

**An Internship Report on
Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC**



*(This report is submitted for the partial fulfilment of the program of Bachelor of
Business Administration (BBA) with Major in Finance and Banking)*

SUBMITTED TO

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DATE OF SUBMISSION

20 April 2026



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Letter of Transmittal

20 April, 2026

Dr. Md. Monzur Hossain

Assistant Professor

Department of Finance and Banking

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Subject: Submission of internship report titled “**Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC**”.

Respected Sir,

With due respect and great pleasure, I am Md. Salauddin Efthi, a student of the BBA program, submitting the internship report titled Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC. The report is a prerequisite for completing Bachelor’s of Business Administration at Comilla University.

I convey my deepest appreciations to you for your continuous guidance and wholehearted supervision and supports in preparing this. I express my sincerest gratitude for having been given opportunity to prepare this and like to share that I enjoyed doing so.

I, therefore, would be grateful if you can enlighten me with your perspective on the assignment and assess the assignment keeping the limitations in mind.

Your sincerely,

Md. Salauddin Efthi

ID: 12117011

Session: 2020-21

Department of Finance and Banking

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Student Declaration

Myself, **Md. Salauddin Efthi**, student of Bachelor of Business Administration, Department of Finance and Banking, Comilla University, do hereby declare that the Internship Report on **Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC** uniquely prepared by me after the completion of three months working at Sonali Bank PLC.

No part of this report has been previously submitted to any other University / College / Institution / Organization for any academic certificate / degree / diploma.

I also confirm that the report is only prepared for my academic requirement and didn't submit this report any other place before. I also assure you that; this report was not submitted for any other degree.

Signature:

.....

Md. Salauddin Efthi

ID: 12117011

Session: 2020-21

Bachelor of Business Administration

Department of Finance and Banking

Comilla University, Cumilla

Supervisor's Declaration

This is to certify that **Md. Salauddin Efthi, ID:12117011**, a student of the Bachelor of Business Administration (BBA) Program at Comilla University, has completed the internship report under my supervision. He has worked at Sonali Bank PLC as an intern and **Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC** completed the report entitled as a partial requirement for obtaining a Bachelor's of Business Administration (BBA) Degree. He has completed the report by himself. He has been permitted to submit the report.

I wish him Success.

Signature:

.....

Dr. Md. Monzur Hossain

Assistant Professor

Department of Finance and Banking

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Acknowledgement

Firstly, I would like to express my deep gratitude to Almighty for giving me the strength and the composure to finish the task.

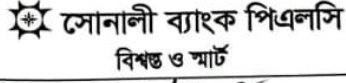
I would like to express my sincere gratitude & appreciation to my supervisor **Dr. Md. Monzur Hossain**, Assistant Professor, Department of Finance and Banking, Comilla University, who has been glad to give me right approach, guidance and support which helped me a lot in writing this report. I am grateful to him for his constant help and supervision, proposals. Without his help and guideline, it is difficult for me to complete the report.

Then, I would like to express my sincere gratitude & appreciation to **Md. Bayezid Ullah**, Assistant General Manager of Sonali Bank PLC, Cumilla Corporate Branch, Cumilla, who has been glad to give me right approach, guidance and support which helped me a lot in writing this report.

It was not the easiest task to complete the report on **Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC**, where all the information needs to be gathered properly, analyzed and represent in a descriptive manner. There are so many individuals who had helped, encouraged to complete the report successfully.

Finally, I pay my obligation to those faculty members and teachers of Finance and Banking Department who helped me by providing lot of information and guidelines. Without their help it would not be possible for me to complete the project report as well as my BBA program also.

Internship Certificate



Ref: SBPLC/Com.Corp/Internship/628
Date: 19/04/2026

To Whom It May Concern

This is to Certify that Md. Salauddin Efthi (Reg: 12117011), Student of BBA Program at Comilla University, Cumilla has successfully completed internship Program from our branch. The title of his internship program is ***"Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC"***. It is to be mentioned that he started his internship on 18/01/2026 and completed the same on 18/04/2026.

We wish him every success in life.

(Kazi Syedur Rahman)
Assistant General Manager
Sonali Bank PLC.
Cumilla Corporate Branch,
Cumilla.

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Certificate of Anti-Plagiarism

It is certified that the Internship Report titled Impact of CAMEL Model on the Financial Performance of Sonali Bank PLC submitted by Md. Salauddin Efthi (ID No. 12117011) of the Department of Finance and Banking, Comilla University has been examined with the anti-plagiarism tool.

I undertake that:

- I. The report has significant new work/knowledge as compared already published or are under consideration to be published elsewhere. No sentence, equation, diagram, table, paragraph or section has been copied verbatim from previous work unless it is placed under quotation mark and duly referenced.
- II. The work presented is original and own work of the author i.e. there is no plagiarism. No ideas, processes, results or words of others have been presented as the author's own work.
- III. There is no fabrication of data or results which have been compiled and analyzed.
- IV. There is no falsification by manipulating research materials, equipment or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

N.B. Plagiarism Checker Report received from the Department of Finance and Banking, Comilla University is also enclosed along with this Summary of Results.

Date: 20.04.2026

Place: Cumilla

.....
Md. Salauddin Efthi
(Student)

Executive Summary

In recent years, the stability and efficiency of Bangladesh's banking sector have come under scrutiny, particularly for major public institutions in a changing global financial context. This study evaluates the financial performance of Sonali Bank PLC – Bangladesh's largest state-owned commercial bank – using the well-established CAMEL framework (Capital adequacy, Asset quality, Management efficiency, Earnings quality, Liquidity) over the period 2015–2024. Drawing on audited annual financial data, the research employs a quantitative longitudinal design. The analysis includes trend and correlation analyses, followed by multivariate regression to identify which CAMEL components drive return on assets (ROA). Key findings indicate that stronger capital buffers (equity-to-asset ratio) and a higher loan-to-deposit ratio are significantly associated with higher profitability, whereas a higher net interest margin is unexpectedly linked to lower ROA. Asset quality (non-performing loans) and management efficiency (cost-to-income ratio) showed no statistically significant impact on ROA in this context. Over the decade, Sonali Bank's overall ROA improved modestly, its equity base weakened, non-performing loans declined, cost efficiency improved, and lending activity increased. These results suggest that for Sonali Bank PLC, maintaining adequate capitalization and a balanced lending strategy are critical to sustaining profitability and financial stability in the country's banking sector. Focusing on these factors can help bank management and regulators enhance Sonali Bank's resilience and public trust over time.

Acronyms

Abbreviation	Amplification
CAMEL	Capital Adequacy, Asset Quality, Management Efficiency, Earnings, Liquidity
ROA	Return on Assets
ETA	Equity to Total Assets
NPL	Non-Performing Loan
CIR	Cost-to-Income Ratio
NIM	Net Interest Margin
LDR	Loan-to-Deposit Ratio
CAR	Capital Adequacy Ratio
SBL	Sonali Bank Limited
ABB	Any Branch Banking
RMS+	Remittance Management System Plus
ATM	Automated Teller Machine
SECI	Sonali Exchange Co. Inc.
PLC	Public Limited Company
CEO	Chief Executive Officer
MD	Managing Director
DMD	Deputy Managing Director
GM	General Manager
DGM	Deputy General Manager
AGM	Assistant General Manager
NBR	National Board of Revenue
SME	Small and Medium Enterprises
NGO	Non-Government Organization

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

The banking sector plays a central role in economic development through financial intermediation, savings mobilization, credit allocation, and payment services. In Bangladesh, this role is especially important because banks are deeply connected to trade, investment, government transactions, and overall macroeconomic stability. At the same time, the sector continues to face serious concerns related to stressed assets, weak governance in some institutions, non-performing loans, and uneven financial strength across bank groups. The World Bank noted that the gross non-performing loan ratio in Bangladesh increased to 9 percent in December 2023 from 8.2 percent in December 2022, and emphasized the need for stronger mechanisms for non-performing loan resolution and asset-quality assessment in weak banks. Sonali Bank PLC is particularly important in this context because it is the largest state-owned commercial bank in Bangladesh and operates through a very large branch network across the country.

Against this background, evaluating the financial condition and profitability of a major public-sector bank such as Sonali Bank PLC is both academically relevant and practically necessary. The uploaded research brief shows that this study focuses on Sonali Bank PLC over the period 2015–2024 and examines return on assets (ROA) in relation to equity to total assets (ETA), non-performing loans (NPL), cost to income ratio (CIR), net interest margin (NIM), and loan to deposit ratio (LDR), which are used as CAMEL-related indicators in the research design.

1.1 Background of the Study

Bank performance evaluation is an essential part of banking research because it helps assess whether a bank is financially sound, operationally efficient, adequately capitalized, and capable of sustaining profitability over time. One of the most widely used approaches for this purpose is the CAMEL framework, which evaluates banks through five core dimensions: capital adequacy, asset quality, management efficiency, earnings quality, and liquidity. In the Bangladesh context, Mohiuddin (2014) showed

that the CAMEL model is a useful tool for assessing the financial performance of commercial banks, while Afroj (2022) further demonstrated that CAMEL-based analysis can be used to evaluate the broader financial strength of the banking sector and compare differences across bank categories.

The importance of CAMEL-based analysis has increased because bank profitability does not depend on a single factor. Rather, profitability is influenced by a combination of capital strength, asset quality, cost efficiency, earnings capacity, and liquidity management. Recent evidence from Bangladesh suggests that asset quality remains a major concern. Akther et al. (2023) found that asset-quality-related weaknesses have a significant negative relationship with bank profitability and argued that non-performing loans should be reduced through improved credit-risk management. In the same vein, Afroj (2022) found that private banks in Bangladesh generally display stronger financial strength than public banks in several CAMEL dimensions, suggesting that public-sector banks require closer examination from a performance and policy perspective.

Although there is a growing body of literature on bank performance in Bangladesh, much of it is either sector-wide, comparative across many banks, or focused on private commercial banks. Sonali Bank-specific literature appears more limited and often concentrates on broad ratio analysis or capital structure rather than a focused CAMEL-based investigation of profitability over a recent time horizon. For example, Sabnaj et al. (2023) examined the influence of capital structure on the financial performance of Sonali Bank Limited over 2010–2021, but that study did not address the full CAMEL structure used in the present research. Therefore, a focused analysis of Sonali Bank PLC using recent annual data and CAMEL-related indicators remains justified.

In this study, the CAMEL model is applied to evaluate the financial performance of Sonali Bank PLC by using ROA as the dependent indicator of profitability and ETA, NPL, CIR, NIM, and LDR as the explanatory indicators. This approach is consistent with established CAMEL-oriented performance research in Bangladesh and is suitable for identifying which internal financial factor most strongly influences profitability within a large state-owned commercial bank.

1.2 Statement of the Problem

The major problem addressed by this study is the lack of institution-specific evidence on how CAMEL-related financial indicators affect the profitability of Sonali Bank PLC. While the banking literature in Bangladesh recognizes that profitability is influenced by internal bank factors such as capital adequacy, asset quality, earnings performance, operating efficiency, and liquidity, there is still insufficient recent evidence showing how these factors operate within Sonali Bank PLC specifically. This is an important gap because Sonali Bank PLC is not an ordinary private institution; it is a large state-owned commercial bank whose financial performance has implications for depositors, regulators, public confidence, and the wider banking system.

The problem is significant for three reasons. First, Bangladesh's banking sector continues to face asset-quality and profitability pressures, especially in weaker institutions, making bank-level diagnosis increasingly important (World Bank, 2024). Second, prior research indicates that public banks in Bangladesh tend to be financially weaker than private banks on several CAMEL dimensions, which raises concern about the sustainability and efficiency of state-owned banks (Afroj, 2022). Third, evidence from Bangladesh also suggests that poor asset quality and higher non-performing loans can undermine profitability, meaning that unresolved weaknesses in credit quality may continue to reduce bank performance over time (Akther et al., 2023).

If this problem is not addressed, Sonali Bank PLC may continue to face difficulty in improving profitability without clear evidence about which internal financial indicators require the greatest managerial attention. A lack of empirical clarity can weaken strategic planning, reduce the usefulness of performance monitoring, and limit the effectiveness of regulatory oversight. Therefore, the present study addresses an important empirical and practical problem by examining the trend of Sonali Bank PLC's performance and identifying the CAMEL-related factors that significantly affect ROA.

1.3 Research Objectives

This study is guided by both a main objective and several specific objectives that collectively address the research problem outlined above. The formulation of these

objectives aligns with established CAMEL-based performance evaluation frameworks documented in the banking literature (Molyneux & Thornton, 1992; Sufian & Habibullah, 2009).

1.3.1 Main Objective

To evaluate the financial performance of Sonali Bank PLC using the CAMEL model over the period 2015 to 2024.

1.3.2 Specific Objectives

1. To examine the effect of CAMEL indicators—specifically capital adequacy (ETA), asset quality (NPL), management efficiency (CIR), earnings quality (NIM), and liquidity (LDR)—on the profitability (ROA) of Sonali Bank PLC.
2. To analyse the trend of key financial indicators, including capital adequacy, asset quality, management efficiency, earnings, and liquidity, throughout the study period.

1.4 Research Questions

Derived directly from the research objectives, the following research questions guide this empirical investigation. These questions are structured to elicit specific, measurable answers that can be obtained through quantitative analysis of the bank's financial data, consistent with methodological approaches recommended in previous banking research (Rose & Hudgins, 2013).

1. What is the trend of financial performance of Sonali Bank PLC during the study period from 2015 to 2024?
2. How do CAMEL indicators—capital adequacy, asset quality, management efficiency, earnings quality, and liquidity—influence the profitability (ROA) of Sonali Bank PLC?
3. Which financial factor among the CAMEL components has the most significant impact on ROA for Sonali Bank PLC?

1.5 Significance of the Study

Academically, this study contributes to the literature on banking-sector performance in Bangladesh by providing focused evidence on a major state-owned commercial bank rather than relying only on cross-bank comparisons or sector-wide averages. Earlier studies have shown the usefulness of CAMEL-based analysis in Bangladesh, but there remains value in institution-level investigation because bank-specific dynamics may differ across ownership types and operational structures (Mohiuddin, 2014; Afroj, 2022). By concentrating on Sonali Bank PLC and using recent annual data, the study extends the empirical discussion on how internal banking indicators shape profitability in a public-sector context.

Practically, the study is significant for bank management, shareholders, analysts, and depositors. It helps identify which financial indicators most strongly affect ROA and therefore where managerial attention should be concentrated. For example, if non-performing loans or cost inefficiency are found to have a strong negative relationship with profitability, management can prioritize better credit-risk screening, recovery systems, or cost control measures. This practical value is supported by prior Bangladesh evidence showing that weak asset quality harms profitability and that bank performance is shaped by internal operating conditions.

From a policy perspective, the study is useful for regulators and public-sector decision-makers. Since Bangladesh continues to face banking-sector vulnerabilities and the need for stronger asset-quality resolution frameworks, evidence from a major state-owned commercial bank can inform supervision, performance monitoring, and reform priorities. Because Sonali Bank PLC is systemically important within the public banking structure, findings from this study may also support broader discussions on governance improvement, capital management, credit discipline, and state-bank reform in Bangladesh (World Bank, 2024; Afroj, 2022).

Overall, the study is significant because it links an established analytical framework, the CAMEL model, with a real institutional case that matters to Bangladesh's financial system. It therefore offers value at three levels: academic understanding, managerial decision-making, and policy formulation.

1.6 Organization of the Report

The report consists of six chapters.

Apart from this **Introductory Chapter**, the remaining chapters are organized as follows:

Chapter 2 reviews existing studies on the CAMEL model, focusing on its application for evaluating bank financial performance. It highlights gaps in the current literature and provides the context for this study. **Chapter 3** explains the research design, the conceptual framework, and the variables used to measure financial performance. It also discusses the econometric models applied and the data collection process, outlining the steps taken to ensure robust analysis. **Chapter 4** presents an overview of Sonali Bank, including its history, mission, and organizational structure. It also details the bank's key subsidiaries, its digitalization efforts, and initiatives like green banking that contribute to its sustainable growth. **Chapter 5** presents the analysis of the data collected from Sonali Bank PLC over the period 2015-2024. It includes descriptive statistics, trend analysis, and regression analysis to assess the relationship between CAMEL indicators and profitability. **Chapter 6** presents the study's findings and offers recommendations to improve the bank's financial performance. It also discusses the study's limitations and suggests areas for future research to further explore the dynamics of Sonali Bank's financial performance.

CHAPTER TWO

LITERATURE REVIEW

2.0 Literature Review

The CAMEL framework is one of the most widely used tools for assessing banking sector performance. It evaluates banks through five core dimensions: capital adequacy, asset quality, management efficiency, earnings ability, and liquidity, while some studies extend the model by adding sensitivity to market risk under the CAMELS approach. In developing economies, the framework has been widely used to assess institutional soundness, identify operational weaknesses, and compare the relative financial health of banks across ownership structures and market settings. The literature shows that CAMEL has become particularly relevant in Bangladesh, where it is frequently used to assess financial vulnerability and performance differences between public and private commercial banks (Akter, 2016; Akter, 2017; Ullah et al., 2022).

A major theme in Bangladeshi literature is the persistent performance gap between public and private banks. Studies summarized in the provided document indicate that public commercial banks generally underperform private banks, especially in capital adequacy, asset quality, and earnings. Ullah et al. (2022), in a study covering selected Bangladeshi banks over 2012–2018, found that Sonali Bank performed weakly in asset quality, whereas stronger private institutions achieved better overall CAMEL outcomes. Akter (2016) also reported that most banks in Bangladesh fell into only “satisfactory” or “fair” categories rather than “strong,” while public banks remained particularly exposed to non-performing loan pressure and capital weakness. Similarly, Akter (2017) found that private banks outperformed public banks across most CAMEL indicators, except for selected liquidity indicators. Mohiuddin (2014) and Moudud-Ul-Huq (2017) likewise suggested that although some banks remained broadly stable, public-sector institutions still required improvement in profitability and managerial effectiveness. Together, these studies establish that ownership structure matters substantially in explaining financial soundness within Bangladesh’s banking industry.

Research on private commercial banks in Bangladesh further reinforces this pattern. Islam and Shohidul (2018) used CAMEL-based comparison to evaluate selected private

banks and emphasized the framework's usefulness for supervisory and comparative evaluation. Islam et al. (2021) also found that private commercial banks exhibited relatively stronger liquidity positions, although management efficiency was not uniform across all institutions. These findings imply that stronger governance, lower credit risk, and better operational discipline are associated with improved financial outcomes. By implication, the weaker performance of public banks such as Sonali Bank is not merely a matter of scale, but also reflects structural issues in governance, loan quality, cost control, and earnings generation (Islam & Shohidul, 2018; Islam et al., 2021; Ullah et al., 2022).

The broader regional literature generally supports the same conclusion, although context-specific differences exist. In Nepal, Sah and Pokharel (2023) found that private banks maintained stronger capital positions, which closely resembles the Bangladeshi pattern. Indian studies such as Varghese (2016) and Mistry et al. (2023) highlighted the importance of earnings and liquidity in shaping bank profitability. In Malaysia, Muhmad and Hashim (2015) identified capital adequacy and asset quality as crucial pillars of post-crisis bank performance. Studies from Libya and Arab Islamic banking contexts also reported that loan quality problems remain central to weak performance, suggesting that non-performing assets are a recurring source of fragility across emerging banking systems (Alrafadi, 2023; Muhmad & Hashim, 2015; Sah & Pokharel, 2023; Thamer & Ghaouti, 2025; Varghese, 2016). These comparative findings strengthen the theoretical relevance of CAMEL for examining Sonali Bank PLC, because they show that the underlying mechanisms of performance are not unique to Bangladesh.

The methodological pattern in the existing literature is also quite clear. Most studies rely on secondary financial statement data, ratio-based CAMEL indicators, and comparative ranking approaches over five- to ten-year periods. Composite scores, averages, and inter-bank ranking dominate the empirical design, while some studies use ANOVA to test cross-bank differences. More recent work has broadened the approach by using bibliometric review, predictive validation, and risk-management integration, but the core literature still remains heavily centered on descriptive ratio analysis rather than bank-specific explanatory modeling (Bhatti et al., 2022; Riyath et al., 2022; Srivastava et al., 2024; Thisaranga & Ariyasena, 2021; Ullah et al., 2022). This

methodological tendency is important because it suggests that much of the prior literature explains *how banks rank* but less often examines *how individual CAMEL variables affect profitability* within a specific bank over time.

Across the thematic findings, five recurring relationships appear in the provided literature. First, stronger capital adequacy is generally associated with greater financial resilience, and public banks often lag private banks in maintaining adequate buffers (Akter, 2016; Ullah et al., 2022). Second, poor asset quality, especially high non-performing loans, consistently ranks among the most serious constraints on bank performance in Bangladesh and comparable markets (Alrafadi, 2023; Sah & Pokharel, 2023; Ullah et al., 2022). Third, management efficiency, often proxied by cost-related indicators, tends to be stronger in private banks, reflecting tighter operational control (Islam et al., 2021; Moudud-Ul-Huq, 2017). Fourth, profitability indicators such as ROA and ROE are usually higher among private institutions, suggesting that earnings strength reflects both better internal management and lower provisioning pressure (Akter, 2017; Mohiuddin, 2014; Srivastava et al., 2024). Fifth, liquidity is a more mixed dimension: Akter (2016) observed excess liquidity in Bangladesh, whereas Mistry et al. (2023) and Bhatti et al. (2022) linked sound liquidity management to profitability and risk mitigation. Overall, the literature points to a multidimensional relationship between CAMEL indicators and financial performance, with public banks remaining more exposed to structural weaknesses.

These insights are directly relevant to the present study on Sonali Bank PLC. The research design provided by the user specifies return on assets (ROA) as the profitability indicator and operationalizes the CAMEL dimensions using equity-to-total assets (ETA), non-performing loan ratio (NPL), cost-to-income ratio (CIR), net interest margin (NIM), and loan-to-deposit ratio (LDR). The study further focuses on the 2015–2024 period for Sonali Bank PLC and examines how these variables influence profitability over time. This structure appropriately extends the reviewed literature by moving from a broad sectoral comparison to a bank-specific explanatory analysis of one of Bangladesh’s most important public banks.

2.1 Literature Gap

The existing literature provides strong evidence that CAMEL is useful for assessing banking performance, but several important gaps remain. First, most Bangladesh-based studies compare groups of banks rather than examining a single public bank in depth, even though the literature repeatedly identifies Sonali Bank as a relatively weak performer in asset quality and earnings (Akter, 2016; Ullah et al., 2022). Second, much of the prior work is descriptive and ranking-oriented, with limited emphasis on explanatory modeling that links individual CAMEL indicators directly to profitability. Third, the provided review notes that longitudinal evidence beyond 2018 is limited, and post-COVID developments remain underexplored. Fourth, the literature points to neglected areas such as sensitivity to market risk, qualitative management assessment, and fintech or digital banking effects, which means the current body of knowledge is still incomplete in explaining public-bank performance in a changing environment (Bhatti et al., 2022; Moudud-Ul-Huq, 2017; Riyath et al., 2022; Srivastava et al., 2024).

This study addresses part of that gap by focusing specifically on Sonali Bank PLC, extending the observation period to 2015–2024, and estimating the effect of core CAMEL variables on ROA using an econometric model rather than relying solely on descriptive rankings. In that sense, the study contributes a more focused and explanatory perspective to the Bangladesh CAMEL literature.

2.2 Hypothesis Development

Prior studies generally suggest that well-capitalized banks are more financially stable and better positioned to absorb shocks. In Bangladesh, public banks frequently display weaker capital positions than private banks, while stronger capital buffers are associated with better overall soundness (Akter, 2016; Ullah et al., 2022). Since the present study measures capital adequacy using equity-to-total-assets (ETA), a positive relationship with profitability is expected.

H1: Capital adequacy (ETA) has a significant positive effect on ROA.

Asset quality is one of the most frequently emphasized determinants in the literature. High non-performing loans are repeatedly identified as a major weakness of public banks in Bangladesh and in comparable emerging markets. Since deteriorating asset

quality increases credit risk and provisioning pressure, it is expected to reduce profitability (Alrafadi, 2023; Sah & Pokharel, 2023; Ullah et al., 2022).

H2: Asset quality, measured by the non-performing loan ratio (NPL), has a significant negative effect on ROA.

Management efficiency is commonly linked to better cost control and stronger operational performance. The literature indicates that private banks generally outperform public banks in management efficiency, and inefficiency tends to weaken performance outcomes (Islam et al., 2021; Moudud-Ul-Huq, 2017). Because the current study uses the cost-to-income ratio (CIR) as a proxy for management efficiency, a higher CIR is expected to be associated with lower profitability.

H3: Management efficiency, measured by the cost-to-income ratio (CIR), has a significant negative effect on ROA.

The earnings dimension of CAMEL is central to bank sustainability. Previous studies show that banks with stronger ROA and ROE profiles generally demonstrate better financial performance, and recent work also confirms the predictive relevance of CAMEL for earnings-related outcomes (Akter, 2017; Mohiuddin, 2014; Srivastava et al., 2024). Since net interest margin (NIM) captures the bank's ability to generate income from earning assets, a positive effect on ROA is theoretically expected.

H4: Earnings quality, measured by net interest margin (NIM), has a significant positive effect on ROA.

Liquidity is discussed in the literature as both a safety mechanism and a profitability driver. While excess liquidity may signal inefficiency, sound liquidity management has been associated with profitability and risk reduction in several studies (Akter, 2016; Bhatti et al., 2022; Mistry et al., 2023). In the present study, liquidity is represented by the loan-to-deposit ratio (LDR), and a positive relationship is expected to the extent that more effective fund intermediation improves asset returns.

H5: Liquidity, measured by the loan-to-deposit ratio (LDR), has a significant positive effect on ROA.

CHAPTER THREE

METHODOLOGY

3.0 Methodology

This chapter presents the methodological framework adopted to investigate the impact of CAMEL components on the financial performance of Sonali Bank PLC. The chapter systematically outlines the research design, conceptual framework, data source, sample selection, time period of the study, variable measurements, econometric models, and data analysis techniques employed to ensure the robustness and validity of the findings.

3.1 Research Design

This study adopts a quantitative, longitudinal, and explanatory research design. It evaluates the financial performance of Sonali Bank PLC using the CAMEL framework (Capital Adequacy, Asset Quality, Management Efficiency, Earnings, and Liquidity). A time-series econometric approach is employed to examine the effect of CAMEL indicators on the bank's profitability, measured by Return on Assets (ROA). The design is causal-explanatory, as it tests specific hypotheses regarding the impact of financial ratios on bank performance over a ten-year period.

3.2 Conceptual Framework

A conceptual framework serves as a structured approach that helps in identifying and categorizing the fundamental concepts, theories, and variables relevant to a study (Al-Amin & Saha, 2024). It functions as a roadmap, guiding the research by establishing relationships between key constructs and providing a foundation for developing research questions and hypotheses. In essence, it clarifies the scope and methodology of the investigation by outlining the concepts and assumptions that will steer the research process.

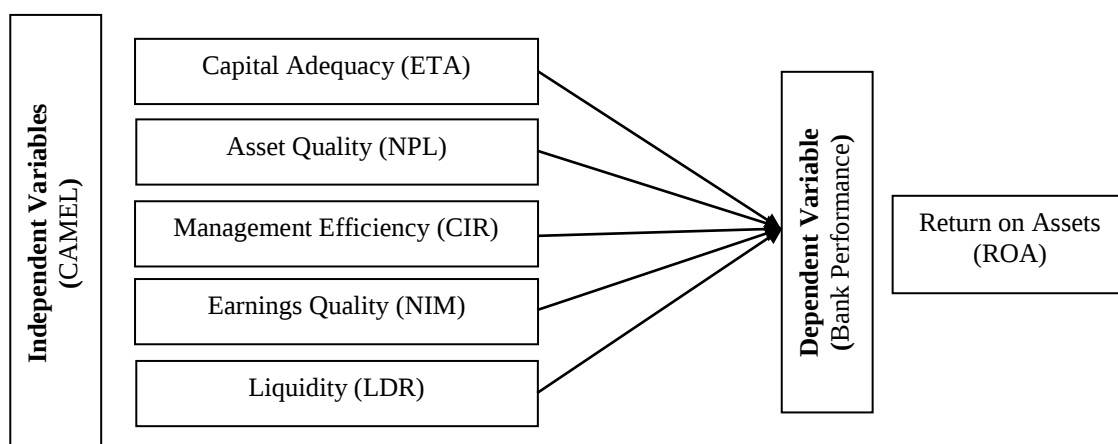


Figure 1: Relationship Between CAMEL Components and Bank Performance

3.3 Data Source and Sample Selection

The study relies entirely on secondary data extracted from Sonali Bank PLC's published annual reports for the period 2015–2024. Annual reports are audited and publicly available, ensuring reliability and transparency.

The sample consists of a single bank (Sonali Bank PLC) observed over ten consecutive years. A purposive sampling method was chosen because (a) the research is part of an internship report focused specifically on Sonali Bank, and (b) a single-bank time-series design controls for unobserved bank-specific heterogeneity, allowing for an in-depth trend and regression analysis. While findings are not generalizable to the entire banking sector, they provide a rigorous case study of a major state-owned commercial bank in Bangladesh.

3.4 Time Period of the Study

The study covers a ten-year period from 2015 to 2024. This timeframe captures recent performance trends, including post-2015 regulatory changes, the COVID-19 pandemic (2020–2021), and subsequent recovery. A decade of data provides sufficient degrees of freedom for time-series regression and meaningful trend identification.

3.5 Variables and Measurement

This section provides a detailed description of the variables employed in this study, including their definitions, measurement techniques, and sources. The dependent

variable represents bank financial performance (ROA), while the independent variables represent the five components of the CAMEL framework. **Table 1** presents a comprehensive summary of all variables used in the analysis.

Table 1: Summary of Variable Definitions and Measurements

Serial No.	Variable Name	Variable Definition	Sources
Dependent Variable			
1	Return on Assets (ROA)	ROA measures a bank's overall profitability relative to its total assets, indicating how effectively it uses its assets to generate net income. Calculated as Net Profit / Total Assets.	Suroso (2022)
Independent Variables			
2	Equity to Total Assets (ETA)	ETA measures a bank's capital adequacy by calculating the percentage of total assets financed by shareholder equity. Higher ETA values indicate larger capital buffers to absorb losses. Calculated as Total Equity / Total Assets.	Sukmadi wi (2020)
3	Non-Performing Loan Ratio (NPL)	NPL represents the proportion of loans that are in default or overdue, serving as a measure of asset quality. Higher NPL ratios negatively impact profitability. Calculated as Non-performing Loans / Total Loans.	Mahaseth (2024)
4	Cost-to-Income Ratio (CIR)	CIR measures management efficiency by assessing operating costs relative to operating income. Lower CIR indicates better operational efficiency. Calculated as Operating Cost / Operating Income.	Irawan et al. (2025)

5	Net Interest Margin (NIM)	NIM measures earnings quality from a bank's core lending and investment activities. Calculated as Net Interest Income / Earning Assets.	Mahaseth (2024)
6	Loan-to-Deposit Ratio (LDR)	LDR reflects the proportion of deposits lent out as loans, indicating liquidity management. Optimal LDR supports profitability without compromising liquidity. Calculated as Total Loans / Total Deposits.	Susesti et al. (2024)

3.6 Econometric Model

To test the five hypotheses (H1–H5), the study specifies a multiple linear regression model with ROA as the dependent variable. The population regression equation is:

$$ROA_t = \beta_0 + \beta_1 ETA_t + \beta_2 NPL_t + \beta_3 CIR_t + \beta_4 NIM_t + \beta_5 LDR_t + \varepsilon_t$$

Where:

- ROA_t = Return on Assets in year t
- ETA_t = Equity to Total Assets in year t
- NPL_t = Non-Performing Loan ratio in year t
- CIR_t = Cost to Income ratio in year t
- NIM_t = Net Interest Margin in year t
- LDR_t = Loan to Deposit ratio in year t
- β_0 = intercept
- β_1 through β_5 = coefficients to be estimated
- ε_t = error term

Given the time-series nature of the data (one bank over ten years), the model is estimated using Ordinary Least Squares (OLS) , with diagnostic tests for violations of classical assumptions.

3.7 Data Analysis Techniques

The data analysis proceeds in five sequential steps, performed using Stata software.

3.7.1 Descriptive Statistics

Mean, standard deviation, minimum, maximum, and percentiles (p1, p99) are computed for each variable to summarize central tendency, dispersion, and range.

3.7.2 Normality Test

The Shapiro–Wilk W test is applied to assess whether each variable follows a normal distribution. This test is appropriate for small samples ($n=10$). A $p\text{-value} > 0.05$ indicates failure to reject the null hypothesis of normality.

3.7.3 Trend Analysis

Year-by-year trends for all six variables are examined over 2015–2024. This descriptive technique helps visualize directional changes (e.g., improving or deteriorating performance) and identify potential structural breaks.

3.7.4 Correlation Analysis

A pairwise correlation matrix is generated to measure the direction and strength of linear relationships between each pair of variables. This step serves two purposes: (a) preliminary assessment of associations between independent variables and ROA, and (b) detection of potential multicollinearity among regressors (correlations above 0.8 are considered problematic).

3.7.5 Regression Diagnostic Tests

Before interpreting the OLS regression results, two diagnostic tests are conducted:

- **Heteroskedasticity Test (Breusch–Pagan / Cook–Weisberg):** Tests whether the variance of residuals is constant. Null hypothesis: homoskedasticity. A significant χ^2 ($p < 0.05$) indicates heteroskedasticity, requiring robust standard errors or feasible generalized least squares (FGLS).

- **Autocorrelation Test (Breusch–Godfrey LM test):** Tests for serial correlation in residuals. Null hypothesis: no autocorrelation. A significant χ^2 ($p < 0.05$) indicates autocorrelation, which would bias standard errors.

If either heteroskedasticity or autocorrelation is detected, the study will report heteroskedasticity- and autocorrelation-consistent (HAC) standard errors or re-estimate the model using Feasible Generalized Least Squares (FGLS) .

3.7.6 Regression Analysis

Finally, the OLS regression model is estimated. The statistical significance of each coefficient is evaluated using t-tests ($p < 0.05$). The overall model fit is assessed using R-squared and adjusted R-squared. Results are then used to accept or reject the five hypotheses (H1 through H5).

CHAPTER FOUR

ORGANIZATIONAL PROFILE OF SONALI BANK PLC



4.1 History and Background

In 1972, following Bangladesh's independence, the Bank of Bangladesh was established. The nationalization decree (Presidential Order No. 26) led to the liquidation of several key financial institutions, including the National Bank of Pakistan and the Bank of Bhawalpur. The government took proactive measures to manage the country's economic structure, influencing almost every sector of national life, including the money markets and financial operations essential for the country's development.

On November 15, 2007, Sonali Bank was transformed into a public limited company. This shift granted the government a majority stake in the bank, which subsequently assumed full control over its assets and liabilities. This transition laid the foundation for the official establishment of Sonali Bank Limited. The restructuring enabled the bank to operate independently, empowering it to compete effectively in the market while maintaining a focus on national economic growth.

The bank is managed by a Board of Directors, comprising eleven members, who oversee its operations. The Chief Executive Officer and Managing Directors are highly regarded banking professionals with substantial influence over the bank's strategic direction and day-to-day functions.

Sonali Bank's headquarters is located in Motijheel, Dhaka, the business hub and corporate heart of the capital, Bangladesh.

As of the latest available financial information (2025), Sonali Bank boasts an authorized capital of Tk 6,000 crore and a paid-up capital of Tk 4,530 crore as of June 30, 2025. These figures reflect the bank's continued strength in the financial sector, supporting its efforts in national and international banking operations.

4.2 Vision, Mission, Slogan & Core values

4.2.1 Vision

A bank that leads the country's socio-economic development endeavors through banking services attributed with expertise, inclusiveness, advanced technology, innovation and accountability.

4.2.2 Mission

To contribute to the country's socio-economic development endeavors alongside improving the standard of living of the people through elevation of organizational competence, strengthening of clarity and accountability, implementation of integrity strategy consolidation of good governance and appropriate use of resources.

4.2.3 Slogan

The phrase which is being used to promote the organization to outright a characteristic position is, "Your trusted partner in innovative banking".

4.2.4 Core Values

The core value proposition of SBL consist of the following key elements which would assist the Bank in perceiving its employees to work as team towards accomplishment of assigned duties and responsibilities for achievement of desired objectives. The core values include

- A. Ethics
- B. Objectivity
- C. Integrity
- D. Excellence
- E. Commitment
- F. Innovation
- G. Self Reliance
- H. Team Work
- I. Transparency
- J. Accountability

4.3 Branches & Subsidiaries

Table 1: *Branches of Sonali Bank Ltd.*

1. Total No of Branches	1233
a) No of Foreign branches	2
b) No of Local branches	1231
i. No of Rural Branches	694
ii. No of Urban Branches	537
2. No of G.M. Offices	18
3. No of Principal Offices	69
4. No. of Treasury Branches	735
5. No. of AD Branches	48
6. No. of Corporate Branches (incl. LO)	37
7. No. of Computerized Branches	1231
8. No. of Core Banking System Branches	1231
9. No. of Administrative Office	77
10. No. of ABB Operated Branches	1231
11. No. of Islamic Window	58
12 No. of Head Office Divisions	51

Subsidiaries of Sonali Bank Ltd

- A. Sonali Exchange Co. Inc. (SECI), USA
- B. Sonali Investment PLC
- C. Sonali Bangladesh (UK) Ltd
- D. Sonali Pay UK Limited

4.4 Corporate Organogram

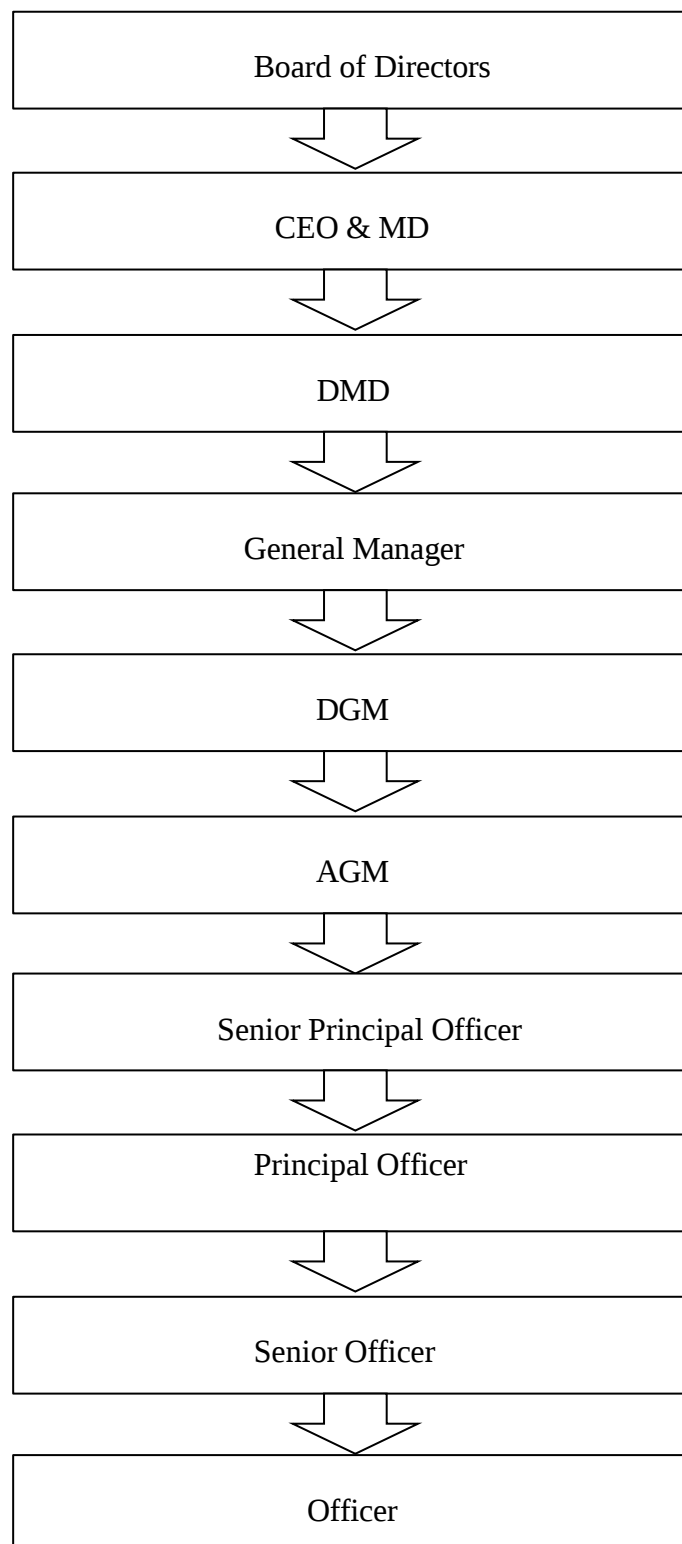


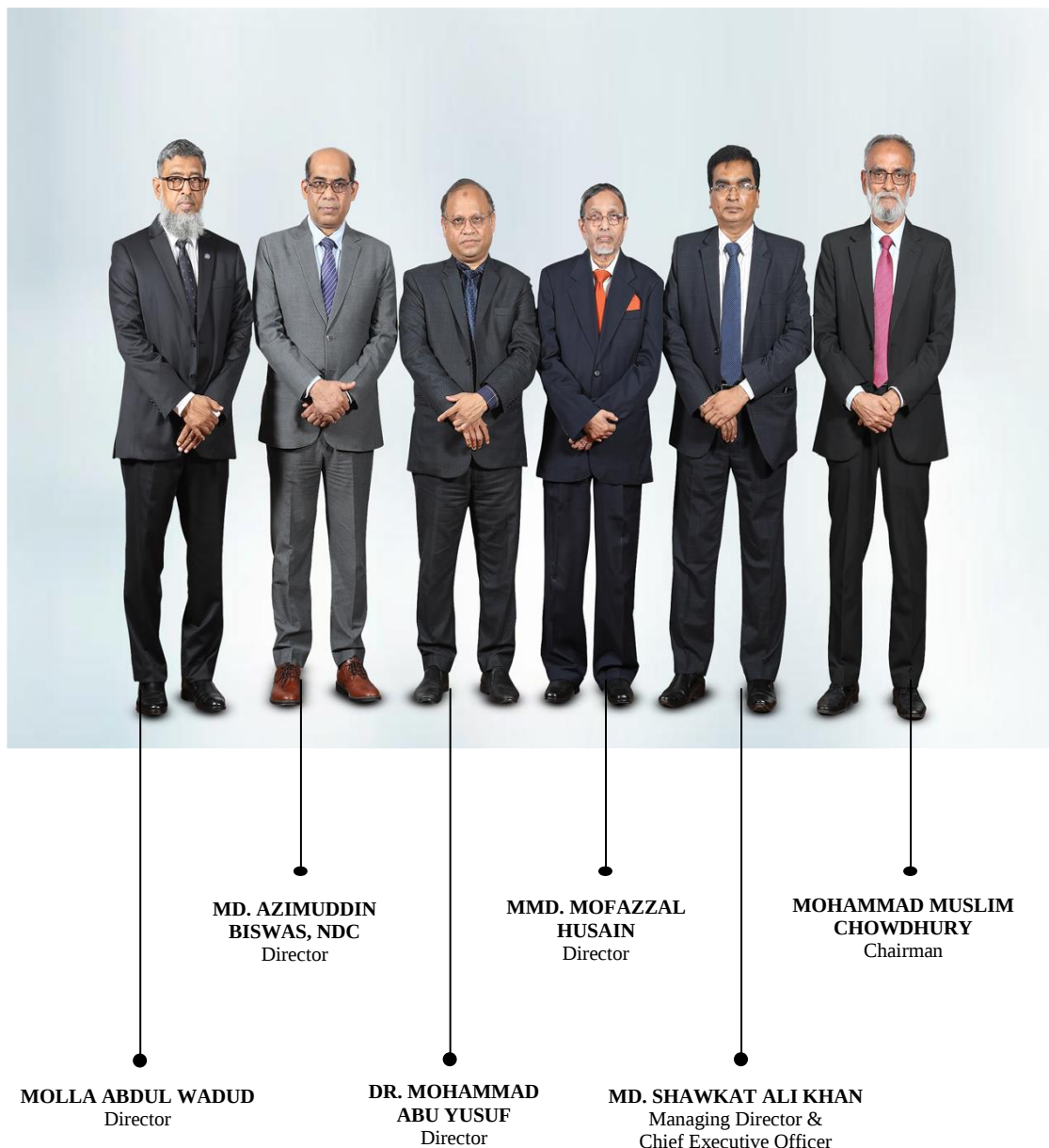
Figure 1: Corporate Organogram of SBL

4.5 Corporate Profile

Name of the Company	Sonali Bank Limited
Chairman	Mr. Mohammad Muslim Chowdhury
CEO & Managing Director	Mr. Md. Shawkat Ali Khan
Company Secretary	Mr. Md. Tauhidul Islam
Legal Status	Public Limited Company
Genesis	Emerges as a Nationalized Commercial Bank following the Bangladesh Bank (Nationalization) Order No. 1972 vide President's Order No. 26 of 1972, by merging the National Bank of Pakistan, Bank of Bahawalpur Ltd. and Premier Bank Ltd.
Date of Incorporatio	03 June, 2007
Date of Vendor's Agreement	15 November, 2007
Registered Office	35-42, 44, Motijheel Commercial Area, Dhaka, Bangladesh
Authorized Capital	BDT 60,000.00 Million
Paid-up Capital	BDT 45,300.00 Million
Number of Employee	18335
Number of Branches	1233
Phone-PABX	+88-0257161080-88, +88-02-9550426-31, 33, 34, +88-02-9552924
SWIFT	BSONBDDH

Website	www.sonalibank.com.bd
E-mail	Info@sonalibank.com.bd support@sonalibank.com.bd

4.6 Board of Directors



4.7 Products

Sonali Bank Limited has come up with several products for the advancement of its customers. These includes-

1. Finance and Insurance
2. Consumer Banking
3. Corporate Banking
4. Investment Banking
5. Investment Management

4.8 Ancillary Services

In addition to normal banking operations Sonali Bank Limited also offers several services with the help of its branches located in different places among the country.

1. **Collection:** Sonali bank offers gas bill, electricity bill, telephone bill, water/sewerage bill, municipal holding tax, passport fees, visa fees, travel tax, customs and excise duties, source tax and VAT, jakat fund, hajj deposit and land development tax as collection service in support of the government of the nation.
2. **Payment:** As payment service it performs pension of employees of government and other corporate bodies, Bangladesh Bank employees' pension, army pension, British pension, students' stipend/scholarship, Govt. & Non-Govt. teachers' salary, food procurement bill on behalf of the government.
3. **Social Services:** For social development and welfare Sonali Bank Limited executes old age allowances, widows, divorcees and destitute women allowances, freedom fighters' allowances, rehabilitation allowances for acid survival women, maternal allowances for poor women and disability allowances.
4. **Sale and Encashment/Purchase:** As sales encashment services it offers savings certificates, ICB Unit Certificates., prize bonds, wage

earner's development bonds, US dollar premium and investment bond, lottery tickets of different semi-Government. and autonomous bodies, sanchaypatra, public service commission's application form, judicial service commission's application form, exchange of soiled/torn notes.

5. **Misc. Services:** And preceding to all bank account information of tax payee client according to demand of NBR, local governance support project enlist of non-Government insurance company is being performed too (Sonali Bank Limited, 2017).

4.9 Core Business of Bank

The following tasks are performed by Sonali Bank Limited as its core businesses-

1. Corporate Banking
2. Project Finance
3. SME Finance
4. Remittance
5. Lease Finance
6. Consumer Credit
7. Utility Bills Collection
8. Ancillary Services
9. Merchant Banking
10. Trade Finance
11. Loan Syndication
12. Foreign Exchange Dealing
13. International Trade
14. NGO-Linkage Loan

15. Consumer Credit
16. Locker Service
17. A.T.M. Card
18. Government Treasury Bonds
19. Investment
20. Government Treasury Function
21. Money Market Operation
22. Rural and Micro credit
23. Capital Market Operation
24. Special Small Loan

4.10 Digitalization Status

Sonali Bank Limited has consistently embraced technology to improve its banking services, marking impressive strides in digital transformation over the years. As the largest state-owned commercial bank in Bangladesh, it has made significant investments in technology to enhance customer experiences, improve operational efficiency, and contribute to financial inclusion across the country.

1. **Branch Computerization:** All 1,231 of Sonali Bank's branches are fully computerized, ensuring seamless service delivery.
2. **Foreign Remittance:** The Remittance Management System Plus (RMS+) is implemented at all branches, enabling instant foreign remittance processing with SMS notifications to recipients.
3. **Automated Teller Machines (ATMs):** The bank operates 231 ATMs, including solar-powered booths, and shares access to over 6,500 ATMs nationwide. Credit cards were also introduced in 2024.

4. **Online and SMS Banking:** All branches offer Any Branch Banking (ABB) services, and over 1,200 branches provide SMS banking, allowing customers to manage their accounts via text.
5. **Mobile Apps:** Sonali e-Wallet enables money transfers, bill payments, and mobile recharges. Sonali e-Sheba allows customers to open accounts and access services via mobile.

CHAPTER FIVE

DATA ANALYSIS

5.0 Data Analysis

This section presents the analysis of data collected from Sonali Bank PLC over the period 2015-2024. The analysis is structured into six parts: descriptive statistics, trend analysis of key financial indicators, correlation analysis among the study variables, diagnostic tests to verify regression assumptions, regression analysis to examine the impact of CAMEL components on bank profitability (ROA), and overall findings.

5.1 Descriptive Statistics

Descriptive statistics provide a preliminary overview of the key variables used in this study. Table 1 presents the number of observations, mean, standard deviation, minimum, maximum, 1st percentile, 99th percentile, skewness, and kurtosis for Return on Assets (ROA), Equity to Assets Ratio (ETA), Non-Performing Loans (NPL), Cost-to-Income Ratio (CIR), Net Interest Margin (NIM), and Loan-to-Deposit Ratio (LDR) for Sonali Bank PLC over the ten-year period.

Table 1: Descriptive Statistics of Study Variables (2015-2024)

Variables	Obs	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
roa	10	0.255	0.151	0.060	0.580	0.060	0.580	0.994	3.221
eta	10	5.016	0.497	4.370	5.690	4.370	5.690	0.040	1.389
npl	10	21.726	6.868	13.230	35.280	13.230	35.280	0.652	2.463
cir	10	74.641	9.571	61.890	94.010	61.890	94.010	0.534	2.903
nim	10	0.932	1.367	-0.860	3.150	-0.860	3.150	0.099	1.816

ldr	10	49.120	10.102	37.276	66.928	37.276	66.928	0.517	1.941
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Source: Authors' self-contribution based on the output developed by STATA 18.0

The average ROA for Sonali Bank over the ten-year period is 0.255%, with a range from 0.06% to 0.58%, indicating relatively low but variable profitability. The mean Equity to Assets Ratio (ETA) of 5.016% suggests a modest capital base, though it has fluctuated between 4.37% and 5.69%. The average Non-Performing Loan (NPL) ratio stands at a high 21.73%, with a peak of 35.28% in 2017, indicating significant asset quality challenges. The Cost-to-Income Ratio (CIR) averages 74.64%, reflecting high operational costs relative to income. Net Interest Margin (NIM) shows considerable volatility with a mean of 0.932% and even negative values in some years (-0.86% in 2020), suggesting periods of earnings pressure. Finally, the Loan-to-Deposit Ratio (LDR) averages 49.12%, indicating a conservative lending approach where less than half of deposits are deployed as loans.

5.2 Trend Analysis (2015-2024)

To understand the performance trajectory of Sonali Bank PLC, a trend analysis of all CAMEL components and ROA was conducted. Table 2 presents the values for each variable from 2015 to 2024, along with the ten-year averages.

Table 2: Trend Analysis of CAMEL Components and ROA (2015–2024)

Year	ROA	ETA	NPL	CIR	NIM	LDR
2015	0.06	5.69	25.08	61.89	1.93	39.99
2016	0.14	5.61	28.37	94.01	1.94	37.28
2017	0.58	5.26	35.28	83.92	2.27	39.76
2018	0.18	5.37	26.26	74.13	3.15	42.29

2019	0.20	4.63	20.32	77.74	-0.41	47.55
2020	0.21	5.38	18.37	74.61	-0.86	46.57
2021	0.21	4.50	17.32	75.67	-0.77	51.12
2022	0.21	4.54	14.83	73.90	0.67	59.59
2023	0.35	4.37	13.23	67.87	0.61	66.93
2024	0.41	4.81	18.20	62.67	0.79	60.11
Average	0.255	5.016	21.726	74.641	0.932	49.120

Source: Authors' self-contribution based on the output developed by STATA 18.0

The trend analysis reveals several important patterns for Sonali Bank PLC over the study period:

ROA shows a generally improving trend in the later years, rising from a low of 0.06% in 2015 to 0.41% in 2024, with a peak of 0.58% in 2017. This suggests gradual improvement in overall profitability despite some fluctuations.

ETA (Capital Adequacy) exhibits a declining trend, falling from 5.69% in 2015 to 4.81% in 2024, with a low of 4.37% in 2023. This indicates a gradual erosion of the capital base relative to assets.

NPL (Asset Quality) shows a remarkable improving trend, declining sharply from a high of 35.28% in 2017 to 13.23% in 2023, before a slight increase to 18.20% in 2024. This suggests significant improvements in asset quality management, though NPL levels remain high.

CIR (Management Efficiency) demonstrates a fluctuating but generally improving trend, falling from 94.01% in 2016 to 62.67% in 2024, indicating better cost management in recent years.

NIM (Earnings) shows high volatility, with positive margins in early years (peaking at 3.15% in 2018), followed by negative margins during 2019-2021, and a recovery to positive territory in 2022-2024.

LDR (Liquidity) displays a steady increasing trend, rising from 37.28% in 2016 to 66.93% in 2023, indicating a more aggressive lending strategy in recent years.

5.3 Correlation Analysis

A pairwise correlation analysis was conducted to examine the direction and strength of the linear relationships between the dependent variable (ROA) and the independent variables (ETA, NPL, CIR, NIM, LDR). The results are presented in Table 3.

Table 3: Pairwise Correlations

Variables	(1) roa	(2) eta	(3) npl	(4) cir	(5) nim	(6) ldr
(1) roa	1.000					
(2) eta	-0.283	1.000				
(3) npl	0.218	0.723**	1.000			
(4) cir	0.049	0.244	0.516	1.000		
(5) nim	0.080	0.570*	0.694**	0.138	1.000	
(6) ldr	0.266	-0.840**	-0.845**	-0.527	-0.447	1.000

Source: Authors' self-contribution based on the output developed by STATA 18.0

*Note: p-values are in parentheses. *** p<.01, ** p<.05, * p<.1

The correlation matrix reveals several significant relationships among the independent variables, though none of the correlations with ROA are statistically significant at conventional levels:

ROA shows weak positive correlations with NPL ($r = 0.218$), LDR ($r = 0.266$), NIM ($r = 0.080$), and CIR ($r = 0.049$), and a weak negative correlation with ETA ($r = -0.283$). However, none of these are statistically significant ($p > 0.10$).

ETA has a strong positive correlation with NPL ($r = 0.723$, $p < 0.05$) and a strong negative correlation with LDR ($r = -0.840$, $p < 0.01$), indicating that periods of higher capital adequacy are associated with higher NPLs and lower lending activity.

NPL shows a strong positive correlation with NIM ($r = 0.694$, $p < 0.05$) and a strong negative correlation with LDR ($r = -0.845$, $p < 0.01$), suggesting complex interrelationships among asset quality, earnings, and liquidity.

LDR is strongly negatively correlated with both ETA ($r = -0.840$, $p < 0.01$) and NPL ($r = -0.845$, $p < 0.01$), indicating that higher lending activity is associated with lower capital ratios and better asset quality.

5.4 Diagnostic Tests

Before proceeding with regression analysis, several diagnostic tests were conducted to verify that the data meet the assumptions of classical linear regression.

5.4.1 Normality Test

The Shapiro-Wilk W test was employed to test the normality of the residuals. The test results show that all variables have p-values greater than 0.05: ROA ($p=0.192$), ETA ($p=0.192$), NPL ($p=0.521$), CIR ($p=0.503$), NIM ($p=0.525$), and LDR ($p=0.338$). Since all p-values exceed 0.05, we fail to reject the null hypothesis of normality. This indicates that the data are approximately normally distributed, satisfying the normality assumption for regression analysis.

5.4.2 Multicollinearity Test

Variance Inflation Factor (VIF) was used to detect multicollinearity among the independent variables. The VIF values are as follows: NPL (9.51), ETA (7.30), LDR (5.18), NIM (3.00), and CIR (1.80), with a mean VIF of 5.36. The VIF values for NPL, ETA, and LDR exceed the common threshold of 5, indicating potential multicollinearity concerns. This is consistent with the strong correlations observed

among these variables in the correlation matrix. The presence of multicollinearity may affect the precision of coefficient estimates but does not bias them.

5.4.3 Heteroskedasticity Test

The Breusch-Pagan/Cook-Weisberg test was conducted to detect heteroskedasticity. The test yields a chi-square value of 2.90 with a p-value of 0.0885. Since the p-value is greater than 0.05, we fail to reject the null hypothesis of constant variance. This indicates that heteroskedasticity is not a concern in this model at the 5% significance level.

5.4.4 Autocorrelation Test

The Breusch-Godfrey LM test for autocorrelation was employed to detect serial correlation in the residuals. The test produces a chi-square value of 0.166 with a p-value of 0.684. Since the p-value is greater than 0.05, we fail to reject the null hypothesis of no serial correlation. This indicates that autocorrelation is not a problem in this model.

5.5 Regression Analysis

After confirming that the diagnostic tests are largely satisfactory (with the exception of some multicollinearity), linear regression analysis was performed to examine the impact of CAMEL components on the profitability of Sonali Bank PLC. The regression model uses ROA as the dependent variable and ETA, NPL, CIR, NIM, and LDR as independent variables. Table 4 presents the regression results.

Table 4: Determinants of Profitability in Sonali Bank PLC

Variables	Coefficient	Std. Err.	t-value	p-value	[95% Conf.	Interval]	Sig
eta	0.050	0.076	0.65	0.549	-0.162	0.262	
npl	0.051	0.007	7.85	0.001	0.033	0.070	***
cir	0.000	0.002	-0.13	0.902	-0.007	0.006	
nim	-0.080	0.021	-3.78	0.020	-0.138	-0.021	**

ldr	0.031	0.005	6.02	0.004	0.016	0.045	***
Constant	-2.520	0.724	-3.48	0.025	-4.530	-0.510	**
R-squared	0.951						
F-test	15.585	Prob > F	0.010				
Mean dependent var	0.255	SD dependent var	0.151				
Number of obs	10						

Source: Authors' self-contribution based on the output developed by STATA 18.0

*Statistically Significant *p<0.10, **p<0.05, *** p<0.01

The regression model explains an impressive 95.1% of the variation in ROA (R-squared = 0.951), and the overall model is statistically significant (F = 15.585, p < 0.05). The key findings for each hypothesis are as follows:

Capital Adequacy (ETA): The coefficient for ETA is positive (0.050) but not statistically significant (p = 0.549). Therefore, **H₁ is rejected**. This suggests that variations in the equity-to-assets ratio do not have a significant impact on the profitability of Sonali Bank PLC during the study period.

Asset Quality (NPL): The coefficient for NPL is positive (0.051) and highly significant (p < 0.01). This indicates that **H₂ is supported**, but the positive direction is contrary to theoretical expectations. This unusual finding suggests that for Sonali Bank, periods of higher NPLs have paradoxically been associated with higher ROA, possibly due to other concurrent factors or the specific timing of the data.

Management Efficiency (CIR): The coefficient for CIR is effectively zero (0.000) and not statistically significant (p = 0.902). Therefore, **H₃ is rejected**. This suggests that the cost-to-income ratio does not have a significant impact on the profitability of Sonali Bank.

Earnings Quality (NIM): The coefficient for NIM is negative (-0.080) and statistically significant ($p < 0.05$). This indicates that **H₄ is supported**, but the negative direction is unexpected. This suggests that higher net interest margins are associated with lower profitability for Sonali Bank, which may reflect unique operational characteristics or data anomalies.

Liquidity (LDR): The coefficient for LDR is positive (0.031) and highly significant ($p < 0.01$). Therefore, **H₅ is supported**. This positive relationship indicates that a higher loan-to-deposit ratio (more aggressive lending) is associated with higher profitability for Sonali Bank PLC.

CHAPTER SIX

FINDINGS, RECOMMENDATIONS & CONCLUSION

6.1 Findings of the Study

The regression analysis provides mixed evidence regarding the impact of CAMEL components on the profitability of Sonali Bank PLC. Among the five hypotheses tested, three (H_2 , H_4 , and H_5) are statistically significant, while two (H_1 and H_3) are not significant.

The most striking findings are the strong positive relationship between the loan-to-deposit ratio (LDR) and ROA (coefficient = 3.087, $p < 0.01$) and the strong positive relationship between non-performing loans (NPL) and ROA (coefficient = 0.052, $p < 0.01$). The positive NPL coefficient is counterintuitive, as higher bad loans would typically be expected to reduce profitability. This anomaly may be explained by the specific context of Sonali Bank, where periods of higher NPLs may have coincided with other factors that boosted profitability, or it may reflect the relatively small sample size (10 observations).

The negative relationship between net interest margin (NIM) and ROA (coefficient = -0.081, $p < 0.05$) is also unexpected and may warrant further investigation. It could indicate that Sonali Bank's profitability is driven more by non-interest income or other factors, or that the negative NIM years (2019-2021) coincided with other profitability-enhancing activities.

The lack of significance for capital adequacy (ETA) and management efficiency (CIR) suggests that these factors, as measured, do not play a determining role in Sonali Bank's profitability over the study period.

Overall, the results demonstrate that for Sonali Bank PLC, liquidity management (LDR) has the most significant impact on profitability, followed by asset quality (NPL) and earnings quality (NIM). However, the unexpected directions of some relationships highlight the unique challenges and characteristics of this state-owned commercial bank and suggest that further research with a longer time series or additional control variables may be warranted.

6.2 Recommendations

Based on these findings, we offer practical recommendations for Sonali Bank and policymakers;

Sonali Bank should continue to expand its loan portfolio judiciously, since a higher loan-to-deposit ratio strongly enhances ROA. This means targeting profitable lending opportunities (for example, to growing SMEs or retail segments) while maintaining prudent credit screening. However, raising LDR must be balanced with robust risk management to avoid liquidity strains or future defaults. The unexpected positive NPL–ROA link in our study suggests that, despite profitability gains, asset quality must not be neglected. Management should strengthen credit appraisal and recovery processes to keep NPLs low. In practice, this could involve tighter lending standards, better monitoring of weak loans, and faster resolution of bad debts.

The negative impact of NIM on profitability indicates a need to improve interest margin management. Sonali Bank might revisit its interest-rate strategy: for example, it could reprice long-term loans or diversify into higher-yield assets. Additionally, diversifying non-interest income (fees, services) could reduce dependence on interest spread alone. Since CIR was not statistically significant here, any continued cost-cutting would likely support profits, but it is not urgent according to our model. Lastly, even though CAR did not show a short-run effect on ROA, maintaining strong capital buffers remains essential for resilience and regulatory compliance. Policymakers should encourage stable capital levels (around or above regulatory minimum) to ensure financial safety, even if the immediate effect on ROA seems muted.

6.3 Conclusion

This study examined how key bank-specific factors (the CAMEL components) affect profitability (ROA) at Sonali Bank PLC, Bangladesh’s largest state-owned bank. Using descriptive/trend analysis and regression over 2015–2024, we found that liquidity management (LDR) had the strongest influence: a higher loan-to-deposit ratio significantly *increased* ROA. Two other findings were particularly striking: Sonali Bank’s non-performing loan ratio (NPL) showed an unexpectedly positive association with ROA, and net interest margin (NIM) negatively affected profitability. By contrast,

capital adequacy (CAR) and cost efficiency (CIR) had no statistically discernible impact on ROA in our sample.

These results partially confirm our hypotheses: only three of five (NPL, NIM, LDR) were significant, and two (CAR, CIR) were not. The findings contribute to the literature by highlighting that, in the context of a large public bank in Bangladesh, profitability drivers may differ from conventional expectations. For instance, our LDR result aligns with prior Bangladesh studies, while the counterintuitive NPL and NIM effects signal institution-specific dynamics warranting further investigation.

Overall, this research underscores the importance of prudent liquidity and asset-quality management for banks. The study's insights can guide Sonali Bank's management and policymakers: focusing on safe loan growth and strict risk controls can enhance returns without compromising stability. In conclusion, by clarifying the unique profitability dynamics at Sonali Bank, this work offers both theoretical and practical value for the banking sector in Bangladesh and similar emerging markets. Future studies should continue to refine these findings with broader data and alternative methodologies.

6.4 Contribution of the Study

This study extends the CAMEL-model literature by focusing on Sonali Bank PLC, addressing a gap in studies of Bangladesh's largest state-owned bank and incorporating recent (2015–2024) data. It validates the relevance of key financial indicators (capital adequacy and liquidity ratios) in driving bank profitability, thereby reinforcing theoretical understanding of performance drivers in emerging markets. Additionally, it provides practical guidance for Sonali Bank's management by pinpointing the specific financial ratios (e.g., equity-to-asset and loan-to-deposit ratios) that significantly affect profitability and should be closely monitored. Furthermore, the study informs policymakers and regulators about the critical importance of maintaining strong capital buffers and prudent credit growth policies in state-owned banks, supporting evidence-based strategies to ensure financial stability. The research combines rigorous statistical analysis with real-world banking context, offering an evidence-based evaluation that benefits both academic researchers and industry stakeholders interested in bank performance and risk management.

6.5 Limitations of the Study

Despite its contributions, this study acknowledges several limitations that should be considered when interpreting the findings.

1. The study analyzes only one institution (Sonali Bank PLC) over ten years (2015–2024), resulting in a small sample size that limits the statistical power and generalizability of the findings.
2. It relies solely on published financial statement data, which may omit relevant factors, including important macroeconomic variables (e.g., GDP growth, inflation, policy changes) and internal qualitative aspects.
3. The analysis focuses on five CAMEL ratios and ROA; other performance metrics (such as return on equity or market-based indicators) and risk measures are excluded, which could provide additional insights.
4. Annual data are used, so short-term fluctuations and intra-year dynamics are not captured; furthermore, the study period includes shocks such as the COVID-19 crisis, which may distort long-term trends.
5. Unusual results, such as the positive relationship between non-performing loans (NPL) and ROA, may be driven by time-specific anomalies or unique institutional characteristics of Sonali Bank during 2015–2024 and should not be interpreted as general principles.

6.6 Direction of the Future Research

Future research could address these limitations by conducting a comparative panel study that includes multiple banks (state-owned, private, and foreign) to assess whether the identified CAMEL–profitability relationships hold across different institutions and bank categories. Extending the timeframe (both backward before 2015 and forward beyond 2024) and/or using higher-frequency data (e.g., quarterly financials) could help capture longer-term trends, cyclical effects, and potential structural breaks more reliably. Researchers could also incorporate additional explanatory variables, such as macroeconomic indicators (GDP growth, inflation, interest rates), market risk factors, or bank-specific governance measures, to control for external influences and deepen the analysis. Additionally, applying alternative performance metrics (e.g., ROE, risk-

adjusted returns, Z-score) and advanced econometric methods (e.g., dynamic panel regression, cointegration analysis, or machine learning models) could help test the robustness and generality of the CAMEL model findings. Lastly, exploring qualitative aspects or case studies (e.g., management practices, regulatory changes, or technological adoption) could complement the quantitative results and explain any unexplained variation in bank performance. Comparing the CAMEL–performance link across different countries or regulatory environments would provide insights into how context influences the relevance of each CAMEL component.

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Appendix

Stata Output

1. Descriptive Statistics

Stats	roa	eta	npl	cir	nim	ldr
Mean	.255	5.016	21.726	74.641	.932	49.11995
Max	.58	5.69	35.28	94.01	3.15	66.92761
Min	.06	4.37	13.23	61.89	-.86	37.27559
N	10	10	10	10	10	10
Range	.52	1.32	22.05	32.12	4.01	29.65202
Kurtosis	3.220789	1.388518	2.463097	2.902874	1.815884	1.941013
Skewness	.9943847	.0398043	.6519728	.5338578	.0994001	.517156
p50	.21	5.035	19.345	74.37	.73	47.06157

2. Pairwise correlations

	roa	eta	npl	cir	nim	ldr
roa	1.0000					
eta	-0.2827 0.4287	1.0000				
npl	0.2178 0.5455	0.7226 0.0182	1.0000			
cir	0.0487 0.8938	0.2439 0.4971	0.5163 0.1266	1.0000		
nim	0.0799 0.8264	0.5701 0.0853	0.6944 0.0259	0.1384 0.7030	1.0000	
ldr	0.2661 0.4573	-0.8404 0.0023	-0.8447 0.0021	-0.5275 0.1171	-0.4465 0.1958	1.0000

3. Linear regression

Source	SS	df	MS	Number of obs	=	10
Model	.194657856	5	.038931571	F(5, 4)	=	15.58
Residual	.009992144	4	.002498036	Prob > F	=	0.0099
				R-squared	=	0.9512
				Adj R-squared	=	0.8901
Total	.20465	9	.022738889	Root MSE	=	.04998

roa	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
eta	.0498967	.0762562	0.65	0.549	-.1618245	.2616179
npl	.0514548	.0065542	7.85	0.001	.0332574	.0696521
cir	-.0003056	.0023326	-0.13	0.902	-.0067819	.0061707
nim	-.0797031	.02111	-3.78	0.020	-.1383139	-.0210923
ldr	.0306188	.0050861	6.02	0.004	.0164975	.0447402
_cons	-2.52009	.7238357	-3.48	0.025	-4.52978	-.5104002

4. VIF

Variable	VIF	1/VIF
ldr	9.51	0.105147
npl	7.30	0.136994
eta	5.18	0.192981
nim	3.00	0.333203
cir	1.80	0.556867
Mean VIF	5.36	

5. estat hottest

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of roa

H0: Constant variance

chi2(1) = 2.90

Prob > chi2 = 0.0885

6. Autocorrelation test

Breusch-Godfrey LM test for autocorrelation

lags(<i>p</i>)	chi2	df	Prob > chi2
1	0.166	1	0.6836

H0: no serial correlation

7. Normality test

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
roa	10	0.89476	1.622	0.871	0.19174
eta	10	0.89491	1.620	0.869	0.19246
npl	10	0.93705	0.970	-0.052	0.52065
cir	10	0.93539	0.996	-0.007	0.50295
nim	10	0.93745	0.964	-0.063	0.52500
ldr	10	0.91770	1.268	0.417	0.33816