poor operational and credit management practices (Messai & Jouini, 2013; Ayyappan & Sakthivadivel, 2013). Similarly, the loan-to-deposit ratio (LDR) reflects the liquidity and lending aggressiveness of a bank. Excessively high LDRs indicate lending risk, which can increase NPLs (Rajha, 2016).

In the case of bank size, defined as the natural logarithm of total assets, this measure has previously had both positive and negative effects on NPLs. Larger banks may benefit from diversified loan portfolios and better credit monitoring, resulting in lower NPL ratios (Morshed Bhuiya *et al.,* 2023). However, marginal defaults may rise due to excessive exposure in certain sectors (Beck *et al.,* 2013). As a measure of a financial institution's capacity to absorb losses, the capital adequacy ratio (CAR) is inversely related to NPL declarations, because when CAR levels are high, banks are better equipped to cover credit risks (Alhassan *et al.,* 2014; Selvaraju, 2018).

Macroeconomic factors also play a key role. When more borrowers can repay their debts, NPLs are reduced; however, inflation and unemployment together can create various credit risks for NPLs (Klein, 2013). Further worsening default risks is the information asymmetry that exists between banks, making credit evaluations less accurate (Stiglitz, 2002). Islamic banks with a thorough understanding of these determinants can stabilize their financial conditions and manage credit risk more effectively.

C. Review of Prior Studies

Non-performing loans (NPLs) are a major problem for the banking system, affecting profitability, liquidity, and the overall health of the banking sector (Rahman & Jahan, 2018). Non-performing loans (NPLs) are defined as "loans (the asset) that have stopped producing income for a protracted period" (Caprio & Klingebiel, 2002). Several methods have been suggested to calculate NPLs, such as NPL ratios to gross loans or net provisions against total capital (Waweru & Spraakman, 2012). Previous studies have shown the negative impact of NPLs on banks' growth, constraining their ability to lend and tying up funds in unproductive assets (Karim *et al.,* 2010; Rehman *et al.,* 2024).

Bank-specific determinants, such as operational inefficiency, bank profitability, bank size, and capital adequacy, have been explored in detail in previous studies. One indicator of transaction costs is the cost-to-income ratio (CIR), which reflects operational inefficiency. A high CIR may indicate poor governance and management, contributing to higher NPL ratios (Messai & Jouini, 2013; Jensen & Meckling, 1976). Profitability ratios, such as return on assets (ROA), have also demonstrated a negative association with NPLs, suggesting that highly efficient and profitable banks have more control over credit risk (Rajha, 2016; Alhassan *et al.,* 2014). Additionally, the capital adequacy ratio (CAR) also helps inhibit NPLs by providing a buffer against future losses. Furthermore, banks with larger and more diversified portfolios in traditional lending tend to have lower NPL ratios (Beck *et al.,* & Merrouche, 2013; Salas & Saurina, 2002).

Comparative analyses of methodologies and findings highlight key similarities and differences. Using a panel dataset, Messai and Jouini (2013) studied European banks and found that inefficiencies and a high CIR significantly

influence NPL ratios. This finding was confirmed in Sri Lanka by Ekanayake and Azeez (2015). Both studies cited operational inefficiency and weak credit management as key catalysts for NPLs, which corresponds with the current study's focus on agency costs, proxied by CIR. Based on the analysis of Bangladeshi banks, Akter and Roy (2017) concluded that NPLs have an inverse impact on profitability ratios, such as net interest margins, which aligns with prior evidence on the impact of ROA in efficient credit risk management.

Despite these consistencies, few studies have focused on Islamic banks. Most of these studies do not consider the unique governance structures and operational tenets of Islamic banking, such as profit-and-loss sharing principles, which could affect agency costs and credit risk. The current study complements the existing literature by examining only Islamic banks in Bangladesh, investigating the impact of agency costs, bank size, return on assets (ROA), loan-to-deposit ratio (LDR), and capital adequacy ratio (CAR) on NPL ratios. By focusing on the unique determinants of Islamic banks, this study sheds light on key issues that have been overlooked in prior research.

III. METHODOLOGY

The study uses a quantitative research design, relying on secondary panel data from the first quarter of 2013-14 to the fourth quarter of 2023-24, and investigates the effects of agency costs and other bank-specific factors on the NPL ratios of selected Islamic banks in Bangladesh.

A. Data and Variables

The data used in this study consist of quarterly financial data from the four largest Islamic banks in Bangladesh: Islami Bank Bangladesh PLC, Al-Arafah Islami Bank PLC, EXIM Bank PLC, and First Security Islami Bank PLC. These banks were selected based on total assets, ensuring that the largest institutions in the Islamic banking sector in Bangladesh were included (Tab Insights, 2024). The data were collected from the available annual reports of the selected banks, which are the most reliable and consistent source of information over the study period and are publicly accessible.

In this study, the Cost-to-Income Ratio (CIR), which serves as the proxy for agency costs, is the independent variable, while the NPL ratio is the dependent variable. Control variables include bank size, return on assets (ROA), loan-to-deposit ratio (LDR), and capital adequacy ratio (CAR). The implementation of this study, including the measurement approaches, measurement scales, and sources of operational variables for the determinants of nonperforming loan (NPL) ratios in the selected Islamic banks in Bangladesh, is shown in Table I.

TABLE I OPERATIONALIZATION OF THE VARIABLES

Variable	Measurement	Measurement Scale	Source
NPL Ratio	Non-performing loans as a percentage of total gross loans	Percentage (%)	Waweru & Spraakman (2012)
Cost-to-Income Ratio	Total operating expenses divided by total operating income	Percentage (%)	Jensen & Meckling (1976)
Bank Size	Logarithm of total assets	Continuous (Logarithmic)	Salas & Saurina (2002)
Return on Assets (ROA)	Net income divided by total assets	Percentage (%)	Messai & Jouini (2013)
Loan-to-Deposit Ratio (LDR)	Total loans divided by total deposits	Ratio	Rajha (2016)
Capital Adequacy Ratio (CAR)	Capital as a percentage of risk-weighted assets	Percentage (%)	Alhassan *et al.,* (2014)

B. Model Specification

To examine the relationship between the NPL ratio and the predictors, the study employs a pooled ordinary least squares (OLS) regression model. The equation is expressed as follows:

$$NPL\ Ratio_{it} = \beta_0 + \beta_1\ CIR_{it} + \beta_2\ Bank\ Size_{it} + \beta_3\ ROA_{it} + \beta_4\ LDR_{it} + \beta_5\ CAR_{it} + \epsilon_{it}$$

Here, *i* represents the bank, and *t* denotes the time period. The coefficients β_1, β_2, ..., β_5 measure the impact of each predictor on the NPL ratio, and ϵ_{it} denotes the error term. As stated by Wooldridge (2020), pooled ordinary least squares (OLS) is particularly effective for panel data analysis, as it provides efficient estimators that account for time- and entity-specific changes.

C. Techniques of Analysis

The data are first analyzed using descriptive statistics, which include the mean, median, and standard deviation - essentially summarizing the data. These statistics enable an exploration of the central tendency and variability of each variable, which helps build an understanding of how the data are distributed (Weisberg, 1992). The analysis measures both the strength and direction of the relationship between two variables. It is important to assess potential collinearity between predictors to ensure that the regression estimates are valid (Wooldridge, 2020).

The researcher performs diagnostic tests to check the robustness of the regression model. To diagnose multicollinearity between variables, Variance Inflation Factor (VIF) tests are conducted to confirm that no predictor is highly correlated with another predictor (Asteriou & Hall, 2021). The Durbin-Watson test is applied to determine whether the residuals are autocorrelated. A value around 2 suggests no autocorrelation (Wooldridge, 2020). Additionally, the Jarque-Bera test for residual normality is applied, with a small value indicating that the residuals are normally distributed (Gujarati & Porter, 2009). This test compares the skewness and kurtosis of the residuals with those of a normal distribution. These are critical tests that ensure the assumptions of pooled OLS regression are met, thus providing reliable results.

Finally, to estimate the relationships among the dependent variable (NPL ratio) and the predictors, pooled OLS regression is employed (Wooldridge, 2020). This technique allows for the capture of both cross-sectional and temporal variation by exploiting panel data, producing unbiased estimates of the effects of agency problems and other bank-specific factors. Sensitivity analysis is performed using EViews 12, where the execution of calculations supports the integrity of the methodology, ensuring stability aligned with the objectives of this research.

IV. ANALYSIS

This paper analyzes the impact of the determinants of Islamic banks' non-performing loans (NPLs) in the context of Bangladesh through descriptive statistics, correlation, and regression analysis. The analysis examines agency costs, profitability, capital adequacy, lending standards, and the relationship between efficiency and credit risk, ultimately bringing us full circle to the connection between operational efficiency and governance. The results of the descriptive statistics for each variable are presented below (see Table II).

TABLE II DESCRIPTIVES STATISTICS

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Observations
NPL_Ratio	17.55012	17.50463	1.435439	15.00472	19.99396	176
Cost_to_Income_Ratio	64.79772	64.61532	2.935516	60.00598	69.95422	176
ROA	82.85051	82.64564	4.247822	75.09276	89.83261	176
CAR	10.88163	10.86133	0.598099	9.492145	12.32026	176
LDR	2.231225	2.228394	0.43579	1.516073	2.993602	176

The mean NPL ratio for the sample is 17.55%, with a moderately low standard deviation of 1.43%, suggesting similar loan performance across the banks. The Cost-to-Income Ratio (CIR) has a mean of 64.80%, indicating operational efficiency and serving as a proxy for agency costs, with little variation. Strong profitability is indicated by the return on assets (ROA), with a mean of 82.85%, while the capital adequacy ratio (CAR), with a mean of 10.88%, reflects good capital adequacy levels. The loan-to-deposit ratio (LDR), with a mean of 2.23, suggests moderate aggressiveness in lending.

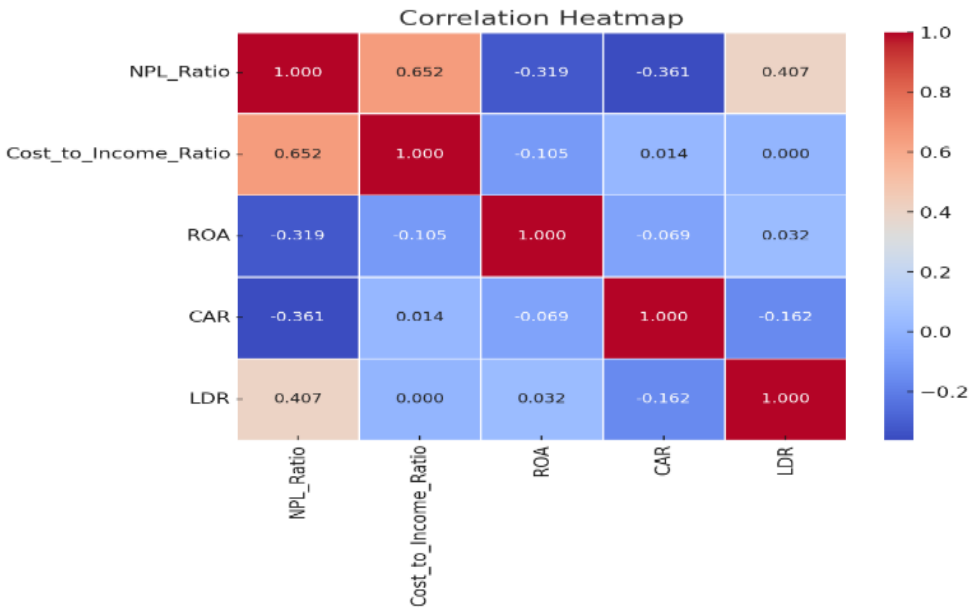

Fig. 1 Correlation Analysis

The correlation analysis reveals significant relationships among the variables in the context of NPL ratios. The Cost-to-Income Ratio (CIR) is strongly and positively correlated (r = 0.652) with the NPL ratio, suggesting that operational inefficiency increases credit risk.

On the other hand, the return on assets (ROA) (r = −0.319) and the capital adequacy ratio (CAR) (r = −0.361) are inversely related to NPL ratios, further demonstrating the protective effects of profitability and capital adequacy. In line with patterns of borrowing performance, the loan-to-deposit ratio (LDR) shows a moderate positive correlation (r = 0.407), highlighting the need for contracted loans and efficient credit management.

The results of the Variance Inflation Factor (VIF) tests indicate that there is no multicollinearity problem in the current study.

TABLE III VARIANCE INFLATION FACTORS

Variable	VIF
const	1169.503
Cost_to_Income_Ratio	1.011243
ROA	1.016357
CAR	1.03121
LDR	1.027322

All VIF values are closer to 1 than to the threshold of 10, suggesting that the predictors - Cost-to-Income Ratio, ROA, CAR, and LDR - are not highly correlated, with values of 1.011, 1.016, 1.031, and 1.027, respectively. It is noted that the VIF for the constant (1169.503) is unusually high, but it does not indicate multicollinearity among the regression models. These results suggest the validity of the independent variables in estimating the NPL ratio, consistent with the data analysis methods used in this study.

TABLE IV OLS ESTIMATION

Variable	Coefficient	Standard Error	t-Statistic	P-value	Significance
Intercept	1.6871	0.751	2.246	0.026	Significant
Cost-to-Income Ratio	0.1277	0.008	16.916	0.000	Significant
ROA	-0.3955	0.051	-7.759	0.000	Significant
CAR	-0.1381	0.016	-8.860	0.000	Significant
LDR	0.0510	0.005	9.707	0.000	Significant
Model Fit Statistics				**Value**	
R-squared				0.768	
Adjusted R-squared				0.763	
F-statistic				141.5	
P-value (F-statistic)				3.78e-53	

The regression model indicates that non-interest income, the cost-to-income ratio, and market share are statistically significant determinants (see Table V). The R-squared value of 0.768 means that 76.8% of the variance in NPL ratios is accounted for by the independent variables, and the adjusted R-squared value of 0.763 further indicates the robustness of the model. The overall model is significant, and the high F-statistic (141.5, $p < 0.01$) demonstrates that the model fits well with the relationships between the variables.

The Cost-to-Income Ratio (CIR), which serves as a proxy for agency costs, is a significant positive predictor ($\beta = 0.1277$, $p < 0.01$). On the other hand, operational inefficiencies that amplify credit risks - especially since higher CIR values degrade NPL ratios - are a major highlight of this finding. This supports the main premise of the study, which suggests that agency costs play a fundamental role in driving loan performance in Islamic banks.

Return on Assets (ROA) ($\beta = -0.3955$, $p < 0.01$) exhibits a significant negative association with NPL ratios, suggesting that higher profitability and operational efficiency decrease the likelihood of loan defaults. Similarly, the Capital Adequacy Ratio (CAR) ($\beta = -0.1381$, $p < 0.01$) demonstrates a negative relationship with NPL ratios, further confirming the need to maintain adequate capital buffers to safeguard against credit risks. These results are consistent with previous studies highlighting the protective role of profitability and capital adequacy.

On the other hand, the Loan-to-Deposit Ratio (LDR) ($\beta = 0.0510$, $p < 0.01$) positively correlates with NPL ratios, meaning that over-extensive lending leads to more defaults. This finding underscores the importance of prudent lending practices to preserve financial stability.

In summary, agency costs, as modeled by the CIR, prove to be crucial determinants of NPL ratios, alongside other specific bank characteristics, including profitability, capital adequacy, and lending behavior. The findings emphasize the need for improved governance and operational efficiency, as well as the reduction of credit risk, to minimize NPLs and enhance the financial performance of Islamic banks.

TABLE V DIAGNOSTIC RESULTS

Diagnostic Test	Test Statistic	P-Value	Interpretation
Omnibus Test	48.07631	-	Indicates significant deviation from normality in residuals
Durbin-Watson Test	2.247974	-	Confirms no significant autocorrelation in residuals
Jarque-Bera Test	10.38699	0.005553	Shows mild non-normality in the residuals

The regression model is validated through diagnostic tests. While the Omnibus Test (statistic = 48.07631) indicates only mild non-normality in the errors, the Jarque-Bera Test (statistic = 10.38699, p = 0.0056) suggests some deviation from normality. The Durbin-Watson statistic (2.248) is not concerning for autocorrelation, ensuring a valid regression estimate. These results imply that, although the residuals do not perfectly follow a normal distribution, the model is robust, and the associations between predictors and the NPL ratio are valid and statistically significant.

V. DISCUSSION AND RECOMMENDATIONS

The findings highlight the significant role of agency costs and bank-specific factors in shaping non-performing loan (NPL) ratios in Islamic banks in Bangladesh. Consistent with prior literature, operational inefficiencies, captured by the cost-to-income ratio (CIR), were robustly and positively associated with NPL ratios, confirming the theoretical expectation that misgovernance and inefficiencies at the bank level exacerbate the level of credit risk (Messai & Jouini, 2013; Jensen & Meckling, 1976). Moreover, profitability, as measured by return on assets (ROA), and capital adequacy (CAR) protect against the onset and growth of NPLs (Rajha, 2016; Alhassan *et al.,* 2014). The relationship between the loan-to-deposit ratio (LDR) and NPLs highlights the risks associated with aggressive lending practices. These findings are not only consistent with previous research but also present a new contribution, as the study focuses on Islamic banks, which maintain different governance structures and operating principles compared to conventional banks.

Islamic banks in Bangladesh should give prime importance to strategic measures for cutting agency costs through governance structural reforms, ensuring that effective internal monitoring is adopted to ultimately reduce NPLs. Additionally, banks should invest in staff training, technology, and tools to assess credit risk and improve operational efficiency. Furthermore, banks with high LDR should have strong capital buffers and track lending methods to counter the dangers of excessive LDR. Finally, regulators need to provide Islamic banks with the flexibility to address their unique governance structures while balancing the need for financial stability with the demands of Shariah compliance.

VI. CONCLUSION

This study highlights how operational inefficiencies, governance practices, and credit risk are interrelated for Islamic banks in the context of Bangladesh. Islamic banks face significant institutional flaws, and agency costs, as represented by the cost-to-income ratio, are symptoms of these deeper governance issues that cannot be ignored. Profitability and capital adequacy remain key buffers, emphasizing the need for solid financial planning and efficient resource allocation. Since Islamic banking operates under unique governance principles, risk management tools must be adapted to ensure Shariah compliance, as operational excellence inherently challenges traditional risk management practices. In response to emerging financial stability challenges, Islamic banks need to focus on innovation, efficiency, and specialized regulatory frameworks while managing global systemic risks. This knowledge serves as the foundation for improving both scholarly discussions and practical measures in Islamic finance.

VII. LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

The generalizability of this study's findings - namely, their application to settings other than the specific Islamic banks in Bangladesh - is limited by the narrow scope of this analysis. Moreover, the analysis does not account for macroeconomic determinants that may affect NPL ratios. Future studies could also explore comparative analyses between Islamic and conventional banks, incorporate larger datasets across regions, and analyze the interaction of macroeconomic and bank-specific determinants to gain a better understanding of NPL dynamics.

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