BASEL III CAPITAL REGULATIONS AND BANK EFFICIENCY: EVIDENCE FROM COMMERCIAL BANKS OF NEPAL

A Dissertation Submitted to the Office of the Dean, Faculty of Management in partial fulfilment of the requirements for the Master's Degree

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Certification of Authorship

I hereby corroborate that I have researched and submitted the final draft of dissertation entitled "**Basel III Capital Regulations and Bank Efficiency: Evidence from Commercial Banks of Nepal".** The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees nor it has been proposed and presented as part of requirements for any other academic purposes.

The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the dissertation

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Report of Research Committee

Ms. Fura Yangee Sherpa has defended research proposal entitled "**Basel III Capital Regulations and Bank Efficiency: Evidence from Commercial Banks of Nepal"** successfully. The research committee has registered the dissertation for further progress. It is recommended to carry out the work as per suggestions and guidance of supervisor Ramesh Kumar Paudel. and submit the thesis for evaluation and viva voce examination**.**

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We have examined the dissertation entitled "**Basel III Capital Regulations and Bank Efficiency: Evidence from Commercial Banks of Nepal"** presented by Ms. Fura Yangee Sherpa for the degree of Master of Business Studies. We hereby certify that the dissertation is acceptable for the award of degree.

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Abbreviations

BCBS	Basel Committee on Banking Supervision
BIS	Bank For International Settlement
C/I	Cost to Income Ratio
CAR	Capital Adequacy Ratio
CBO	Central Bank of Oman
CBP	Capital Buffer Premium
CCPS	Central Counterparties
CDR	Credit Deposit Ratio
CIR	Cost Income Ratio
CRA	Credit Rating Agency
DEA	Data Envelopment Analysis
DTE	Debt-to-Equity Ratio
EFR	Efficiency Ratio
EU	European Union
FSB	Financial Stability Board
FY	Fiscal Year
GIMEL	Global IME Limited
GMM	Generalized Method of Moments
G-SIBs	Global Systemically Important Banks
IETT	Interest Expense to Total Loans
KBL	Kumari Bank Limited
LCR	Liquidity Coverage Ratio
LOS	Low Degree of Positive Relationship
LR	Leverage Ratio
LS	Liquidity Standards
MB	Machhapuchhre Bank
MCR	Minimum Capital Requirement
MOU	Memorandum of Understanding
NIM	Net Interest Margin
NIMB	Nepal Investment Mega Bank
NIMR	Net Interest Revenue to Total Revenue

NPL	Non-Performing Loan
NRB	Nepal Rastra Bank
NSFR	Net Stable Funding Ratio
OETA	Operating Expenses to Total Assets
OLS	Ordinary Least Squares Regression
RAROC	Risk Adjusted Return on Capital
ROA	Return on Assets
ROE	Return on Equity
RWA	Risk Weighted Assets
S.D	Standard Deviation
SB	Siddhartha Bank
U.S	United States

ABSTRACT

Regulating an industry is often driven by the recognition of market imperfections or the potential for market failures, which can incur significant costs for society. However, it's essential to acknowledge that regulation comes with its own costs, and it's crucial that the costs do not outweigh the anticipated benefits. The deregulation of financial markets in many countries during the 1980s was motivated by a desire to enhance market efficiency by removing regulatory constraints. Despite subsequent regulations such as the Basel I and II accords, it's important to consider this historical context when discussing further regulation of the banking sector post-2008 financial crisis. Managing the regulation of the banking industry is a delicate balancing act. The nature of banks' activities, particularly their asset transformation through credit and liquidity creation, leaves them inherently vulnerable. Even minor disruptions in this process can have far-reaching consequences for the overall financial stability of the system. Additionally, given that banks are primary providers of payment services, the stability and reliability of these institutions are vital for facilitating trade and other payment-related activities within the economy. This study aims to analyze the efficiency of Nepalese commercial banks, particularly in the aftermath of the 2008 global financial crisis when Basel III regulations were widely adopted by banks around the world. To achieve its objective, the researcher conducted two regression model to examine operational and investment efficiency of Nepalese commercial banks as a result of implementation of Basel III capital regulation. The study utilized audited annual reports from five sample banks that have adopted the Basel III Accord. These banks are Siddhartha Bank, Machhapuchchhre Bank, Kumari Bank Limited, Nepal Investment Mega Bank (NIMB), and Global IME Limited. The analysis covers the period from fiscal year 2069/70 to 2078/79. The findings revealed the model 1 is statistically insignificant and all variable had negative relationship with OETA in case of operational efficiency regression analysis. Whereas model 2 showed statistically insignificant result with MCR and CAR is positively related but insignificant, CPB is negative and significant mixed result is archived in case of investment efficiency regression analysis. Thus, it can be concluded that the relationship between the independent variables has a very low impact on the efficiency of commercial banks in Nepal. It is due to not considering various other factors which are directly or indirectly involved in evaluating banks efficiency such as banks risk strategies, size and structure, transition phase of capital regulation.

Keywords: Nepalese commercial banks efficiency; Minimum capital requirement; capital adequacy ratio; capital buffer premium;

CHAPTER I

INTRODUCTION

1.1 Background of the Study

The study on Basel III capital regulation and banks efficiency: evidence from commercial banks of Nepal is based on data's that are drawn from five different banks of Nepal by random sampling and adopts capital framework 2015 which is based on the global captain requirement regulatory, Basel III capital regulation by Basel Committee on Banking Supervision (BCBS). The main purpose of the study was to examine whether the adaptation of capital regulatory requirements impacts the Nepalese bank's efficiency and also to assess if indeed the Nepalese banks are efficient.

The Basel Norms refer to the Basel Accords, a set of international banking regulations developed by the Basel Committee on Banking Supervision (BCBS). The committee is comprised of representatives from central banks and regulatory authorities from different countries and operates under the auspices of the Bank for International Settlements (BIS).
The Basel Accords were developed over several years, starting in the 1980s. The BCBS, founded in 1974 as a forum for regular cooperation between its member countries on banking supervisory matters, initially aimed to enhance financial stability by improving supervisory expertise and the quality of banking supervision worldwide. Later, the BCBS shifted its focus to monitoring and ensuring the capital adequacy of banks and the banking system. (Basel Committee on Banking Supervision, 2011)
The Basel I Accord was initially organized by central bankers from the G10 countries, who were working to establish new international financial structures following the collapse of the Bretton Woods system. The meetings are referred to as the "Basel Accords" because the BCBS is based in the Bank for International Settlements' offices in Basel, Switzerland. Member countries include Australia, Argentina, Belgium, Brazil, Canada, China, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. (Basel Committee on Banking Supervision, 1988). The first Basel Accord primarily focused on credit risk and introduced the concept of minimum capital requirements for banks. It

established a risk-weighted capital adequacy framework, assigning specific risk weights to different categories of assets. Under Basel I, internationally operating banks are required to maintain capital (Tier 1 and Tier 2) equivalent to at least 8% of their risk-weighted assets. This requirement ensures that banks hold sufficient capital to meet their obligations.

The second Basel Accord, known as the Revised Capital Framework or more commonly Basel II, updated the original accord and focused on three main areas: minimum capital requirements, supervisory review of an institution's capital adequacy and internal assessment processes, and the effective use of disclosure to enhance market discipline and promote sound banking practices. These three areas are collectively referred to as the three pillars. Basel II expanded the eligible regulatory capital of a bank from two tiers to three. The higher the tier, the fewer subordinated securities a bank can include. Each tier must constitute a certain minimum percentage of the total regulatory capital and is used in calculating regulatory capital ratios. The newly introduced Tier 3 capital, also known as tertiary capital, is held by many banks to cover market risk, commodities risk, and foreign currency risk arising from trading activities. Tier 3 capital includes a broader range of debt than Tier 1 and Tier 2 capital but is of significantly lower quality. Under the subsequent Basel III accords, Tier 3 capital was eliminated. Basel II was a more comprehensive and risk-sensitive framework compared to Basel I It introduced three pillars: minimum capital requirements (similar to Basel I), supervisory review of capital adequacy, and market discipline. Basel II aimed to better align regulatory capital with the risks banks faced and to improve the supervisory process. (Basel Committee on Banking Supervision, 2006)

Basel III was introduced as a response to the 2007-2008 global financial crisis and the ensuing financial crisis, it sought to address the weaknesses exposed during the crisis and strengthen the regulatory framework further The BCBS decided to update and strengthen the Accords in response to the collapse, citing poor governance, risk management, inappropriate incentive structures, and an overleveraged banking industry. In November 2010, an agreement was reached on the capital and liquidity reform package, now known as Basel III. Basel III builds on the three pillars of the previous accords but includes additional requirements and safeguards. For instance, it mandates banks to maintain a minimum amount of common equity and a minimum liquidity ratio. Basel III also

introduces extra requirements for "systemically important banks," or those deemed "too big to fail," effectively eliminating tier 3 capital considerations. These reforms are now part of the consolidated Basel Framework, which encompasses all current and forthcoming Basel Committee on Banking Supervision standards. Basel III tier 1 has been implemented, with all but one of the 27 Committee member countries participating in the Basel III monitoring exercise in June 2021.Basel III included measures to enhance the quality and quantity of bank capital, introduce liquidity standards, and improve risk management practices. (IBM Banking and Financial Markets Data Warehouse, 2017). The completed Basel III framework incorporates gradual implementation provisions for the output floor, commencing at 50% on January 1, 2023, and increasing annually by 5% until reaching full implementation at the 72.5% level in January 2028. These measures from 2023 onwards are sometimes known as Basel 3.1 or Basel IV.

The introduction of Basel III was motivated by the need to strengthen capital requirements by Increase the quantity and quality of capital that banks must hold to better absorb losses during economic downturns, to improve risk management by enhancing risk-sensitive approaches in calculating regulatory capital to better reflect the risk profile of banks and to promote stability The ultimate goal of Basel III is to contribute to the stability of the global financial system by making banks more resilient to economic shocks. Basel III was phased in over several years to allow banks time to adjust to the new requirements gradually. The implementation of Basel III is monitored by national regulators, and compliance is expected from banks operating internationally.

Basel III's main components include stricter capital adequacy requirements (CAR), which specify higher levels of common equity capital for banks to absorb losses in economic downturns. It also provides a clearer definition of regulatory capital. Additionally, Basel III introduces liquidity standards (LS) to ensure banks have enough liquid assets to meet short-term obligations, particularly during financial crises. This is achieved through the introduction of the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR), counterparty credit risk which addresses counterparty credit risk by introducing the credit valuation adjustment (CVA) risk framework. It aims to account for the risk associated with changes in the creditworthiness of counterparty entities, risk weighted assets (RWA) The framework revises the methods for calculating risk-weighted assets, aiming for a more risk-sensitive approach. It introduces changes to the calculation of

credit, operational, and market risk, leverage ratio (LR) it introduces a leverage ratio to complement the risk-based capital ratios. The leverage ratio is a risk-independent metric intended to restrict leverage accumulation in the banking sector. The Countercyclical Buffer introduces an additional capital requirement that regulators can impose on banks during periods of excessive credit expansion. Together, these measures aim to strengthen the resilience of banks and the banking system, enabling them to better withstand financial shocks and economic downturns. The implementation of Basel III standards is overseen and coordinated worldwide by national regulators and central banks. (Basel Committee on Banking Supervision, 2017)

Well-regulated and efficient banks are essential for providing credit facilities to customers and maintaining a balanced flow of economic and financial resources. This study primarily focuses on analyzing the efficiency of Nepalese banks, particularly after the 2008 global financial crisis when Basel III regulations were widely adopted globally.

"Basel III brought significant changes to the existing Accords, emphasizing the need to regulate bank capital and prevent excessive leverage. Firstly, it increased the minimum capital requirement highlighted in Basel II to ensure banks maintain a buffer of capital that can absorb losses during financial and economic stress. Secondly, it improved leverage requirements by introducing a non-risk-based leverage ratio to prevent a financial crisis that could arise from decreased leverage, potentially leading to asset price declines and reduced bank capital. Lastly, Basel III amended liquidity requirements to include two new ratios: the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). The LCR mandates banks to hold enough highly liquid assets to withstand a 30-day stressed funding scenario specified by the bank supervisor. The NSFR requires banks to maintain stable funding above the required amount for one year under extended stress, primarily aiming to address liquidity mismatches and reduce liquidity crises during shocks". (Obadire et al., 2022).

Basel III has a notable impact on banks' organizational structures, particularly within the risk department. The regulatory framework establishes limits and guidelines to improve risk management and promote the creation of internal risk management models. While stricter regulations aim to enhance prudent management and overall safety, they can also limit credit expansion.

Nepal Rastra Bank (NRB) Capital requirement against risk is concerned, the central bank has already created a rule requiring banks to maintain capital at a higher level than specified by Basel III. Similarly, the regulatory framework requires banks to maintain the

capital adequacy ratio at 8 percent while NRB has gone a step forward and already set it at 10 percent. While Basel III requires banks to make a provision of buffer capital by 2.5 percent in 2019 starting from 2016, but the central bank has already asked banks here to maintain a buffer capital of 1 percent starting from the 2018. "According to the draft regulation for implementing Basel III in Nepal, the central bank plans to increase the buffer capital to 2.5 percent in 2019 and raise the total capital adequacy ratio to 12.5 percent within the next five years, while Basel III proposes maintaining it at 10.5 percent by that time. Nepali banks are not currently exposed to complex financial instruments like derivatives and securitized assets, which the global standard assigns higher risk weights. Therefore, the study indicates that the risk exposure of Nepali banks is unlikely to be significantly impacted by Basel III's measures. However, it notes that this will provide good coverage in the future as Nepal's banking industry expands to include such instruments and exposures," it stated (Nepal Rastra Bank, 2015)

Efficiency generally refers to the ability to accomplish a task or achieve a goal with the least amount of wasted resources, time, or effort. It is a measure of how well a system or process converts inputs into outputs. Efficiency can be applied to various contexts, Time efficiency: Completing a task in the shortest possible time. Resource efficiency: Using the fewest resources (such as money, materials, or energy) to achieve a desired outcome. Energy Efficiency: Achieving a goal with the least amount of energy consumption. Process Efficiency: Ensuring that the steps in a process are streamlined and do not involve unnecessary or redundant actions. Cost Efficiency: Achieving a goal at the lowest possible cost. In different fields and industries, efficiency is a critical factor in determining the success and effectiveness of processes, systems, or organizations. Improving efficiency often involves optimizing workflows, eliminating waste, and finding ways to enhance overall productivity.

According to (Jaouadi and Zorgui, 2014), Efficiency is the concept of producing in the most optimal way, utilizing the minimum inputs to achieve the best possible output, which means making the best use of resources to create high-quality products at the lowest cost. In management, efficiency pertains to the optimized utilization of a firm's internal factors. Conversely, the concept of effectiveness focuses on achieving desired outcomes and goals without necessarily considering the optimization of resources or methods used.

Hughes and Mester (2008) The study identifies two common approaches to measuring banking efficiency: the structural approach and the nonstructural approach. The nonstructural approach assesses bank performance by comparing various financial ratios among banks. It also examines the relationship between performance and investment strategies, as well as other factors like governance characteristics. This approach seeks to identify agency problems through correlations between performance ratios and variables that indicate the quality of bank governance. The structural approach, also known as "technical efficiency," relies on a theoretical model of the banking firm and an optimization concept. It views the bank as a financial intermediary that produces information-intensive financial services, diversifies risks, and combines financial intermediation theory with the microeconomics of bank production. This approach helps determine the appropriate outputs and inputs in the bank's production structure.

Giri (2020) concluded that the initiatives of Nepal Rastra Bank have undoubtedly made progress in improving the resilience in the banking sector of Nepal. The project's findings are consistent with the earlier studies that have found that the new regulatory frameworks and amendments in the existing legislation have helped in bringing the improvements in risk governance to some extent in the banking industry of Nepal.

(Achraya, 2020). The action of NRB makes influence on overall economic stability of country. It is the heart of the monetary management, circulation and control for continuous economic development. This bank has also the challenges to maintain regulatory and supervisory issues with the economic stagnation created by natural biological calamities of COVID 19. It may create worse situation as financial crisis occurred in the history of mankind, which requires innovative and new prudential efforts to revitalize the economy and banking business. Maintaining normal economic and banking business and granting relief packages to the people and organization carry huge challenges for the world community.

Subedi and Timilsina (2023) The number of Class A commercial banks in Nepal peaked at 32 in FY2012 but has since declined due to regulatory restrictions on new licenses and the implementation of merger guidelines. Initially, these banks acquired several Class B and Class C entities. Later, Class A banks began merging with one another, a trend that

has accelerated in recent years and quarters. As of mid-October 2022, 14 out of the 26 existing Class A commercial bank are in various stages of the merger process. These include:

- Nabil Bank Limited and Nepal Bangladesh Bank Limited (acquisition MOU signed in January 2022; combined operations from July 2022)
- Nepal Investment Bank Limited and Mega Bank Nepal Limited (merger MOU signed in June 2022; combined operations from January 2023)
- Kumari Bank Limited and Nepal Credit and Commerce Bank Limited (merger MOU signed in October 2022; combined operations from January 2023)
- Prabhu Bank Limited and Century Commercial Bank Limited (acquisition MOU signed in August 2022; combined operations from January 2023)
- Global IME Bank Limited and Bank of Kathmandu Limited (merger MOU signed in June 2022; combined operations from January 2023)
- Himalayan Bank Limited and Civil Bank Limited (acquisition MOU signed in July 2022)
- Laxmi Bank Limited and Sunrise Bank Limited (merger MOU signed in January 2023)

These mergers have reduced the number of Class A banks to 20, with potential for further reductions through future mergers. Factors driving these mergers include regulatory pressure, interest rate spread ceilings, limits on non-interest service income, rising compliance costs, and moderate profitability amid asset quality concerns. The central bank's stance on equity raising will be critical, as no fresh equity shares (rights issuance) have been floated by commercial banks in the past five years, partly due to the central bank's encouragement of mergers and acquisitions. The central bank's decisions on equity issuance will impact banks' Tier I capitalization and solvency, particularly given increasing asset quality concerns, high credit concentration among top borrowers, and the banks' limited capital buffers to withstand major credit shocks.

The profitability of banks has declined, and the outlook remains moderate to weak in the medium term, potentially dampening interest in new equity issues, especially among promoter shareholders due to the limited liquidity of promoter shares in the stock exchange. Weakening capitalization due to credit losses and challenges in raising capital through equity issuance may trigger another round of mergers and acquisitions.

Credit growth in the Nepalese banking industry has moderated following a period of high growth and increased borrower leverage. The increase in delinquencies after the rollback of COVID-era forbearance suggests a high dependence on borrowers' credit profiles and bank asset quality on regulatory policies. The incremental asset quality and solvency of banks will depend on future regulatory actions. Potential deterioration in asset quality in the coming quarters may necessitate recapitalization, given many banks' moderate capital cushions. However, weak to moderate profitability prospects could challenge banks' ability to recapitalize through equity issuance.

1.2 Problem Statement

The implementation of Basel III, intended to strengthen the global banking system by introducing more rigorous capital and liquidity requirements, presents a multifaceted challenge for financial institutions. The transition to Basel III compliance requires significant adjustments in risk management practices, capital structures, and operational processes.

Obadire et al., (2022) Basel III capital regulation positively influences the operating and investment efficiency of the sampled African banks. The findings indicate that for each unit increase in bank buffer capital, there is a corresponding increase of 0.71 in operating efficiency and 70.5 in investment efficiency. The results from the random effect and pooled OLS regression models also demonstrate a statistically significant positive relationship at the 10% and 5% significance levels, respectively. This suggests that stricter capital requirements impact banks' decisions and perspectives on cost containment strategies, thereby enhancing operational efficiency. Additionally, these regulations influence banks' risk behaviors, encouraging them to focus on value-adding investments with positive net present value to boost investment efficiency.

Stricter and higher regulatory requirements and buffer premiums are generally argued to stabilize and protect banks from market and economic shocks (Lotto, 2018; Sutoeova and Teply, 2013). This stability enables banks to confidently explore various profitable investments at well-calculated risk levels, expand their operations, and adopt innovative business practices, thereby thriving in their core activities of lending and credit creation.

Giordano and Schumacher (2017) argue that banks with inadequate buffer capital are hesitant to take risks that could yield profitable returns, as they lack the cushion capital to

protect against risk and potential losses. They further assert that undercapitalization undermines the operational viability of banks, leading to inefficiencies in their operations. Capgemini (2014) found a positive correlation between capital buffer premiums and bank efficiencies, arguing that higher and stricter capital requirements enhance banks' financial performance, thereby improving their efficiency. Similarly, Nguyen (2020) noted that increased capital provides African banks with confidence, as the capital buffer acts as a safeguard against economic and financial shocks. Consequently, banks can conduct their lending operations smoothly and confidently engage in profitable, high-yield investments, leading to improved operational and investment efficiency.

Banking organizations are grappling with the complexities of adapting to the new regulatory framework major issues of Basel III capital regulation and Nepalese commercial banks efficiency can be questioned as:

1. What are the situations of implementation of Basel III capital regulation and its effect on efficiency of selected commercial banks?
2. Is there any the relationship between minimum capital requirement, capital adequacy ratio, capital buffer premium, to ratio of operating expenses to total assets and ratio of net interest revenue to total earnings?
3. Does the Basel III capital regulation have impact on Nepalese Commercial Bank’s efficiency?

1.3 Objectives of the Study

The general objective of the study is to analyze the Basel III capital regulation and its impact on Nepalese commercial bank’s efficiency. The specific objectives are:

1. To investigate the situation of Basel III capital requirement and efficiency of selected banks.
2. To examine the relationship among minimum capital requirement, capital adequacy ratio, capital buffer premium, to ratio of operating expenses to total assets and ratio of net interest revenue to total earnings of commercial banks of Nepal.
3. To analyze the impact of minimum capital requirement, capital adequacy ratio, capital buffer premium, to ratio of operating expenses to total assets and ratio of net interest revenue to total earnings on operating and investing efficiency of commercial banks of Nepal.

1.4 Rationale of the Study

This study examines the capital funds of commercial banks in Nepal under Basel III capital regulations, as mandated by the Nepal Rastra Bank (NRB) directives on capital adequacy norms and standards for Nepalese commercial banks. It focuses on the impact of capital requirements, particularly on the capital adequacy of five selected commercial banks in Nepal. The study analyzes the effect of Basel III capital regulations on bank efficiency by evaluating the NRB's capital adequacy framework for these banks.

Key influential factors under Basel III, such as the minimum capital requirement, capital adequacy ratio, capital buffer premium, and leverage ratio, are considered as determinants of banking efficiency. The study measures bank efficiency through a multilinear regression analysis between these factors and ratios like the operating expenses to total assets and net interest revenue to total earnings for the period 2069/70–2078/79. The research aims to establish a relationship between the behavior of commercial banks regarding deposit collection and loan disbursement for profit-making while adhering to NRB norms and standards.

Adequate and sufficient capital is essential for banks and financial institutions to balance capital with the risk in their assets, ensuring stability. Thus, capital adequacy has become a crucial criterion for depository institutions. Capital adequacy regulations and relationship banking are key policies for protecting depositors, facilitating banking, and stabilizing the nation's financial functions. This study provides an overview of the capital adequacy background of Nepal's financial services sector and NRB regulations on capital management for commercial banks to mitigate risks. It helps establish a link between various financial aspects of the banking sector and capital regulation standards.

This study is also valuable to stakeholders in the banking sector, such as management, depositors, borrowers, and investors, aiding them in making prudent and rational decisions related to their interests. Additionally, it offers recommendations and advocates actions needed to strengthen the capital base for stability and depositor protection. This research serves as a reference for future researchers.

1.5 Limitations of the Study

a) The study is mainly based on the secondary data collected from various sources and primary data could not be included.

b) Not all financial sub-sectors have been covered by the study. Institutions that have been providing micro-finance for rural development have not been covered.

c) The study is concerned with only capital aspect and does not include all the aspect of banking.

d) The study covers only five commercial bank of Nepal and study does not cover other commercial banks of Nepal.

e) The whole study is based on figures of only ten years (from FY 2069/70 to 2078/2079) and figures before the FY 2069/70 have not been considered.

CHAPTER II

LITERATURE REVIEW

Throughout the course of this study, numerous literatures on financial sector reforms have been referenced. A significant portion of these references comes from various agencies, especially the Nepal Rastra Bank (NRB), which oversees the operations of commercial banks, finance companies, and cooperatives. The study extensively reviews laws, by-laws, directives, guidelines, and other regulations issued by these authorities to assess the impact of the capital adequacy framework on commercial banks in Nepal.

2.1. Origin of BASEL III

The Basel Committee on Banking Supervision (2011) introduced Basel III, the third series of international banking regulations developed by the Basel Committee on Banking Supervision (BCBS). The inception of Basel III can be traced back to the aftermath of the global financial crisis that began in 2007-2008. This crisis exposed critical weaknesses in the international banking regulatory framework, highlighting the need for reforms to address these vulnerabilities. Specifically, the crisis revealed significant issues in the banking sector, such as insufficient capital buffers, poor risk management practices, and a lack of liquidity.

In response, leaders of the G20 nations convened to discuss the crisis and called for a review and strengthening of international regulatory standards to prevent future occurrences. The Financial Stability Board (FSB), established in 2009 as the successor to the Financial Stability Forum, played a crucial role in coordinating international efforts to address financial stability issues. The BCBS, part of the Bank for International Settlements (BIS), led the development of these international banking standards.

Between 2009 and 2010, the BCBS issued consultative documents proposing enhancements to the Basel II framework and sought feedback from stakeholders and the banking industry. In December 2010, the BCBS officially released the Basel III framework. Basel III introduced substantial reforms aimed at strengthening the regulation, supervision, and risk management of the banking sector.

Key Components of Basel III (Basel Committee on Banking Supervision, 2017):

1. **Higher Capital Requirements:** Basel III raised the minimum capital requirements, including the introduction of a common equity Tier 1 capital requirement.
2. **Liquidity Standards:** The framework introduced new liquidity standards, such as the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR).
3. **Counterparty Credit Risk Measures:** Basel III addressed counterparty credit risk through measures like the introduction of the leverage ratio and enhancements to the risk-weighted assets calculation.

Basel III was designed to be implemented over a phased timeline, allowing banks and regulators time to adapt to the new standards. The implementation period spanned several years, with some provisions being gradually phased in.

The adoption of Basel III required coordination among various countries and jurisdictions to ensure consistent and effective global implementation. Countries and regions integrated Basel III principles into their national regulatory frameworks, with some adjustments based on local conditions and specificities.

Basel III represents a significant effort to rectify the shortcomings identified in the pre-crisis Basel II framework. The reforms aim to create a more resilient and stable global banking system by strengthening capital and liquidity requirements, enhancing risk management practices, and promoting financial stability.

The importance of Basel III, as outlined by the Basel Committee on Banking Supervision (2017), can be summarized in several key aspects:

1. **Financial Stability and Risk Mitigation:** Basel III aims to enhance risk management and reduce the probability of banking crises by addressing weaknesses in the financial system.
2. **Capital Adequacy with Higher Requirements:** Basel III mandates higher capital requirements for banks, ensuring they maintain a stronger capital base to absorb losses during economic downturns.
3. **Improved Risk Management:** Basel III introduces more sophisticated risk measurement methodologies, particularly for market and operational risks, promoting better risk management practices.
4. **Liquidity Standards:** Introducing Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), Basel III enhances a bank's ability to withstand short-term and long-term liquidity stress.

5. **Counterparty Credit Risk:** Addressing this risk by promoting the use of central clearing counterparties and encouraging sound collateral management practices.
6. **Systemically Important Banks:** Basel III identifies and imposes additional regulatory requirements on these banks to prevent their failure from causing widespread economic disruption.
7. **Mortgage and Securitization Standards:** Basel III includes measures to regulate mortgage lending and introduces more stringent standards for the securitization of assets, reducing the likelihood of risky financial products.
8. **Market Discipline:** Basel III encourages banks to provide more transparent information to the public and regulators, fostering market discipline.
9. **International Consistency:** Establishing a common set of international standards, Basel III promotes consistency and a level playing field among global banks.
10. **Crisis Prevention and Mitigation:** Introducing measures for early intervention by regulators to address vulnerabilities before they become systemic issues.
11. **Regulatory Capital Instruments:** Allowing for the inclusion of innovative capital instruments, providing flexibility for banks to meet their capital requirements.
12. **Macroprudential Oversight:** Introducing tools that regulators can use to address systemic risks at a broader level, beyond individual institutions.
13. **Credit Rating Agency (CRA) Reform:** Reducing reliance on credit rating agencies by introducing alternative measures of creditworthiness.

In essence, Basel III's significance lies in its holistic approach to bolstering the global banking system's resilience, improving risk management, and fostering financial stability amid economic uncertainties. Its implementation stands as a pivotal element in worldwide endeavors to avert and alleviate future financial crises.

Previous research has yielded conflicting findings regarding the effects of regulatory and supervisory policies on banking efficiency. Some studies have provided empirical evidence indicating the impact of certain regulatory and supervisory practices on bank development and stability. These studies suggest that there is no statistically significant relationship between the strictness of capital requirements, the authority of official supervision, and banking efficiency. However, they have found that regulatory and supervisory practices that are most effective in enhancing bank profitability and stability

emphasize the importance of accurate information disclosure, enabling private sector monitoring of banks, and creating incentives for private entities to exercise corporate control

Similarly, this study has reviewed the implementation documents of Basel III from the Bank for International Settlements (BIS) website, specifically focusing on banking supervision. It has also referenced past research on the relationship between Basel III capital regulation and banking efficiency. Additionally, various relevant articles from newspapers, journals, magazines, books, and internet sources have been consulted. The chapter provides references to the most pertinent documents, offering a theoretical review and insights into the impact of Basel III capital regulation on the efficiency of Nepalese banks.

2.2. Capital Adequacy Framework 2015

The Basel Committee on Banking Supervision (BCBS) unveiled a comprehensive reform package titled "Basel III: A global regulatory framework for more resilient banks and banking systems" in December 2010. This initiative, known as Basel III capital regulations, represents the BCBS's response to enhancing the banking sector's ability to withstand shocks arising from financial and economic stress, thereby reducing the risk of contagion from the financial sector to the real economy (Basel Committee on Banking Supervision, 2011).

Basel III reforms primarily focus on strengthening microprudential regulation at the bank level to enhance the resilience of individual banking institutions during periods of stress. Additionally, the reforms also address macroprudential concerns, aiming to mitigate system-wide risks that can accumulate across the banking sector, as well as the procyclical amplification of these risks over time.

These new global regulatory and supervisory standards aim to elevate the quality and quantity of capital (Pillar 1) to ensure that banks can better absorb losses both in ongoing operations and under extreme stress scenarios. The reforms also aim to broaden the coverage of risk within the capital framework, introduce a leverage ratio as a complement to the risk-based capital measure, raise standards for supervisory review processes (Pillar 2), and enhance public disclosures (Pillar 3), among other objectives. The macroprudential elements of Basel III are predominantly embedded in the capital buffers.

These buffers, including the capital conservation buffer and the countercyclical buffer, are designed to safeguard the banking sector during periods of excessive credit expansion.

Nepal Rastra Bank (2015) has recognized the importance of capital in ensuring the stability and health of banks and the broader banking system. To align with international standards while considering local market conditions, the NRB has implemented capital adequacy requirements based on international practices with necessary adjustments. In an effort to adopt best practices globally, (Nepal Rastra Bank, 2013) the NRB has issued an action plan for Basel III implementation and expressed its intent to adopt the Basel III framework, albeit with some simplifications. Through extensive discussions with stakeholders and impact assessments at various stages, this framework has been developed. It serves as a guide for implementing Basel III in Nepal. The Basel III framework maintains its foundation on three key pillars: minimum capital requirements, supervisory review of capital adequacy, and market discipline, which were established in the Basel II capital adequacy framework.

2.3 Theoretical review

The neoclassical economic theory states that financial liberalization allows bank lending to more attractive destination at lower cost which increases productivity and growth but at the same time some scholar beliefs that financial liberalization leads to risky behavior by the banks, therefore the financial liberalization triggers lending cycles in economies with credit restriction and overall imperfections in the financial markets, that the higher level of inefficiencies as a matter of fact, there exist trade-off between economic efficiency and market stability. A competitive banking system promotes the efficiency and therefore important for growth, but market power is necessary for stability in the banking system,. (Gajurel, 2010).

There are four main theories used to measure bank efficiency: Conventional Neoclassical Theory, Managerial Theories, Behavioral Theories, and X-efficiency Theory.

1. **Conventional Neoclassical Theory**: Developed by Cournot in 1883, this theory treats the firm as a "black box" that converts resources into profitable goods through a production function. It assumes firms operate in a perfectly competitive market, aiming to maximize profits by simultaneously maximizing revenues and

minimizing costs. This leads to a competitive equilibrium where the marginal rates of substitution between any two economic variables (inputs or outputs) are equal for all firms. However, this theory has been criticized as impractical and too narrow, especially in the context of modern large organizations where there is a separation of ownership and control.

2. **Managerial Theories**: These theories argue that management, rather than aiming to maximize profits, will pursue their own interests and utility. While they are constrained by profit limitations, the primary focus is on management's own goals.
3. **Behavioral Theories**: According to this theory, firms' ability, need, or desire to maximize profit is questionable due to uncertainty and incomplete information in the business environment. The firm is seen not as a unified structure but as a coalition of various participants, such as owners, managers, workers, and customers, each with different interests and objectives. Firms have multiple specific goals, including production, inventory, sales, market share, and profit, which may conflict with each other. Consequently, decision-making involves constant bargaining and ambition adjustments, and discrepancies between available resources and required payments can increase costs and reduce efficiency.
4. **X-efficiency Theory**: Introduced by Leibenstein in a series of papers starting in 1998, this theory links to both behavioral and managerial utility theories. It defines X-efficiency as the overall efficiency of a firm in using its resources and the best available technology to transform inputs into maximum outputs at minimum cost. Leibenstein criticizes the neoclassical theory's assumption that firms maximize profits, suggesting instead that many firms aim to maximize managerial utility. (Jaabi, 2018)

Each of these theories offers a different perspective on the factors influencing a firm's efficiency and the challenges they face in achieving optimal performance.

2.4 Empirical Review

An empirical review offers essential context for a current study by summarizing and synthesizing existing empirical research in the field. It enables readers to understand what is already known and highlights gaps or unresolved questions. By reviewing past empirical studies, researchers can pinpoint gaps, contradictions, or limitations in the

existing literature. This process justifies the need for the new study, showing how it addresses these gaps or helps resolve contradictions. It also aids in constructing a theoretical framework for the current research, allowing researchers to identify patterns, trends, or conflicting findings that can inform the theoretical foundation of the new study.

Conducting a thorough review of existing empirical research helps researchers avoid redundancy. By understanding what has already been explored and published, they can design their studies to provide new insights or perspectives rather than duplicating previous efforts. Researchers can also learn from the methodologies used in earlier studies. The empirical review highlights effective or innovative research methods, as well as pitfalls or challenges faced by other researchers. By critically assessing the quality of past empirical studies, researchers can evaluate the reliability and validity of the evidence in the literature, informing readers about the strength of the existing knowledge base.

Including an empirical review demonstrates that researchers are well-versed in the existing literature in their field. It showcases a deep understanding of the subject matter and positions the new study within the broader scholarly conversation. Research is a cumulative process, and an empirical review contributes to the ongoing academic discourse, showing how the current study adds to the body of knowledge and advances the field.

In summary, an empirical review is essential in a research paper because it provides the intellectual and academic foundation for the new study. It connects the research to the broader scholarly conversation, justifies its significance, and informs the design and methodology of the current investigation.

Ndedi and Ketuma (2015) conducted a study titled "Exploration of the Impact of Basel III on the Performance of Commercial Banks," with the primary aim of assessing how the Basel III principles of capital requirement, leverage ratio, and liquidity requirements affect commercial bank performance. The study employed a mixed-methods approach, integrating both qualitative and quantitative data collection methods. The main data sources were secondary data from EU countries.

Their findings, based on comparisons of three different scenarios, reveal that the bank maintains a solvent balance sheet. Under normal conditions (scenario 1), the bank is projected to achieve a positive annual net income while maintaining a 50% dividend

payment. In scenario 2, which involves an increase in the Risk-Weighted Assets (RWA) of the credit portfolio due to a downgrade in credit ratings by rating agencies, the RWAs rise, leading to a decrease in Tier ratios. This scenario's increased RWAs are offset by reducing the risk of the total credit portfolio through credit allocation adjustments and lower dividend payments. This results in higher Tier ratios but a lower return rate, ultimately leading to a reduced net income.

Scenario 3 represents a more severe financial crisis, with an unexpected loss of 600 million. The results for this scenario indicate that while the bank remains solvent, it must withhold dividend payments from 2016 to 2019. Across all scenarios, the bank's Liquidity Coverage Ratio (LCR) is well above the minimum requirements, suggesting that the LCR does not significantly enhance financial stability. The Net Stable Funding Ratio (NSFR) is not a challenge for the bank due to 75.5% of deposits having maturities longer than one year. Despite meeting all Basel III requirements, the bank should aim to attract more deposits with maturities shorter than one year to achieve a more balanced distribution among deposits. This would allow the credit portfolio to invest in assets with longer maturities, yielding higher returns.

The study also concludes that an increase in capital does not necessarily lead to higher financing costs. A higher leverage ratio provides a greater tax advantage, making a lower capital level preferable. However, the new Basel III capital ratios aim to prevent over-leveraging, thus reducing such tax advantages. Ultimately, the new requirements significantly impact the bank's net income and credit portfolio allocation.

Bilal and Salim (2016) conducted a study titled "Does Basel III Implementation Impact Financial Performance? Evidence from Omani Commercial Banks," with the goal of examining how Basel III implementation affects the financial performance of commercial banks in Oman. To achieve this objective, the researchers used qualitative research methods and descriptive analysis. They gathered data from published financial statements of commercial banks, their websites, reports from the Central Bank of Oman (CBO), and other published reports. The study used annual data from all Omani commercial banks for the period 2013-2015 to calculate key financial ratios, assessing the impact of Basel III on capital adequacy and financial performance.

Additional data sources included library references and reviews of various articles, papers, and relevant previous studies. To test the relationship between capital adequacy and profitability in the Omani commercial banking sector, the researchers employed a

correlation analysis model. Financial performance or profitability was measured using Return on Assets (ROA), Return on Equity (ROE), Cost-to-Income Ratio (C/I), Net Interest Margin (NIM), and Debt-to-Equity Ratio (DTE). The study focused on the seven leading local commercial banks.

The results from Table 2 indicated that ROA was positively correlated with NIM (0.131), Income Expense Trading Transactions (IETT) (0.826), and Credit Deposit Ratio (CDR) (0.830), although these correlations were not statistically significant. This suggests that Basel III implementation did not negatively impact ROA, leading to the rejection of the hypothesis.

The findings from Table 3 showed that ROE, as a measure of profitability, was positively correlated with NIM (0.789) and IETT (0.076), with these correlations also not being statistically significant. However, CDR (0.060) had a positive and significant impact on ROE, suggesting that capital adequacy requirements might positively affect the ROE of commercial banks in Oman, thus rejecting the hypothesis.

Table 4's results indicated a strong relationship between Equity Financing Ratio (EFR) and IETT at a 0.05 level of significance, with positive correlations with NIM (0.681) and CDR (0.228), though these were not statistically significant. Consequently, the hypothesis was again rejected.

Table 5 showed that Net Income (NI) was positively associated with NIM (0.131), IETT (0.826), and CDR (0.830), but these correlations were not significant. Similarly, Table 6 revealed that DTE was positively associated with NI, NIM (0.851), IETT (0.929), and CDR (0.565), but these influences were not significant.

Theoretically, there is a negative relationship between capital adequacy and financial performance. However, the study's main objective was met, as the findings indicated that Basel III implementation positively impacts the financial performance of commercial banks in Oman, leading to the rejection of the research hypotheses.

The study by Ding and Sickles (2018) titled “Capital Regulation, Efficiency, and Risk Taking: A Spatial Panel Analysis of U.S. Banks” aimed to evaluate the effects of capital regulations on capital adequacy ratios, portfolio risk levels, and cost efficiency among U.S. banks. The researchers analyzed a large panel data set of U.S. banks from 2001 to 2006. Initially, they estimated the model using two-step generalized method of moments (GMM) estimators. After obtaining residuals from these regressions, they proposed a method to construct a network based on clustering these residuals. The residuals capture

unobserved heterogeneity beyond systematic factors and the banks' business decisions, influencing capital levels, risk, and cost efficiency, thereby representing unobserved network heterogeneity among banks.

The researchers then re-estimated the model within a spatial error framework. Comparisons between Fixed Effects, GMM Fixed Effect models, and spatial fixed effects models revealed clear evidence of unobserved spatial effects in the interbank network. The empirical findings demonstrated a strong positive two-way relationship between changes in Non-Performing Loans (NPL) and changes in capital. This implies that banks' NPL holdings increase when their capital increases and vice versa. Regarding efficiency, the results indicated a positive relationship between efficiency and changes in NPL as well as changes in capital. This suggests that more efficient banks tend to increase their capital holdings and take on greater credit risk.

Bhattarai (2021) conducted a study titled "Capital Adequacy Ratio and Financial Performance of Commercial Banks in Nepal" to assess the impact of various capital adequacy ratios—core capital ratio, supplementary capital ratio, and total capital fund ratio—on financial performance metrics such as return on assets (ROA) and return on equity (ROE), and to explore their interrelationships. The study also examined the effect of capital adequacy ratios on the financial performance of commercial banks in Nepal. Employing a descriptive and causal-comparative research design, the study relied on secondary data sources. Data were collected from the annual audit reports of 26 out of 27 commercial banks for the fiscal years 2012/13 to 2018/19, with Rastriya Banijya Bank excluded due to unavailable reports, resulting in 182 observations.

Statistical tools used included mean range, standard deviation, coefficient of variation, correlation analysis, and regression analysis. According to Table 2, there is a low degree of direct correlation between ROA and the core capital ratio, supplementary capital ratio, and total capital fund ratio at a 1% level of significance (LOS). Similarly, there is a low degree of positive correlation between ROE and the supplementary capital fund ratio at a 1% LOS, and a low degree of inverse correlation between ROE and both the core capital ratio and total capital fund ratio at a 1% LOS. There is a moderate positive relationship between ROA and ROE at a 1% LOS. Additionally, there is a low degree of positive correlation between the supplementary capital fund ratio and the total capital fund ratio at a 5% LOS, and a low degree of negative correlation between the core capital ratio and the supplementary capital ratio at a 1% LOS. However, a high degree of positive correlation

between the core capital ratio and total capital fund ratio is statistically insignificant. Finally, there is a low degree of direct correlation between the supplementary capital fund ratio and total capital fund ratio at a 1% LOS.

Table 3 presents three regression models that are statistically significant at a 1% LOS. The impact of the total capital fund ratio and the core capital ratio on ROA is significant at a 1% LOS, whereas the impact of the supplementary capital fund ratio on ROA is insignificant. All regression models exhibit no multicollinearity issues, and they are free from autocorrelation and heteroscedasticity problems. Models 1 and 2 confirm that the total capital fund ratio positively affects ROA. According to regression model 2, a coefficient value of 0.342 indicates that a 1-unit increase in the total capital fund ratio results in an average 0.342-unit increase in ROA, assuming all other factors remain constant. Likewise, the core capital ratio positively impacts ROA, with a coefficient value of 0.308, as supported by regression model 3. All regression models account for approximately 10% of the study area.

Table 4 confirms that the three regression models are statistically significant at a 1% LOS and satisfy regression assumptions, including no multicollinearity, no autocorrelation, and no heteroscedasticity. Table 4 shows that both the core capital ratio and total capital fund ratio positively affect ROE, whereas the supplementary capital fund ratio has no significant impact on ROE. The study finds that ROE is more variable compared to ROA, and the supplementary capital is more dispersed than the core capital ratio. There is a low degree of positive correlation between ROA and both the core and supplementary capital ratios, and a low degree of positive correlation between ROE and the supplementary capital ratio, but a low degree of inverse correlation between ROE and the core capital ratio. Both the core capital ratio and total capital fund ratio positively influence ROA and ROE.

Obadire et al. (2022) conducted a study titled "Basel III Capital Regulations and Bank Efficiency: Evidence from Selected African Countries" aimed at analyzing the efficiency of African banks, particularly following the widespread adoption of Basel III regulations after the 2008 global financial crisis. The research was approached in two parts. The first part investigated the impact of Basel III capital regulations on the operational and investment efficiency of African banks using popular random effects and pooled ordinary least squares (OLS) panel data regression models. The second part assessed whether

African banks are indeed efficient by analyzing their efficiency levels using the input-oriented Data Envelopment Analysis (DEA) approach.

The study utilized audited bank-level data from 45 listed banks across six African countries—South Africa, Nigeria, Kenya, Tanzania, Uganda, and Malawi—that adopted the Basel III Accord from 2010 to 2019. The data were sourced from the IRESS database. The regression results indicated that bank capital regulation positively impacts the operational and investment efficiency of the sampled African banks. Specifically, for every one-unit increase in bank buffer capital, the operating and investment efficiency of banks increased by 0.71 and 70.5 units, respectively.

The random effect and pooled OLS regression results also demonstrated a statistically significant positive relationship at 10% and 5% significance levels, respectively. This suggests that increased capital regulation influences banks' decisions and strategies for cost containment, enhancing their operational efficiency. Additionally, it alters their risk behavior by prioritizing value-adding and positive net present value investments, thereby improving their investment efficiency.

Ramayuli et al. (2022) conducted a study titled "Role of Basel III with Performance Measurement Based on RAROC: A Study on Banks in Indonesia." The study aimed to examine the effects of the Liquidity Coverage Ratio (LCR) or liquidity risk, capital structure, and market discipline on banking performance measured by Risk-Adjusted Return on Capital (RAROC). Additionally, it explored the combined impact of LCR, capital structure, and market discipline on banking performance (RAROC).

The study utilized audited bank-level data from 45 listed banks in six African countries—South Africa, Nigeria, Kenya, Tanzania, Uganda, and Malawi—that adopted the Basel III Accord from 2010 to 2019. The data were obtained from the IRESS database. The regression results presented in Table 4 indicated that bank capital regulation positively affects the operating and investment efficiency of the sampled African banks. Specifically, for every one-unit increase in bank buffer capital, the operating and investment efficiency of banks increased by 0.71 and 70.5 units, respectively.

The results from the random effect and pooled OLS regression models also showed a statistically significant positive relationship at 10% and 5% significance levels, respectively. This suggests that heightened capital regulations influence banks' decisions and strategies for cost containment, thereby enhancing operational efficiency. Moreover,

these regulations modify banks' risk behaviors, leading them to focus on value-adding and positive net present value investments, thus improving their investment efficiency.

Mamun et al. (2022) conducted a study titled "Affiliation between Capital Adequacy and Performance of Banks in Bangladesh" to explore the relationship between bank performance and capital adequacy in Bangladesh. The study sampled 20 listed conventional banks over a period of 11 years, from 2010 to 2020. The analysis employed correlation and multivariate fixed effect regression analysis to examine how the capital adequacy ratio (CAR), the credit deposit ratio (CDR), and the cost-income ratio (CIR) influence bank performance.

The descriptive statistics for the dependent and independent variables revealed that the mean CAR was 12.35%, ranging from 6.31% to 17.93%, with a variation of 1.77% within the banking industry in Bangladesh. The CDR ranged from 64.34% to 99.73%, averaging 83.32%, with a 7% variation. The CIR showed the highest variation, ranging from 20.63% to 76.82%, with a mean of 48.42%. The mean ROE was 13.49%, with a variation of 6.32%. The average ROA was 1.14%, ranging from 0.01% to 4.01%, with the least variation at 0.64%.

Pearson correlation analysis indicated a negative correlation between ROA and CAR (-0.271), and between ROA and CIR (-0.266). There was an insignificant positive correlation (0.051) between ROA and CDR. ROE had a negative correlation with CAR (-0.266) and CIR (-0.166), while the correlation with CDR was insignificantly positive (0.052).

For Model 1, the fixed effect model was determined to be more appropriate when the p-value was less than 0.05, indicating the acceptance of the alternative hypothesis. The fixed effect model explained 30.5% of the variance in ROA by the variance in CAR, CDR, and CIR. The study found a significant negative relationship between CAR and ROA, leading to the acceptance of H1. However, CDR showed no significant relationship with ROA, leading to the rejection of H2.

In Model 2, the fixed effect model was applicable as indicated by a p-value less than 0.05. The model explained 33% of the fluctuation in ROE by CAR, CDR, and CIR. The results showed a negative association between CAR and ROE, confirming H4. Additionally, there was a positive association between CDR and ROE, leading to the acceptance of H5.

In conclusion, the correlation and regression analysis indicated that CAR has a negative association with ROA, and CIR has a negative relationship with ROA, while CDR has no relationship with ROA. Conversely, CAR and CIR have a negative association with ROE,

but CDR has a positive relationship with ROE. The study concluded that there is a significant association between capital adequacy and both ROA and ROE, indicating a significant relationship between capital adequacy and bank performance.

Ogunmola et al. (2022) conducted a study titled "The Influence of Capital Requirement of Basel III Adoption on Banks' Operating Efficiency: Evidence from U.S." This research focuses on U.S. banks and examines how they can maintain sound development by ensuring operational efficiency under the enhanced Basel III requirements for core capital adequacy and Tier 1 capital adequacy ratios. The paper employs empirical analysis and data envelopment analysis to evaluate the input-output efficiency of banks and offers practical recommendations for improving efficiency and maintaining financial system stability.

The study analyzes actual data to explore the relationship between different capital tiers of U.S. banks concerning performance and risk. The findings suggest that following the financial crisis and during the COVID-19 pandemic, U.S. banks should enhance their core and Tier 1 capital to mitigate risk impacts. It is inferred that, given the severe economic consequences of the health crisis, an appropriate capital strategy can be effectively employed to control risks.

Empirical results indicate that increasing Core or Tier 1 capital ratios has significantly negative impacts on bank performance, whereas an increase in the Tier 2 capital ratio does not significantly affect performance. These results suggest that banks may prefer to increase the cheaper Tier 2 capital to meet higher capital adequacy ratios, as it does not significantly impact performance. However, Tier 2 capital offers less risk absorption capacity compared to Core capital and Tier 1 capital.

Grzeta et al. (2023) conducted a study titled "Size matters: analyzing bank profitability and efficiency under the Basel III framework" to assess the impact of two major regulatory changes, Basel II and Basel III, on bank performance, considering bank size and various bank-specific and macroeconomic factors. The study analyzed data from 433 European commercial banks over the period 2006–2015.

The study employed a two-stage empirical analysis. In the first stage, relative efficiency was calculated using non-parametric data envelopment analysis (DEA). In the second stage, dynamic panel data analysis was used to examine the impact of bank-specific and macroeconomic variables, as well as regulation, on bank performance in terms of profitability and efficiency.

The results showed a varied impact of regulation on bank performance based on bank size. Large- and medium-sized banks benefited from regulation, showing improved efficiency and profitability. In contrast, small banks experienced a negative impact on performance, possibly due to the additional administrative and regulatory burdens imposed by the new regulatory framework.

The study also highlighted the decline in bank profitability, with the average return on assets (ROA) decreasing from nearly 1.5% before the 2008 crisis to approximately 0.4% after 2009. Despite this decline, most banks remained profitable, with a median ROA of 1%.

Overall, the findings suggest that larger banks have been more successful in adapting to the new regulatory environment compared to smaller banks. However, the challenges faced by small banks in terms of profitability and efficiency could lead to future failures or mergers with larger banks, potentially increasing concentration in the banking sector and systemic risk.

2.5 Research Gap

In Nepal, there is a lack of research specifically examining the impact of Basel III capital regulations on bank efficiency. Few studies have explored this relationship in the Nepalese banking sector, which is characterized by a diverse range of commercial banks in terms of size and background. Existing studies have typically focused on specific elements of Basel III to evaluate financial performance, such as the study by Bhattarai (2021) on the impact of capital adequacy ratio on the financial performance of commercial banks in Nepal, but they have not addressed efficiency.

This study aims to fill this gap by examining the impact of Basel III capital regulations on bank efficiency using data from commercial banks in Nepal. Nepal Rastra Bank implemented the Capital Adequacy Framework 2015, based on the global regulatory framework of the Basel III Accord 2010, from mid-July 2016/17. Commercial banks in Nepal have made significant efforts to meet the requirements of this framework.

It is important to note that Basel III implementation is an ongoing process, and its impact may change over time. The study also considers how the adaptation of new strategies and regulatory changes can influence efficiency over different time periods.

CHAPTER III

RESEARCH METHODOLOGY

The main aim of this study is to examine how the Basel III capital regulations affect the operational and investment efficiency of banks in Nepal. This will be achieved by using regression analysis models. The study will focus on two dependent variables: the ratio of operating expenses to assets and the ratio of interest revenue to total earnings. The independent variables will include components of Basel III such as minimum capital requirement, capital adequacy ratio, and capital buffer premium. These variables will be used to assess the efficiency of Nepalese commercial banks under the Basel III regulations, which are widely adopted by banks worldwide.

3.1 Research Design

The research design for the study "Basel III Capital Regulations and Bank Efficiency: Evidence from Commercial Banks of Nepal" involves a quantitative approach utilizing descriptive and causal analysis. This approach includes regression models to analyze the relationship between minimum capital requirement, capital adequacy ratio, and capital buffer premium with the ratio of operating expenses to total assets and the ratio of net interest revenue to total earnings. Past data is utilized for analysis, and various changes observed in the data are described across different aspects. The analysis involves the use of tables and various research tools.

3.2 Population and Sample, and Sampling Design

The study focuses on the population of 'A' Class Financial Institutions, comprising 20 commercial banks in Nepal and the period of research has been ten fiscal years (F.Y. 2068/69/ to F.Y. 2078/79). However, due to time constraints and limited data availability, five commercial banks were randomly selected as samples for the research.

The sample banks that are used for this research are as following:

1. Siddhartha Bank
2. Machhapuchchhre Bank
3. Kumari Bank Limited
4. Nepal Investment Mega Bank (NIMB)
5. Global IME Limited

3.3 Nature and Sources of Data

Data for the study were solely collected from secondary sources. These secondary sources primarily included audited financial statements and Basel disclosures published on the banks' websites, as well as information from the Nepal Rastra Bank's website (www.nrb.org.np) and other relevant websites. Additional data were gathered from the Nepal Rastra Bank itself. Directives pertaining to the financial sector, specifically the commercial banking sector, were extracted from the Unified Directives 2079 and the Basel III framework. Furthermore, data from other researchers or organizations, as well as publicly available scholarly articles, books, journals, magazines, and newspapers, were also collected and synthesized for the study.

3.4 Method of Analysis

This study examines both the qualitative and quantitative aspects of Nepal's commercial banking sector concerning Basel III capital regulations and bank efficiency. The qualitative component of the study centers on the Unified Directives and Capital Adequacy Framework issued by the Nepal Rastra Bank (NRB), which is based on the Basel III capital regulations for international banking. The quantitative analysis includes statistical analyses and tests.

3.4.1 The descriptive statistics

Descriptive statistics for the sampled commercial banks in Nepal include measures such as the minimum, maximum, mean, and standard deviation. These values represent the lowest and highest points of the variable.

a) Mean

The mean represents the average value of the variables included in the study. It serves as a central point that is considered most representative of the data.

$$\bar{X} = \frac{\sum x}{N}$$

Where,

$\overline{X}$ = Mean

X = Individual Observation

N = Number of observation

b) Standard deviation

Standard deviation indicates the diversity or spread of data within each variable of a dataset. It is a measure of how much the data points deviate from the mean. Standard deviation is not only used to express the variability of a population but also to gauge the confidence in statistical conclusions. A low standard deviation suggests that the data points are close to the mean, while a high standard deviation indicates that the data is spread out over a wider range of values.

$$S.D = \sqrt{\frac{\sum(x-\bar{x})^2}{N}}$$

Where,

SD = Standard deviation

$\overline{X}$ = Mean

X = Individual Observation

N = Number of observation

3.4.2 Correlation Analysis

Karl Pearson Correlation Analysis

The relationship between two variables is measured using Karl Pearson's correlation coefficient. This coefficient, denoted by r, indicates how variables are correlated. Pearson's correlation coefficient is a method to quantify the degree to which two or more variables are associated or related to one another. It is the most commonly used bi-variate correlation statistic. The correlation coefficient between two variables ranges from +1 (indicating a perfect positive relationship) to -1 (indicating a perfect negative relationship).

$$r = \frac{n\Sigma xy - \sum xy}{\sqrt{n\Sigma x^2 - \sum(x)^2}\sqrt{n\Sigma y^2 - \sum(y)^2}}$$

Where,

n= number of pairs in observation

x=first variable

y =second variable

Multiple correlation: In real life, many independent variables can influence a dependent variable. The study of the degree of relationship between a single dependent variable and several independent variables in combination is known as multiple correlation analysis. In this study, the effort is directed towards identifying the correlation between the dependent variables OETA and NIMR with the combined effect of the independent variables MCR, CAR, and CBP. The calculation of multiple correlation coefficients can be expressed through a specific formula.

$$R123 = \sqrt{\frac{r_{12}^2 + r_{13}^2 - 2r_{12}r_{13}r_{23}}{1 - r_{23}}}$$

Where,

r12 = correlation coefficient between variable x1 and x2

r23 = correlation coefficient between variable x2 and x3

r13 = correlation coefficient between variable x1 and x3

In the research, we evaluated whether the sample coefficient of multiple correlation, R, signifies a true correlation between OETA and NIMR, considering the combined effect of Basel III elements MCR, CAR, and CBP, or if it is merely due to sampling fluctuations. This was done using a t-test to determine the significance of the observed sample multiple correlation coefficient. The test statistic used for the t-test is calculated as follows:

$$t = \frac{R}{\sqrt{1-R^2}}\sqrt{n-2}$$

3.4.3 Multiple Linear Regression Analysis

Regression analysis is a statistical technique used to examine the relationship between one dependent variable and one or more independent variables. The goal is to model and understand the relationship between the variables and make predictions based on that relationship. In simple terms, regression analysis helps you understand how the value of the dependent variable changes when one or more independent variables are varied. To evaluate the effect of Basel III regulatory requirements on the operational and investment efficiency of Nepalese banks. To access the profitability performance of bank from 2069/70 2078/79 a multiple regression equation given below: the following models were defined

$$OETA\ i, t = \beta 0 + \beta 1\ MCR\ i, t + \beta 2 CAR\ i, t + \beta 3 CBP\ i, t + E\ i, t \ldots\ldots (1)$$

$$NIMR\ i, t = \beta 0 + \beta 1\ MCR\ i, t + \beta 2 CAR\ i, t + \beta 3 CBP\ i, t + E\ i, t \ldots\ldots (2)$$

In the above models, Equations (1) and (2), β0 represents the intercept/slope parameters, whilst β1–4 represents the coefficient of the variables and E represents the error term. Model Equation (1) tests the extent to which the operating efficiency of banks, which is represented by the ratio of operating expenses to total assets (OETA), was affected by the Basel III regulatory requirements, whilst model Equation (2) tests the extent to which the investment efficiency of banks, which is represented by the ratio of net interest revenue to total earnings (NIMR), was affected by the Basel III regulatory requirements

3.5 Research Framework and Definition of Variables

The dependent variables for this study are the ratio of operating expenses to total assets (OETA) and the ratio of net interest revenue to total earnings (NIMR). These variables are used to predict or explain the efficiency of banks and serve as the outcome or response variables. The independent variables for this study include the Minimum Capital Requirement (MCR), Capital Adequacy Ratio (CAR), and Capital Buffer Premium (CBP), which are factors that influence the dependent variables. To analyze the relationship and impact of these independent variables on the ratios of operating expenses to total assets and net interest revenue to total earnings, a multiple linear regression method is applied, assessing the operational and investment efficiency of Nepalese banks.

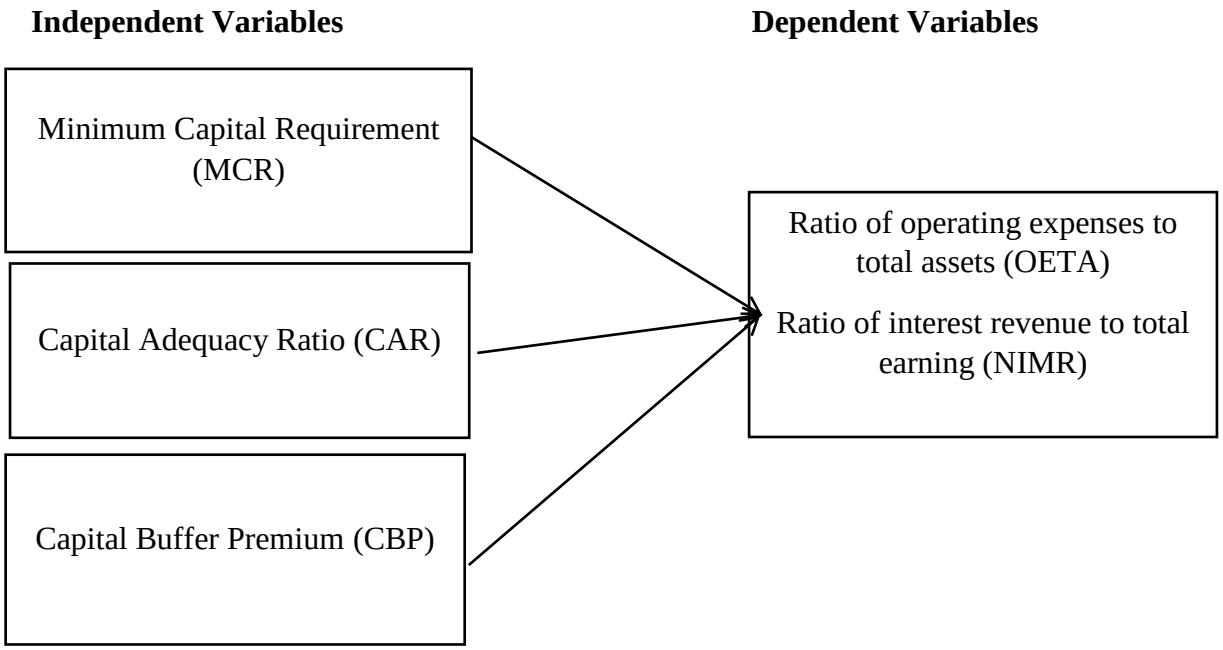

Figure 1. Conceptual Framework

Source: Obadire, et al. (2022)

1. **The Minimum Capital Requirement (MCR)** is the mandated minimum amount of capital that banks must maintain to ensure their financial stability and ability to cover potential losses. This regulatory measure is designed to protect depositors, shareholders, and the overall stability of the financial system. The capital acts as a financial buffer to absorb unexpected losses and maintain the bank's solvency during adverse economic conditions. MCR is typically expressed as a percentage of the bank's risk-weighted assets (RWA), which account for the varying levels of

risk associated with different types of assets on a bank's balance sheet. For this research, MCR is calculated as 8.5% of RWA. According to Nepal Rastra Bank's (2015) "Capital Adequacy Framework 2015," all Class A banks must maintain a minimum total capital (MTC) of 8.5% of total risk-weighted assets (RWAs). The data are derived from the Basel III disclosures published quarterly by the banks and available on their websites.

2. **The Capital Adequacy Ratio (CAR)** is a crucial financial metric used to assess a bank's financial health and its capacity to absorb potential losses. Expressed as a percentage, the CAR is calculated by dividing a bank's capital by its risk-weighted assets (RWA). The primary objective of the CAR is to ensure that banks maintain an adequate capital buffer to cover the risks inherent in their operations. The formula for calculating the Capital Adequacy Ratio is as follows:

   $$CAR = \frac{\text{Tire 1 Capital + Tire 2 Capital}}{\text{Risk- Weighted Assets}}$$

   Where,

   Tier 1 Capital: This represents the highest quality capital, encompassing Common Equity Tier 1 (CET1) capital, which includes common equity and retained earnings. Tier 1 capital is regarded as the core capital, providing a robust foundation for a bank's financial stability.

   Tier 2 Capital: This comprises supplementary capital, such as subordinated debt and other instruments that are less permanent than Tier 1 capital. Tier 2 capital offers an additional layer of protection to absorb losses during financial distress.

   Risk-Weighted Assets (RWA) are the assets on a bank's balance sheet adjusted for their risk levels. Various asset categories carry different risk weights, which reflect the varying degrees of risk associated with each type of asset. Regulatory authorities determine these risk weights based on guidelines such as those outlined in the Basel III framework.

3. **Capital Buffer Premium (CBP)** This refers to the additional capital that banks are required to hold beyond the minimum regulatory requirements. This extra capital acts as a cushion to absorb potential losses and enhances the banks' resilience during adverse economic conditions. The capital buffer premium is

calculated as the difference between the actual capital (core capital plus supplementary capital) and the minimum regulatory capital.

CBP = Actual capital –Minimum Regulatory Capital

Where, the actual capital of a bank is the sum of its Tier 1 and Tier 2 capital. The minimum regulatory capital required is set at 8 billion as per the Capital AdequacyFramework2015.

4. **Operating Expenses to Total Assets (OETA)** is a metric that indicates the efficiency of a bank's operations. It represents the percentage of a bank's total assets that is utilized for covering operating expenses. These expenses include costs like salaries, rent, utilities, and other overhead expenses. OETA is calculated by dividing operating expenses by total assets. For this study, OETA values are extracted from the annual audited reports of the sampled banks on a yearly basis and are used to assess the efficiency of banks.

   $$OETA = \frac{\text{Operating expenses}}{\text{Total Assets}}$$

5. **Net Interest Revenue to Total Earnings (NIMR)** is a metric that evaluates the importance of net interest income in relation to a bank's total earnings. It indicates the proportion of total earnings that is attributable to net interest income. A higher NIMR suggests that a significant portion of the bank's earnings comes from net interest income, while a lower NIMR indicates that non-interest income sources are more significant contributors to the bank's overall earnings. The ratio is calculated by dividing net interest revenue by total earnings. In this study, NIMR values are obtained from the annual audited reports of the sampled banks on a yearly basis and are used to assess and explain banks' efficiency.

   $$NIMR = \frac{\text{Net Interest Revenue}}{\text{Total Earning}}$$

CHAPTER IV

RESULTS AND DISCUSSION

This chapter contributes to highlight the formulated objectives of the research study. This chapter focuses on presenting, analyzing, and interpreting the relevant data from Siddhartha Bank (SB), Machhapuchchhre Bank (MB), Kumari Bank Limited (KBL), Nepal Investment Mega Bank (NIMB), and Global IME Limited (GIMEL). The data, sourced from secondary sources, is processed using financial, descriptive, and statistical tools outlined in the previous chapter on research methodology. This section aims to provide a statistical analysis of the quantitative data to enhance the understanding of how Basle III capital regulations impact banks' efficiency. It is divided into three parts: Data presentation, Data analysis, and Interpretation. This chapter is crucial in addressing the research study's objectives.

4.1 Comparison of the variables

4.1.1 Operating expense to total assets (OETA)

The operating expense to total assets (OETA) ratio provides a measure of a bank's operational efficiency by indicating the proportion of its total assets consumed by operating expenses. Appendix A Table A1 presents the calculation of OETA.

Table A1 in the appendix demonstrates that the OETA of the sample commercial banks fluctuates each year over the ten-year period, reflecting variations in operating costs and total assets due to various factors. The lowest OETA among the sample banks is 0.095 for Nepal Investment Mega Bank (NIMBL), while the highest is 0.0205 for Machhapuchchhre Bank. OETA serves as an indicator of a bank's cost management efficiency. A lower ratio suggests that a bank can generate more revenue with fewer expenses, which is generally positive, whereas a higher ratio indicates poorer cost management efficiency.

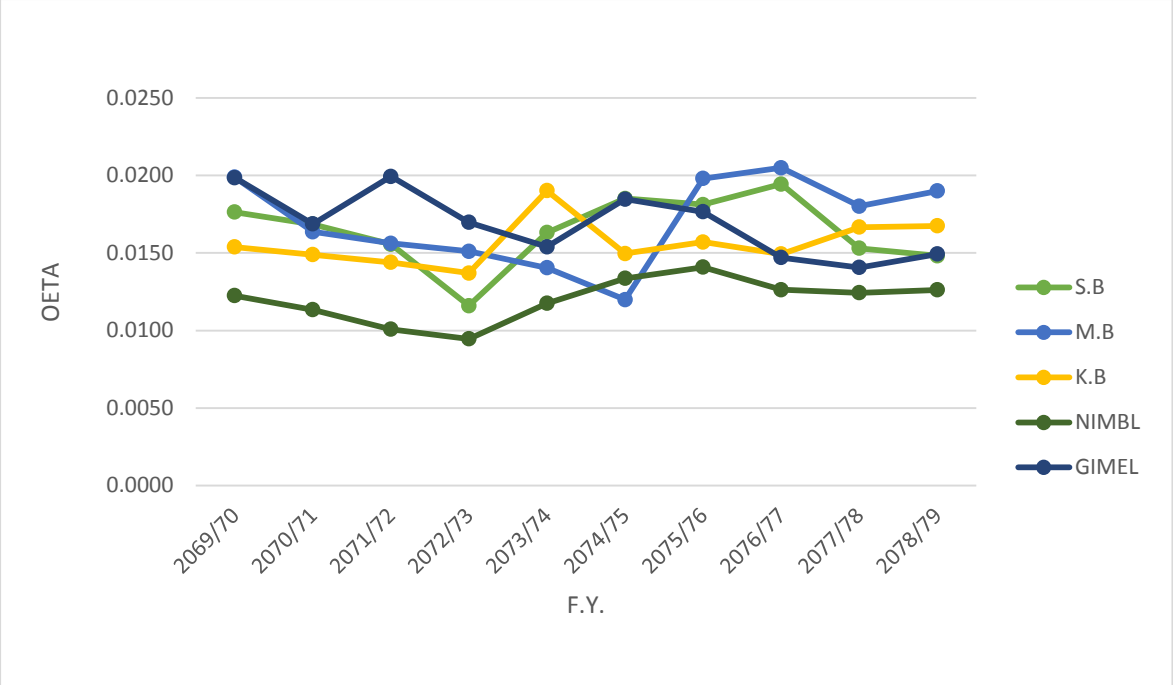

Figure 2. OETA of sample banks.

Source: Table A1

Figure 2. shows a graphical representation of all sample bank's OETA, which is obtained by the ratio of operating expenses to total assets and gives us a gives us insights into a company's cost management efficiency. Here X axis represents ten fiscal years' i.e. F. Y 2069/70 to 2078/79 and Y axis represents OETA of all sample banks which derived from the audited annual reports of all sample banks. Line graph in above figure 2 shows decreasing and increasing trend each year which shows that OETA of all sample commercial banks varies each year as operating cost and total assets of banks varies each year due to various factors.

4.1.2.Net Interest Revenue to Total Earning (NIMR)

It offers an indication of how much net interest income contributes to a bank's overall earnings. A higher ratio suggests that a substantial part of the bank's earnings comes from net interest income, while a lower ratio indicates that non-interest income sources play a more significant role in the bank's overall earnings. The calculation table for Net Interest Margin to Total Earnings Ratio (NIMR) is presented in Appendix A Table A2.

Table A2 in the appendix demonstrates that the NIMR of all sampled commercial banks fluctuates annually over the ten-year period, reflecting variations in net interest income and total earnings due to various factors. The lowest NIMR among the sample banks is

2.657 for NIMBL, while the highest is 16.350 for Machhapuchchhre Bank. NIMR provides insights into the contribution of net interest income to a bank's total earnings, where a higher ratio indicates that a significant portion of the bank's earnings comes from net interest income, while a lower ratio suggests that non-interest income sources play a more significant role in the bank's overall earnings.

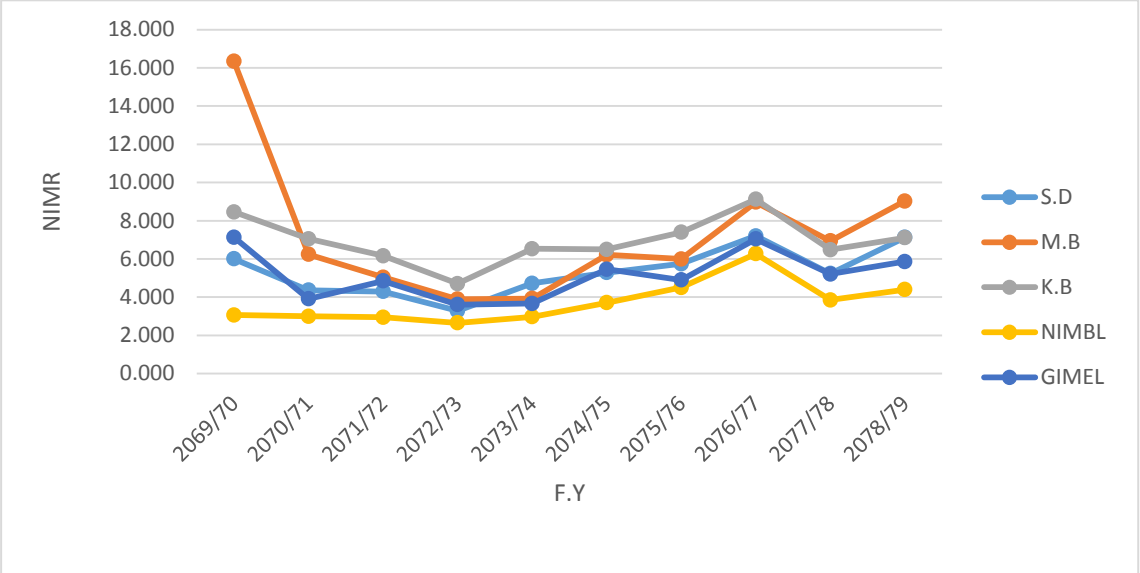

Figure 3. NIMR of sample banks.

Source: Table A2

Figure 3. shows a graphical representation of all sample bank's NIMR, which is obtained by the ratio of net interest revenue to total earning, for this research NIMR is derived from the annual audited report of the sample banks on yearly basis. Here X axis represents ten fiscal years' i.e. F. Y 2069/70 to 2078/79 and Y axis represents NIMR of all sample banks. Line graph in above figure shows decreasing and increasing trend each year which shows that NIMR of all sample commercial banks varies each year. Line graph in above figure 3 shows decreasing and increasing trend each year which shows that NIMR of all sample commercial banks varies each year as interest revenue and total earning of banks varies each year due to various factors.

4.1.3 Minimum Capital Requirement (MCR)

The Minimum Capital Requirement (MCR) serves as a financial buffer to absorb unforeseen losses and ensure the bank's stability during challenging economic conditions. As per the Capital Adequacy Framework, all Class A banks must maintain a minimum total capital (MTC) of 8.5% of their total risk-weighted assets (RWAs). This requirement is aimed at protecting depositors, shareholders, and the overall stability of the financial system.

Table A3 in the appendix presents the MCR figures for all sampled commercial banks over a ten-year period. The lowest MCR among the sample banks is Rs 0.187 billion for Machhapuchchhre Bank, while the highest is Rs 26.102 billion for Global IME Bank. This regulation ensures that banks maintain a minimum level of capital to cover potential losses and maintain stability.

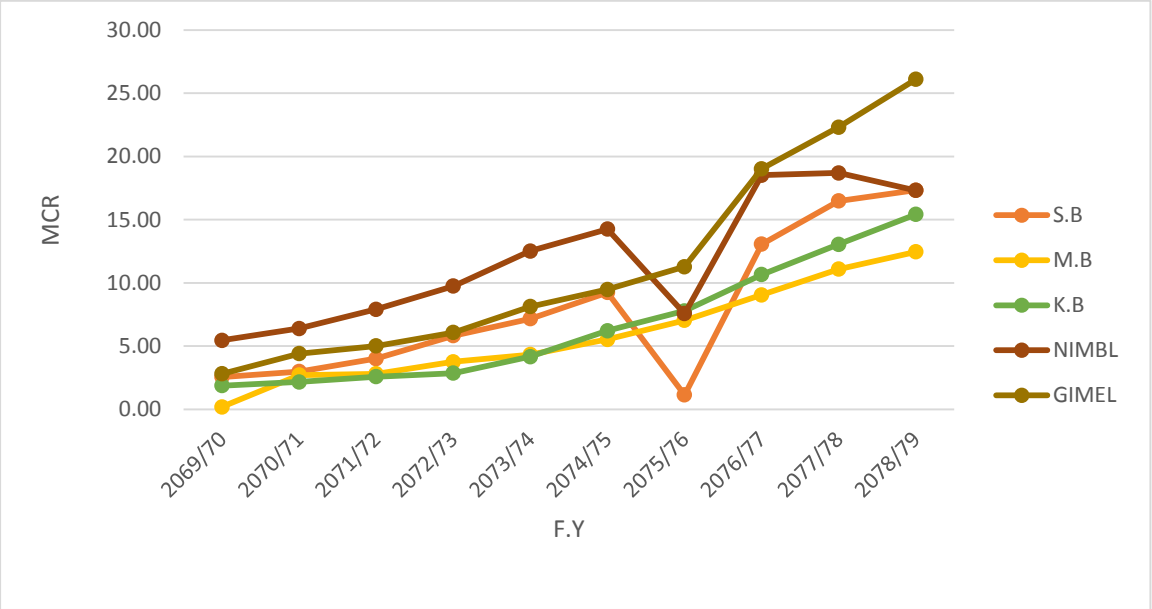

Figure 4. MCR of sample banks.

Source: Table A3

Figure 4. shows a graphical representation of all sample bank's MCR, which is 8.5% of total risk weighted assets (RWAs) for this research MCR is derived from the annual audited report of the sample banks on yearly basis. Here X axis represents ten fiscal years' i.e. F. Y 2069/70 to 2078/79 and Y axis represents MCR in Rs billion of all sample banks. Line graph in above figure shows decreasing and increasing trend each year which shows that NIMR of all sample commercial banks varies each year. Line graph in above figure 4 shows increasing trend each year except for F.Y 2075/76 which shows that MCR

of all sample commercial banks are increasing each year as a result of capital regulation under capital adequacy framework 2015.

4.1.4 Capital Adequacy Ratio (CAR)

It is expressed as a percentage and is calculated by dividing a bank's capital by its risk-weighted assets (RWA). The purpose of the CAR is to ensure that banks maintain a sufficient capital buffer to cover the risks associated with their operations. CAR calculation table is presented in Appendix A Table A4

Table A4 in appendix shows CAR of all sample bank over the period of ten years. Lowest value of CAR from among the sample banks is 10.29 % of Machhapuchhre Bank and highest value of CAR 16.82 of Machhapuchhre Bank. CAR is used to evaluate a bank's capital adequacy and its ability to cover potential losses arising from its risk-taking activities, such as lending and investing.

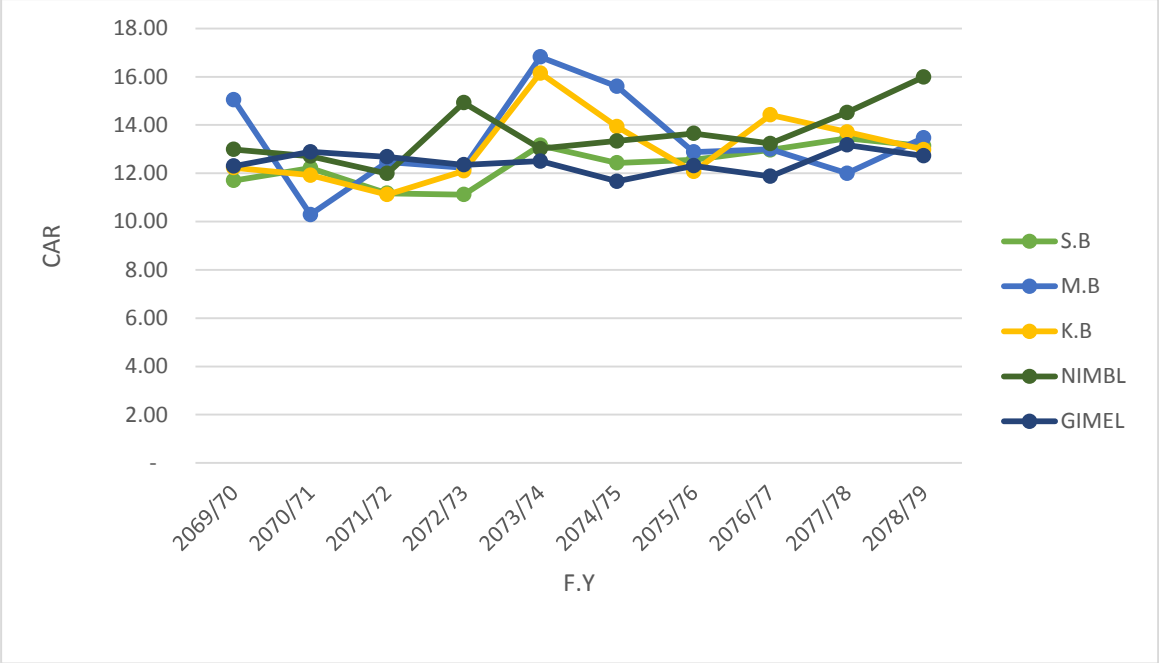

Figure 5. CAR of sample banks.

Source: Table A4

Figure 5. shows a graphical representation of all sample bank's CAR, it is expressed as a percentage and is calculated by dividing a bank's capital by its risk-weighted assets (RWA) for this research. It is derived from the annual audited report of the sample banks on yearly basis. Here X axis represents ten fiscal years' i.e. F. Y 2069/70 to 2078/79 and Y axis represents CAR in percentage of all sample banks. Line graph in above figure

shows decreasing and increasing trend each year which shows that CAR of all sample commercial banks varies each year. Line graph in above figure 5 shows increasing and decreasing trend each year which shows that CAR of all sample commercial banks are different each year as a result of variation of capital and risk weighted assets of respective banks.

4.1.5 Capital Buffer Premium (CBP)

It is often associated with additional capital that banks are required to hold beyond the minimum regulatory capital requirements. This extra capital serves as a cushion to absorb potential losses and enhances the resilience of banks during adverse economic conditions. For this research capital buffer premium is calculated as difference between actual total capital i.e. Tire1 capital +Tire 2 capital and Minimum regulatory capital. Minimum regulatory capital for all Nepalese commercial banks is 8 billion. Total actual capital is derived from quarterly Basel disclosure of the respective bank. CBP calculation table is presented in Appendix A Table A5

Table A5 in appendix shows CBP of all sample bank over the period of ten years. Lowest value of CBP from among the sample banks is Rs (5.138) in billon of Kumari Bank. In early years i.e. F.Y. 69/70 to 2072/73 some banks have negative value which is the result of transition phase, banks during those period did not meet the required regulatory capital which is 8 billion as per the capital adequacy frame work. Highest value of CBP is Rs 33.492 billion of Global IME Bank which indicates that the banks actual total capital is higher than that of minimum regulatory capital. CBP is extra capital that serves as a cushion to absorb potential losses and enhances the resilience of banks during adverse economic conditions.

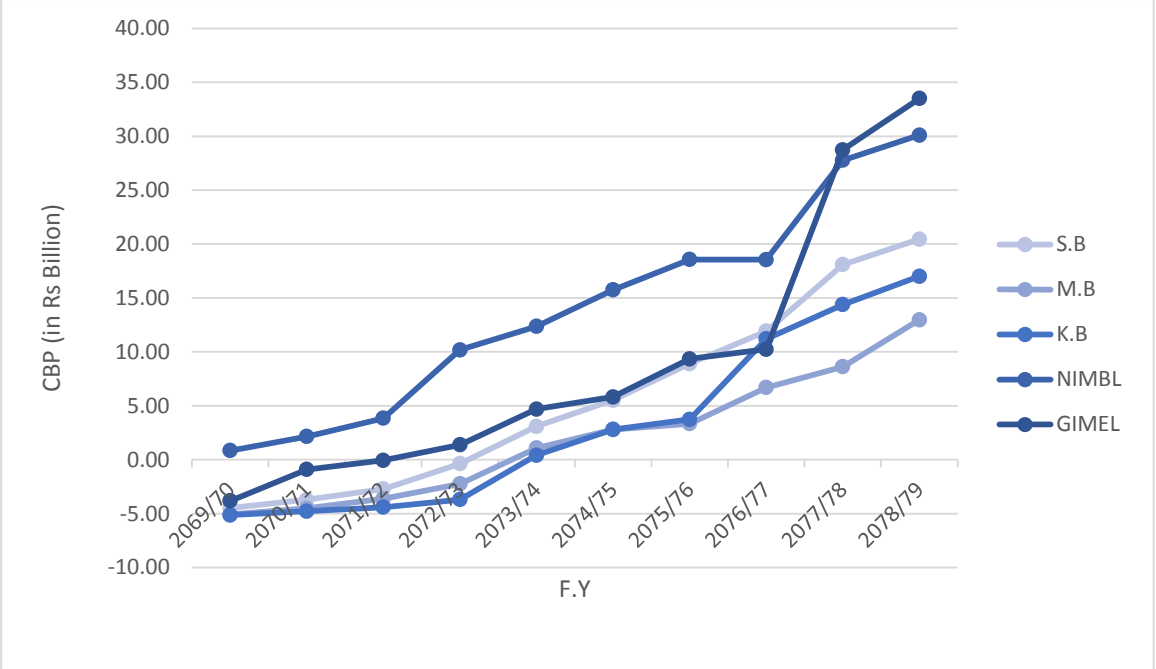

Figure 6. CBP of sample banks.

Source: Table A5

Figure 6. shows a graphical representation of all sample bank's CBP, for this research capital buffer premium is calculated as difference between actual total capital i.e. Tire1 capital +Tire 2 capital and Minimum regulatory capital. Minimum regulatory capital for all Nepalese commercial banks is 8 billion. It is derived from the annual audited report of the sample banks on yearly basis. Here X axis represents ten fiscal years' i.e. F. Y 2069/70 to 2078/79 and Y axis represents CBP in Rs billion of all sample banks. Line graph in above figure shows negative value in the initial Years which indicates that during F.Y 2069/70-72/73 sample banks were unable to maintain the minimum regulatory capital as directed by NRB and it further shows increasing trend in CBP which shows that banks have meet the capital regulatory requirement and also has extra buffer premium amounts to serves as a cushion to absorb potential losses and enhances the resilience of banks during adverse economic conditions.

4.1.6 Descriptive Statistical Result

Table 1 presents a summary of the descriptive statistics for all variables analyzed in the study. It displays the efficiency indicators of banks, including the ratio of operating expenses to total assets and the ratio of interest revenue to total earnings. The table illustrates the relationship between the independent variables (MCR, CAR, and CBP) and the dependent variables of the study (OETA and NIMR), which were calculated and derived as described in the methodology in Chapter 3. This presentation aids in analyzing the overall performance of the sampled banks.

Table 1

Descriptive statistical result.

Variables	Minimum	Maximum	Mean	Standard Deviation	Kurtosis	Skewness
OETA	0.009	0.02	0.016	0.003	-0.606	-0.126
NIMR	2.657	16.35	5.689	2.283	8.56	2.132
MCR	0.187	26.102	8.77	6.062	0.174	0.879
CAR	10.29	16.82	12.983	1.33	1.154	0.959
CBP	-5.138	33.492	6.746	10.075	0.244	0.927

Source: Appendix A-Table A6

Note: MCR data are in billion (Rs), CAR is measured in percentage (%) and CBP data are also in billion (Rs)

Table 1 provides a summary of the statistical data for both the dependent and independent variables in the panel dataset. The Basel III Accord specifies a total capital ratio of 8% and a liquidity coverage ratio of 100%, while the NRB has set a total capital ratio of 8.5% and a liquidity coverage ratio of 100%, which were closely adhered to by all the banks in the study. According to Table 6, the average capital and liquidity requirements for each bank in the sample are approximately Rs 8.770 billion (MCR), 12.983% (CAR), Rs 6.746 billion (CBP), and 181.72% (LCR), significantly exceeding the regulatory requirements outlined in the Basel III Accord. A higher CAR suggests that African banks maintain a capital adequacy ratio well above the Basel III Accord's prescribed 8% of the CET 1 ratio and Tier 1 capital ratio. Additionally, the higher CBP indicates that, collectively, the banks have a sufficient capital buffer to protect them during potential financial or economic crises.

Furthermore, the skewness normality test indicates that all variables exhibit relatively even distributions, with skewness coefficients close to zero. Most variables are skewed to the right, except for NIMR, which is skewed to the left. This suggests that the variables are asymmetrically distributed, with the mean, median, and mode occurring at different points. Additionally, the kurtosis coefficients for most variables are less than 3, indicating a lack of positive surplus kurtosis and suggesting a light-tailed distribution known as platykurtic. The exception is NIMR, which has a kurtosis coefficient of 8.560, indicating a heavy-tailed distribution.

4.2 Correlation Analysis

Correlation analysis is utilized in this study to examine the association between minimum capital requirement, capital adequacy ratio, capital buffer premium, and the ratios of operating expenses to total assets and net interest revenue to total earnings. It assesses whether there is a significant relationship between these variables and identifies whether the relationship is positive or negative. Table 2 displays the correlation coefficients between OETA, NIMR, MCR, CAR, and CBP, indicating the strength and direction of the relationships using Pearson's correlation coefficient.

Table 2

Correlation Analysis between the variables

Variables	OETA	NIMR	MCR	CAR	CBP
OETA	1				
NIMR	.544**	1			
MCR	-0.22255	-0.07311	1		
CAR	-0.13744	0.12739	0.182141	1	
CBP	-0.2364	-0.08988	.921**	.340*	1

Source: Results drawn from SPSS

Note: Correlation is significant at the 0.01 level (2-tailed) and Correlation is significant at the 0.05 level (2-tailed)

From the table 2 the Pearson product correlation of NIMR and OETA was found to be moderately positive and statistically significant ($r = 0.544$, $p < 0.001$), correlation of MCR and OETA, MCR and NIMR, CAR and OETA, was found to be negative correlation, correlation of CAR and NIMR was found to be very low positive and statistically insignificant ($r = 0.12739$, $p = 0.378$), Correlation of CAR and MCR was found to be very

low positive and statistically insignificant (r = 0.182141, p = 0.206), correlation of CBPA and OETA , CBP and NIMR was found to be negative correlation, CBP and MCR was found to be very high positive and statistically significant (r = 0.921, p < 0.001), CBP and CAR was found to be low positive and statistically significant (r = 0.340, p < 0.001).

4.3 Linear Regression Analysis

To assess the influence of Basel III regulatory standards on the operational and investment efficiency of Nepalese commercial banks, two multiple linear regression models were formulated in Chapter 4. These models examine how minimum capital requirement, capital adequacy ratio, and capital buffer premium relate to the ratios of operating expenses to total assets and net interest revenue to total earnings.

4.3.1 Regression Analysis between OETA and Explanatory Variables

To test the impact of Basel III regulatory requirements on the Nepalese commercial banks operational efficiency model 1 regression equation i.e.

$OETA_{i,t} = \beta 0 + \beta 1\ MCR_{i,t} + \beta 2 CAR_{i,t} + \beta 3 CBP_{i,t} + E_{i,t}$……. (1)

is put to test.

Table 3

Regression Analysis between OETA and Explanatory Variables

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig. (p)
(Constant)	0.018	0.005		3.910	0.000
MCR	-4.559E-05	0.000	-0.100	-0.255	0.800
CAR	0.000	0.000	-0.079	-0.488	0.628
CBP	-3.191E-05	0.000	-0.117	-0.284	0.778
R	.247[a]				
R Square	0.061				
Adjusted R Square	0.000				
Sig (p)	0.404				
Std. Error of the Estimate	0.003				

Source: Results dawn from SPSS

Table 3 displays the regression outcomes examining the impact of Basel III regulatory requirements on the operational efficiency of the sampled banks. The dependent variable,

OETA, was regressed against the predictor variables MCR, CAR, and CBP. The R-squared value of 0.061 indicates that only a small proportion of the variance in OETA can be explained by MCR, CAR, and CPB collectively. With a p-value of 0.404, Model 1 is deemed statistically insignificant.

Analyzing individual independent variables, MCR shows a p-value of 0.800, indicating a statistically insignificant negative relationship with OETA. Similarly, CAR exhibits a p-value of 0.628, also indicating a statistically insignificant negative relationship with OETA. Additionally, CBP demonstrates a p-value of 0.778, suggesting a statistically insignificant negative relationship with OETA. These findings align with empirical studies indicating a negative impact of Basel III capital regulations on the operational efficiency of Nepalese commercial banks under Model 1.

In summary, the regression results indicate that MCR, CAR, and CBP do not significantly affect the operational efficiency of Nepalese commercial banks under the specified model.

4.3.2 Regression Analysis between NIMR and Explanatory Variables

To assess the influence of Basel III regulatory requirements on the investment efficiency of Nepalese commercial banks, Model 1 regression equation was employed.

$$NIMR_{i,t} = \beta_0 + \beta_1 MCR_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CBP_{i,t} + E_{i,t} \ldots\ldots (2)$$

is put to test.

Table 4

Regression Analysis between OETA and Explanatory Variables

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig. (p)
(Constant)	0.651	3.925		0.166	0.869
MCR	0.095	0.149	0.251	0.633	0.530
CAR	0.371	0.282	0.216	1.315	0.195
CBP	-0.089	0.094	-0.395	-0.952	0.346
R	.211[a]				
R Square	0.045				
Adjusted R Square	-0.018				
Sig (p)	0.547				
Std. Error of the Estimate	2.303				

Source: Results dawn from SPSS

Table 4 displays the regression outcomes concerning the impact of Basel III regulatory requirements on the investment efficiency of the sampled banks. The dependent variable, NIMR, was regressed against the predictive variables MCR, CAR, and CBP. The R-squared value of 0.045 indicates the proportion of the variance in NIMR that can be explained by the independent variables MCR, CAR, and CPB. With a p-value of 0.547, which is greater than 0.05, Model 1 is deemed statistically insignificant.

Analyzing the individual independent variables, MCR has a p-value of 0.530, above the 0.05 threshold, and a beta coefficient of 0.251, indicating a positive yet statistically insignificant relationship with NIMR. This suggests that a one-unit change in MCR leads to a positive 0.251 unit change in NIMR under this model, while keeping CAR and CPB constant.

Similarly, CAR exhibits a p-value of 0.195, higher than 0.05, and a beta coefficient of 0.216, indicating a positive and statistically insignificant relationship with NIMR. A one-unit change in CAR leads to a positive 0.216 unit change in NIMR under this model, while keeping MCR and CPB constant.

Regarding CBP, the p-value is 0.346, exceeding 0.05, and the beta coefficient is -0.395, indicating a negative and statistically insignificant relationship with NIMR. A one-unit change in CBP leads to a -0.395 change in NIMR under this model, while keeping MCR and CAR constant. Overall, empirical studies on the relationship between NIMR and Basel III capital regulation have shown mixed results on the investment efficiency of Nepalese commercial banks under Model 2 of the regression equation.

4.3.4 Summary table of level of significant

Table 5

Summary table of level of significant

Independent variables	OETA	NIMR	OETA Model 1	NIMR Model 2
MCR	Insignificant	Insignificant and positive relationship	Insignificant	Insignificant
CAR	Insignificant	Insignificant and positive relation	Insignificant	Insignificant
CBP	Insignificant	Insignificant and negative relationship	Insignificant	Insignificant

Source: Result drawn from SPSS

4.4 Discussion

This study aims to assess the effectiveness of Nepalese commercial banks, particularly after the 2008 global financial crisis when Basel III regulations were widely adopted worldwide. To achieve this goal, the researcher employed two regression models to investigate the operational and investment efficiency of Nepalese commercial banks following the implementation of Basel III capital regulations.

Basel III capital regulations were introduced to strengthen banking sector regulation, supervision, and risk management. They require banks to maintain higher levels of common equity and Tier 1 capital to cover their risk-weighted assets, ensuring a more robust capital base. Basel III also sets liquidity standards, mandating banks to hold a minimum amount of high-quality liquid assets to meet short-term liquidity needs and prevent crises.

In Nepal, the implementation of Basel III has increased capital requirements for banks, enhancing sector stability but posing challenges for smaller banks to raise and maintain sufficient capital. Stricter requirements have led banks to be more selective in lending, favoring low-risk loans, which could impact access to credit for some segments of the economy.

Compliance with Basel III involves implementing new risk management systems, increasing operational costs for banks and potentially affecting overall efficiency. Changes in lending practices and higher capital requirements have also influenced interest rates and bank profitability, prompting adjustments in pricing strategies.

Despite these challenges, Basel III is expected to enhance banking sector stability, increasing confidence among depositors and investors. However, the specific impact on Nepalese commercial banks will depend on factors such as bank size, economic conditions, and the sector's adaptability to new regulations. Additionally, ongoing updates to Basel III may further shape its impact on banks in Nepal.

The results of the Karl Pearson correlation analysis provide insights into the relationships between the variables studied, including OETA, NIMR, MCR, CAR, and CBP. The correlation analysis revealed that:

- There is a moderately positive and statistically significant correlation between NIMR and OETA ($r = 0.544$, $p < 0.001$).

- There are negative correlations between MCR and OETA, MCR and NIMR, as well as CAR and OETA.
- The correlation between CAR and NIMR is very low and not statistically significant ($r = 0.12739$, $p = 0.378$).
- The correlation between CAR and MCR is very low and not statistically significant ($r = 0.182141$, $p = 0.206$).
- There are negative correlations between CBP and OETA, CBP and NIMR.
- There is a very high positive and statistically significant correlation between CBP and MCR ($r = 0.921$, $p < 0.001$).
- There is a low positive and statistically significant correlation between CBP and CAR ($r = 0.340$, $p < 0.001$).

These findings indicate the strength and direction of the relationships between the variables, providing valuable insights into the dynamics of Nepalese commercial banks' efficiency and the impact of Basel III regulatory requirements.

The operational efficiency of the banks was tested by regressing the dependent variable OETA on the predicting variables of MCR, CAR, and CBP. The R square value of 0.061 indicates that only a small proportion of the variance in OETA can be predicted from the independent variables. The p-value of 0.404, which is higher than 0.05, indicates that the model is statistically insignificant. Additionally, all variables had a negative relationship with OETA.

This result contrasts with the findings of Obadire et al. (2022), who found that all variables were positively related but statistically insignificant to OETA. In their study, only CPB was found to have a statistically significant relationship with OETA.

In testing the investment efficiency of the banks, the dependent variable NIMR was regressed on the predicting variables of MCR, CAR, and CBP. The R-square value of 0.045 indicates that the proportion of the variance in NIMR that can be predicted from MCR, CAR, and CPB is low. Additionally, the p-value of 0.547 is higher than 0.05, indicating that the model is statistically insignificant. The relationship between MCR and CAR with NIMR was positive but insignificant, while the relationship between CBP and NIMR was negative and significant. This analysis yielded mixed results regarding the investment efficiency of the banks.This result too is arguable to the result of (Obadire, et al. 2022) which showed that all variable are pisitively related and ststisticslly insignifican to OETA except the CPB which is negative is and statistically insignificant.

CHAPTER V
SUMMARY AND CONCLUSION

This chapter comprises a summary, conclusion, and recommendations for the research study. It starts with summarizing the research, followed by an assessment of the study's quality and a conclusion. The chapter concludes with recommendations for further research.

5.1 Summary

The study on the impact of Basel III capital regulations on the efficiency of commercial banks in Nepal was conducted using data from five Nepalese banks selected through random sampling. The study was based on the Capital Adequacy Framework 2015, which is derived from the global regulatory framework, Basel III, established by the Basel Committee on Banking Supervision (BCBS). The main aim of the research was to investigate whether the implementation of these regulatory requirements affected the efficiency of Nepalese banks and to assess their overall efficiency. The objectives included analyzing the impact of Basel III regulations on Nepalese commercial banks' efficiency, comparing the compliance and efficiency levels of selected banks, examining the relationship between various Basel III requirements and operational and investment efficiency metrics, and evaluating the overall impact of Basel III regulations on Nepalese banks' efficiency.

To achieve the research objectives, data from the annual reports of five commercial banks spanning from 2068/2069 to 2078/79 was collected. Correlation and regression analyses were then conducted to examine the relationship between the dependent variables (OETA and NIMR) and the independent variables (MCR, CAR, and CPB) representing Basel III capital requirement indicators. Statistical software such as SPSS was used for data analysis. Descriptive statistics, correlation analysis, and regression analysis were employed to analyze the data obtained from the annual reports of the sample banks and other relevant sources in order to address the research objectives.

Mean value of OETA in an average shows that NIMBL with lowest mean is more cost management efficient and Machhapuchhre Bank with the highest mean value is less cost management efficient.

Mean value of NIMR in an average shows that NIMBL with lowest mean indicates that non-interest income sources play a more substantial role in their overall earnings, whereas Machhapuchhre Bank with the highest mean indicates that a significant portion of the bank's earnings is derived from net interest income.

Mean value of MCR in an average shows that NIMBL with highest mean indicates that they hold more risk weighted assets than the other sample banks and so is required to maintain high minimum capital requirement, whereas Machhapuchhre Bank with the lowest mean indicates that they hold less risk weighted assets than the other sample banks and so is required to maintain less minimum capital requirement.

Mean value of CAR of all sample banks shows that all sample commercial banks of has been maintaining minimum capital adequacy ratio requirement which as per NRB directives is 11 %.

Mean value of CBP of all commercial banks are positive which means banks actual total capital is higher than that of minimum regulatory capital. CBP is extra capital that serves as a cushion to absorb potential losses and enhances the resilience of banks during adverse economic conditions.

Regression analysis under model 1 to test the operational efficiency of the banks, the dependent variable OETA was regressed on predicting variables of MCR, CAR and CBP. Here the value of R square is 0.061 which represents the proportion of the variance in the dependent variable OETA that can be predicted from the set of independent variables i.e. MCR, CAR and CPB. P = 0.404 which is higher than 0.05 which shows that the model 1 is statistically insignificant and all variable had negative relationship with OETA.

Regression analysis under model 2 to test the investment efficiency of the banks The dependent variable NIMR was regressed on predicting variables of MCR, CAR and CBP. Here the value of R square is 0.045 which represents the proportion of the variance in the dependent variable OETA that can be predicted from the set of independent variables i.e. MCR, CAR and CPB. P = 0.547 which is higher than 0.05 which shows that the model 1 is statistically insignificant and MCR and CAR is positive but insignificant where CPB is negative and significant mixed result is archived in case of investment efficiency regression analysis.

5.2 Conclusion

The study investigated how the implementation of Basel III regulations affected the operational and investment efficiencies of five Nepalese commercial banks from 2010 to 2019. It utilized model 1 and model 2 regression analyses to assess the extent of operational and investment efficiencies within these banks. The regression analysis examined the relationships between the independent variables (MCR, CAR, CBP) and the dependent variables (OETA ratio, NIMR).

The study findings show a negative relationship between the independent variable and OETA which also showed that the relation is statistically insignificant which means the operational efficiency of the banks is not just defined by this factors there are some other major factors that is directly or indirectly related with the performance efficiency of the banks.

Another notable finding is that while there is a positive relationship between MCR, CAR, and NIMR, it is statistically insignificant in terms of the investment efficiency of the bank. This suggests that while MCR and CAR play a role in the investment efficiency of the bank, there are other factors at play that must also be considered for a more accurate assessment. The negative relationship between CBP and NIMR indicates that CBP indirectly influences investment efficiency. CBP serves as an additional capital reserve, acting as a buffer against potential losses and strengthening banks' resilience during challenging economic conditions. However, CBP is also statistically insignificant in the model 2 regression analysis.

This research is significant not only for its contribution to the Basel III literature in Nepal but also for filling the gap in understanding the impact of the capital buffer premium on the operational and investment efficiency of Nepalese commercial banks. The study confirms the expected influence of Basel III capital and liquidity regulations on bank efficiency and demonstrates that the capital buffer premium has a notable positive effect on determining the operational efficiency of the selected banks. This suggests that these banks are operationally efficient due to their adherence to stringent capital requirements.

Based on these findings, several policy recommendations can be made. Firstly, Nepalese banks should strive to maintain a buffer premium level above the prescribed minimum to

ensure ongoing efficiency. Central and reserve banks implementing Basel III should aim to establish a robust buffer capital to protect banks from economic and financial shocks, control risk-taking behaviors, and support cost containment strategies. Therefore, Nepal's central and reserve banks should monitor banks' buffer premium levels and compliance with regulatory supervision. Secondly, governments and central banks, including Nepal Rastra Bank (NRB), considering Basel III implementation can use this study's findings and methodology to assess the suitability of the new Accord in their jurisdiction using local bank-level data. Lastly, the study underscores the importance of careful assessment in implementing the Basel Accord and selecting the appropriate mix of Basel III variables. Nepalese banks and central banks should carefully consider which mix of Basel III variables best suits their needs, as the regulatory requirements can have varying impacts on bank efficiency in Nepal.

5.3 Implications

The study offers several implications for improving bank management practices and increasing profitability based on its empirical analysis findings. It also provides recommendations for future research:

1. **Sample Size Expansion:** The study utilized a small, randomly selected sample of five commercial banks from Nepal that have adopted the Basel III regulatory framework. Future research in similar areas could enhance their sample size by including more banks, especially as more countries adopt the Basel III Accord.
2. **Incorporation of Additional Basel III Elements:** While the study focused on key components of the Basel III framework, such as minimum capital requirements, capital adequacy ratio, and capital buffer premium, future studies could consider incorporating other revised elements of the Basel III Accord, such as the liquidity coverage ratio, credit valuation adjustment framework, corporate supervision, counterparty credit risk, and stress testing, as relevant data becomes available.
3. **Alternative Measures of Investment Efficiency:** The study used the ratio of net interest revenue to total earnings (NIMR) as a measure of investment efficiency, despite its limitations in accurately reflecting investment activities. Future studies could explore other measures of investment efficiency, provided reliable data

sources are available, to gain a more comprehensive understanding of bank dynamics.

Despite the data availability limitations, the study's results remain reliable and robust. Future research should consider these recommendations to uncover new dynamics in bank efficiency. Overall, the study concludes that the relationship between the independent variables and the efficiency of Nepalese commercial banks is minimal, likely due to the exclusion of various other factors such as risk strategies, bank size and structure, the transition phase of capital regulation, and the central bank's stance on equity raising plans.

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ANNEXURE-A

Appendix A Table A1. OETA calculation

F.Y.	Operating Expenses	Total Assets	OE/TA	Bank
69-70	593,407,424.00	33,653,855,758.00	0.0176	S.B
70-71	678,755,617.00	40,277,752,199.00	0.0169	S.B
71-72	787,938,096.00	50,647,295,616.00	0.0156	S.B
72-73	862,712,556.00	74,402,915,402.00	0.0116	S.B
73-74	1,241,670,302.00	76,124,947,919.00	0.0163	S.B
74-75	1,695,218,866.00	91,586,102,891.00	0.0185	S.B
75-76	2,614,329,449.00	144,272,631,574.00	0.0181	S.B
76-77	3,315,902,545.00	170,585,160,318.00	0.0194	S.B
77-78	3,503,021,196.00	228,941,959,915.00	0.0153	S.B
78-79	3,917,943,558.00	264,327,023,510.00	0.0148	S.B
69-70	602,584,467.00	30,296,203,445.00	0.0199	M.B
70-71	666,358,047.00	40,723,957,096.00	0.0164	M.B
71-72	761,760,885.00	48,753,495,062.00	0.0156	M.B
72-73	897,979,619.00	59,455,467,829.00	0.0151	M.B
73-74	967,796,326.00	68,925,737,686.00	0.0140	M.B
74-75	1,016,601,966.00	84,787,647,814.00	0.0120	M.B
75-76	2,084,317,320.00	105,246,046,329.00	0.0198	M.B
76-77	2,552,610,113.00	124,519,568,920.00	0.0205	M.B
77-78	2,850,493,929.00	158,213,547,572.00	0.0180	M.B
78-79	3,396,533,781.00	178,727,308,101.00	0.0190	M.B
69-70	434,274,886.00	28,222,569,756.00	0.0154	K.B
70-71	461,821,815.00	31,020,602,045.00	0.0149	K.B
71-72	538,080,319.00	37,374,510,826.00	0.0144	K.B
72-73		42,416,507,350.00	0.0137	K.B

	581,109,454.00			
73-74	812,731,801.00	42,738,462,031.00	0.0190	K.B
74-75	919,146,729.00	61,416,164,427.00	0.0150	K.B
75-76	1,653,642,826.00	105,311,485,153.00	0.0157	K.B
76-77	2,289,581,660.00	153,341,629,610.00	0.0149	K.B
77-78	3,164,128,420.00	189,792,403,473.00	0.0167	K.B
78-79	3,551,579,764.00	212,108,438,392.00	0.0167	K.B
69-70	895,778,924.00	73,152,154,761.00	0.0122	NIMBL
70-71	977,096,418.00	86,173,927,574.00	0.0113	NIMBL
71-72	1,052,246,536.00	104,345,436,413.00	0.0101	NIMBL
72-73	1,227,662,358.00	129,782,705,314.00	0.0095	NIMBL
73-74	1,826,084,323.00	155,361,353,118.00	0.0118	NIMBL
74-75	2,296,662,049.00	171,893,546,610.00	0.0134	NIMBL
75-76	2,617,826,098.00	185,841,988,230.00	0.0141	NIMBL
76-77	2,564,345,589.00	203,023,897,140.00	0.0126	NIMBL
77-78	2,833,829,293.00	227,930,126,922.00	0.0124	NIMBL
78-79	3,084,486,913.00	244,448,793,470.00	0.0126	NIMBL
69-70	774,850,264.00	39,018,489,785.00	0.0199	GIMEL
70-71	1,021,195,157.00	60,535,759,012.00	0.0169	GIMEL
71-72	1,379,603,720.00	69,186,488,883.00	0.0199	GIMEL
72-73	1,488,765,057.00	87,701,310,349.00	0.0170	GIMEL
73-74	1,815,454,307.00	117,893,944,868.00	0.0154	GIMEL
74-75	2,324,450,976.00	125,847,432,347.00	0.0185	GIMEL
75-76	2,677,375,576.00	151,653,562,387.00	0.0177	GIMEL
76-77	4,027,587,515.00	273,876,591,053.00	0.0147	GIMEL
77-78	4,868,107,014.00	346,141,698,952.00	0.0141	GIMEL
78-79	5,384,716,032.00	360,537,220,470.00	0.0149	GIMEL

Source: Annual Reports of the Banks (FY 2069/70 to 2078/79)

Appendix A Table A2. NIMR calculation

F.Y.	Interest Revenue	Total Earnings	IR/TE	Bank
2069/70	2,898,414,698	482,556,447	6.01	S.B
2070/71	3,056,286,677	700,534,999	4.36	S.B
2071/72	3,295,249,733	767,080,512	4.30	S.B
2072/73	4,118,493,985	1,254,918,004	3.28	S.B
2073/74	6,625,302,722	1,402,294,306	4.72	S.B
2074/75	10,057,002,594	1,904,061,504	5.28	S.B
2075/76	12,972,540,680	2,257,688,322	5.75	S.B
2076/77	15,432,152,273	2,143,613,715	7.20	S.B
2077/78	14,949,205,421	2,854,828,343	5.24	S.B
2078/79	20,677,563,975	2,902,464,042	7.12	S.B
2069/70	2,429,629,170	148,599,200	16.35	M.B
2070/71	2,836,363,821	454,687,791	6.24	M.B
2071/72	3,109,270,185	616,372,739	5.04	M.B
2072/73	3,495,300,235	898,222,681	3.89	M.B
2073/74	5,118,027,561	1,302,483,429	3.93	M.B
2074/75	7,766,355,770	1,249,688,316	6.21	M.B
2075/76	10,177,522,844	1,697,088,243	6.00	M.B
2076/77	11,352,889,497	1,265,150,663	8.97	M.B
2077/78	11,155,483,067	1,607,473,174	6.94	M.B
2078/79	15,232,370,932	1,686,655,245	9.03	M.B
2069/70	2,464,306,976	291,448,365	8.46	K.B
2070/71	2,410,784,399	341,654,966	7.06	K.B
2071/72	2,433,130,920	394,788,376	6.16	K.B
2072/73	3,736,879,327	793,142,994	4.71	K.B
2073/74	6,804,011,381	1,041,892,704	6.53	K.B
2074/75	6,804,011,381	1,046,488,403	6.50	K.B
2075/76	9,098,573,839	1,230,378,260	7.39	K.B
2076/77	10,569,829,224	1,158,505,956	9.12	K.B
2077/78	12,776,387,133	1,970,730,157	6.48	K.B
2078/79	18,355,159,241	2,579,809,832	7.11	K.B
2069/70	5,878,272,056	1,915,027,932	3.07	NIBL
2070/71	5,816,279,068	1,939,612,344	3.00	NIBL
2071/72	5,786,160,480	1,961,852,380	2.95	NIBL
2072/73	6,776,754,762	2,550,883,563	2.66	NIBL
2073/74	9,248,698,650	3,114,131,140	2.97	NIBL
2074/75	13,574,102,163	3,659,322,725	3.71	NIBL
2075/76	14,975,214,929	3,324,112,936	4.51	NIBL
2076/77	15,201,326,112	2,423,186,059	6.27	NIBL
2077/78	13,712,045,202	3,558,605,809	3.85	NIBL

2078/79	16,703,930,495	3,797,603,953	4.40	NIBL
2069/70	3,206,646,423	449,218,454	7.14	GIMEL
2070/71	3,810,202,300	974,037,010	3.91	GIMEL
2071/72	4,660,874,460	960,608,067	4.85	GIMEL
2072/73	4,988,276,774	1,382,223,998	3.61	GIMEL
2073/74	7,366,045,631	2,006,159,460	3.67	GIMEL
2074/75	11481732049	2101363149	5.46	GIMEL
2075/76	13530884797	2761953667	4.90	GIMEL
2076/77	20489400668	2908664367	7.04	GIMEL
2077/78	21693582784	4165151840	5.21	GIMEL
2078/79	29,058,367,013	4,959,224,743	5.86	GIMEL

Source: Annual Reports of the Banks (FY 2069/70 to 2078/79)

Appendix A Table A3 MCR calculation

F.Y.	Risk Weighted Assets	MCR is 8.5% of RWA	MCR (Rs in billion)	Bank
2069/70	30,018,453,000.00	2,551,568,505.00	2.55	S.B
2070/71	35,112,735,000.00	2,984,582,475.00	2.98	S.B
2071/72	47,256,493,000.00	4,016,801,905.00	4.02	S.B
2072/73	68,523,450,000.00	5,824,493,250.00	5.82	S.B
2073/74	84,286,276,000.00	7,164,333,460.00	7.16	S.B
2074/75	108,762,140,000.00	9,244,781,900.00	9.24	S.B
2075/76	13,458,367,600.00	1,143,961,246.00	1.14	S.B
2076/77	153,612,274,000.00	13,057,043,290.00	13.06	S.B
2077/78	193,943,290,000.00	16,485,179,650.00	16.49	S.B
2078/79	216,569,716,000.00	17,325,577,280.00	17.33	S.B
2069/70	2,331,786,900.00	186,542,952.00	0.19	M.B
2070/71	33,845,000,000.00	2,707,600,000.00	2.71	M.B
2071/72	35,170,000,000.00	2,813,600,000.00	2.81	M.B
2072/73	47,044,000,000.00	3,763,520,000.00	3.76	M.B
2073/74	54,053,406,000.00	4,324,272,480.00	4.32	M.B
2074/75	69,135,850,000.00	5,530,868,000.00	5.53	M.B
2075/76	88,037,690,000.00	7,043,015,200.00	7.04	M.B
2076/77	113,062,420,000.00	9,044,993,600.00	9.04	M.B
2077/78	138,594,610,000.00	11,087,568,800.00	11.09	M.B
2078/79	155,610,970,000.00	12,448,877,600.00	12.45	M.B
2069/70	23,404,024,889.00	1,872,321,991.12	1.87	K.B
2070/71	26,990,617,924.00	2,159,249,433.92	2.16	K.B
2071/72	32,249,795,642.00	2,579,983,651.36	2.58	K.B
2072/73	35,781,831,483.00	2,862,546,518.64	2.86	K.B
2073/74	52,094,409,419.00	4,167,552,753.52	4.17	K.B
2074/75	77,607,259,109.00	6,208,580,728.72	6.21	K.B

2075/76	97,296,443,099.00	7,783,715,447.92	7.78	K.B
2076/77	133,194,927,555.00	10,655,594,204.40	10.66	K.B
2077/78	163,185,158,940.00	13,054,812,715.20	13.05	K.B
2078/79	192,727,823,942.00	15,418,225,915.36	15.42	K.B
2069/70	68,106,513,350.00	5,448,521,068.00	5.45	NIBL
2070/71	79,875,453,607.00	6,390,036,288.56	6.39	NIBL
2071/72	98,822,812,656.00	7,905,825,012.48	7.91	NIBL
2072/73	121,867,349,058.00	9,749,387,924.64	9.75	NIBL
2073/74	156,448,460,126.00	12,515,876,810.08	12.52	NIBL
2074/75	178,104,774,642.00	14,248,381,971.36	14.25	NIBL
2075/76	94,613,065,028.00	7,569,045,202.24	7.57	NIBL
2076/77	231,470,042,816.00	18,517,603,425.28	18.52	NIBL
2077/78	233,655,973,000.00	18,692,477,840.00	18.69	NIBL
2078/79	216,394,113,479.00	17,311,529,078.32	17.31	NIBL
2069/70	35,105,942,442.00	2,808,475,395.36	2.81	Globle IME
2070/71	55,065,072,500.00	4,405,205,800.00	4.41	Globle IME
2071/72	62,630,567,047.00	5,010,445,363.76	5.01	Globle IME
2072/73	75,934,080,250.00	6,074,726,420.00	6.07	Globle IME
2073/74	101,569,229,994.00	8,125,538,399.52	8.13	Globle IME
2074/75	118,442,071,877.00	9,475,365,750.16	9.48	Globle IME
2075/76	141,011,946,263.00	11,280,955,701.04	11.28	Globle IME
2076/77	237,749,108,526.00	19,019,928,682.08	19.02	Globle IME
2077/78	278,928,955,755.00	22,314,316,460.40	22.31	Globle IME
2078/79	326,277,055,692.00	26,102,164,455.36	26.10	Globle IME

Source: Basel III Disclosure of the Banks (FY 2069/70 to 2078/79)

Appendix A Table A4 CAR calculation

F.Y.	(CAR)	Bank
2069/70	11.70%	S.B
2070/71	12.22%	S.B
2071/72	11.17%	S.B
2072/73	11.12%	S.B
2073/74	13.16%	S.B
2074/75	12.43%	S.B
2075/76	12.56%	S.B
2076/77	12.97%	S.B
2077/78	13.45%	S.B
2078/79	13.13%	S.B
2069/70	15.04%	M.B
2070/71	10.29%	M.B
2071/72	12.46%	M.B
2072/73	12.23%	M.B
2073/74	16.82%	M.B
2074/75	15.60%	M.B
2075/76	12.88%	M.B
2076/77	13.00%	M.B
2077/78	12.00%	M.B
2078/79	13.47%	M.B
2069/70	12.23%	K.B
2070/71	11.92%	K.B
2071/72	11.12%	K.B
2072/73	12.10%	K.B
2073/74	16.15%	K.B
2074/75	13.93%	K.B
2075/76	12.07%	K.B
2076/77	14.42%	K.B

2077/78	13.71%	K.B
2078/79	12.98%	K.B
2069/70	12.99%	NIBL
2070/71	12.71%	NIBL
2071/72	11.99%	NIBL
2072/73	14.92%	NIBL
2073/74	13.02%	NIBL
2074/75	13.34%	NIBL
2075/76	13.65%	NIBL
2076/77	13.23%	NIBL
2077/78	14.52%	NIBL
2078/79	15.99%	NIBL
2069/70	12.30%	GIMEL
2070/71	12.89%	GIMEL
2071/72	12.68%	GIMEL
2072/73	12.35%	GIMEL
2073/74	12.50%	GIMEL
2074/75	11.67%	GIMEL
2075/76	12.31%	GIMEL
2076/77	11.87%	GIMEL
2077/78	13.17%	GIMEL
2078/79	12.72%	GIMEL

Source: Basel III Disclosure of the Banks (FY 2069/70 to 2078/79)

Appendix A Table A5 CBP calculation

F.Y.	Actual Total Capital (Tire1+Tire2)	Minimum Regulatory Capital	CBP	CBP (in Rs Billion)	Bank
2069/70	3,513,565,000.00	8,000,000,000.00	(4,486,435,000.00)	(4.49)	S.B
2070/71	4,289,061,000.00	8,000,000,000.00	(3,710,939,000.00)	(3.71)	S.B
2071/72	5,279,254,000.00	8,000,000,000.00	(2,720,746,000.00)	(2.72)	S.B
2072/73	7,623,222,000.00	8,000,000,000.00	(376,778,000.00)	(0.38)	S.B
2073/74	11,092,190,000.00	8,000,000,000.00	3,092,190,000.00	3.09	S.B
2074/75	13,516,563,000.00	8,000,000,000.00	5,516,563,000.00	5.52	S.B
2075/76	16,906,340,000.00	8,000,000,000.00	8,906,340,000.00	8.91	S.B
2076/77	19,921,671,000.00	8,000,000,000.00	11,921,671,000.00	11.92	S.B
2077/78	26,094,277,000.00	8,000,000,000.00	18,094,277,000.00	18.09	S.B
2078/79	28,445,810,000.00	8,000,000,000.00	20,445,810,000.00	20.45	S.B
2069/70	2,923,876,000.00	8,000,000,000.00	(5,076,124,000.00)	(5.08)	M.B
2070/71	3,481,600,000.00	8,000,000,000.00	(4,518,400,000.00)	(4.52)	M.B
2071/72	4,381,670,749.03	8,000,000,000.00	(3,618,329,250.97)	(3.62)	M.B
2072/73	5,752,550,000.00	8,000,000,000.00	(2,247,450,000.00)	(2.25)	M.B
2073/74	9,091,177,000.00	8,000,000,000.00	1,091,177,000.00	1.09	M.B
2074/75	10,787,830,000.00	8,000,000,000.00	2,787,830,000.00	2.79	M.B
2075/76	11,337,250,000.00	8,000,000,000.00	3,337,250,000.00	3.34	M.B
2076/77	14,695,020,000.00	8,000,000,000.00	6,695,020,000.00	6.70	M.B
2077/78	16,629,410,000.00	8,000,000,000.00	8,629,410,000.00	8.63	M.B
2078/79	20,964,570,000.00	8,000,000,000.00	12,964,570,000.00	12.96	M.B
2069/70	2,862,010,816.00	8,000,000,000.00	(5,137,989,184.00)	(5.14)	K.B

2070/71	3,216,476,830.00	8,000,000,000.00	(4,783,523,170.00)	(4.78)	K.B
2071/72	3,586,582,167.00	8,000,000,000.00	(4,413,417,833.00)	(4.41)	K.B
2072/73	4,300,116,751.00	8,000,000,000.00	(3,699,883,249.00)	(3.70)	K.B
2073/74	8,411,275,030.00	8,000,000,000.00	411,275,030.00	0.41	K.B
2074/75	10,810,253,014.00	8,000,000,000.00	2,810,253,014.00	2.81	K.B
2075/76	11,739,283,206.00	8,000,000,000.00	3,739,283,206.00	3.74	K.B
2076/77	19,201,735,022.00	8,000,000,000.00	11,201,735,022.00	11.20	K.B
2077/78	22,380,521,640.00	8,000,000,000.00	14,380,521,640.00	14.38	K.B
2078/79	25,012,586,623.00	8,000,000,000.00	17,012,586,623.00	17.01	K.B
2069/70	8,848,882,764.00	8,000,000,000.00	848,882,764.00	0.85	NIBL
2070/71	10,150,618,014.00	8,000,000,000.00	2,150,618,014.00	2.15	NIBL
2071/72	11,844,552,593.00	8,000,000,000.00	3,844,552,593.00	3.84	NIBL
2072/73	18,182,543,651.00	8,000,000,000.00	10,182,543,651.00	10.18	NIBL
2073/74	20,367,202,860.00	8,000,000,000.00	12,367,202,860.00	12.37	NIBL
2074/75	23,752,126,546.00	8,000,000,000.00	15,752,126,546.00	15.75	NIBL
2075/76	26,560,249,730.00	8,000,000,000.00	18,560,249,730.00	18.56	NIBL
2076/77	26,545,202,002.00	8,000,000,000.00	18,545,202,002.00	18.55	NIBL
2077/78	35,769,405,227.00	8,000,000,000.00	27,769,405,227.00	27.77	NIBL
2078/79	38,102,697,682.00	8,000,000,000.00	30,102,697,682.00	30.10	NIBL
2069/70	4,183,410,238.00	8,000,000,000.00	(3,816,589,762.00)	(3.82)	GIMEL
2070/71	7,098,328,556.00	8,000,000,000.00	(901,671,444.00)	(0.90)	GIMEL
2071/72	7,940,986,787.00	8,000,000,000.00	(59,013,213.00)	(0.06)	GIMEL
2072/73	9,381,257,819.00	8,000,000,000.00	1,381,257,819.00	1.38	GIMEL
2073/74	12,691,076,786.61	8,000,000,000.00	4,691,076,786.61	4.69	GIMEL

2074/75	13,820,387,872.00	8,000,000,000.00	5,820,387,872.00	5.82	GIMEL
2075/76	17,357,735,188.23	8,000,000,000.00	9,357,735,188.23	9.36	GIMEL
2076/77	18,234,058,039.75	8,000,000,000.00	10,234,058,039.75	10.23	GIMEL
2077/78	36,731,180,222.00	8,000,000,000.00	28,731,180,222.00	28.73	GIMEL
2078/79	41,491,734,356.00	8,000,000,000.00	33,491,734,356.00	33.49	GIMEL

Source: Basel III Disclosure of the Banks (FY 2069/70 to 2078/79)

Appendix A Table A6 descriptive statistics result

S.No.	F.Y.	OETA	NIMR	MCR	CAR	CBP
1	2069/70	0.0176	6.006	2.55	11.70	-4.49
2	2070/71	0.0169	4.363	2.98	12.22	-3.71
3	2071/72	0.0156	4.296	4.02	11.17	-2.72
4	2072/73	0.0116	3.282	5.82	11.12	-0.38
5	2073/74	0.0163	4.725	7.16	13.16	3.09
6	2074/75	0.0185	5.282	9.24	12.43	5.52
7	2075/76	0.0181	5.746	1.14	12.56	8.91
8	2076/77	0.0194	7.199	13.06	12.97	11.92
9	2077/78	0.0153	5.236	16.49	13.45	18.09
10	2078/79	0.0148	7.124	17.33	13.13	20.45
11	2069/70	0.0199	16.350	0.19	15.04	-5.08
12	2070/71	0.0164	6.238	2.71	10.29	-4.52
13	2071/72	0.0156	5.044	2.81	12.46	-3.62
14	2072/73	0.0151	3.891	3.76	12.23	-2.25
15	2073/74	0.0140	3.929	4.32	16.82	1.09
16	2074/75	0.0120	6.215	5.53	15.60	2.79
17	2075/76	0.0198	5.997	7.04	12.88	3.34
18	2076/77	0.0205	8.974	9.04	13.00	6.70
19	2077/78	0.0180	6.940	11.09	12.00	8.63
20	2078/79	0.0190	9.031	12.45	13.47	12.96
21	2069/70	0.0154	8.455	1.87	12.23	-5.14
22	2070/71	0.0149	7.056	2.16	11.92	-4.78
23	2071/72	0.0144	6.163	2.58	11.12	-4.41
24	2072/73	0.0137	4.711	2.86	12.10	-3.70
25	2073/74	0.0190	6.530	4.17	16.15	0.41
26	2074/75	0.0150	6.502	6.21	13.93	2.81
27	2075/76	0.0157	7.395	7.78	12.07	3.74
28	2076/77	0.0149	9.124	10.66	14.42	11.20

29	2077/78	0.0167	6.483	13.05	13.71	14.38
30	2078/79	0.0167	7.115	15.42	12.98	17.01
31	2069/70	0.0122	3.070	5.45	12.99	0.85
32	2070/71	0.0113	2.999	6.39	12.71	2.15
33	2071/72	0.0101	2.949	7.91	11.99	3.84
34	2072/73	0.0095	2.657	9.75	14.92	10.18
35	2073/74	0.0118	2.970	12.52	13.02	12.37
36	2074/75	0.0134	3.709	14.25	13.34	15.75
37	2075/76	0.0141	4.505	7.57	13.65	18.56
38	2076/77	0.0126	6.273	18.52	13.23	18.55
39	2077/78	0.0124	3.853	18.69	14.52	27.77
40	2078/79	0.0126	4.399	17.31	15.99	30.10
41	2069/70	0.0199	7.138	2.81	12.30	-3.82
42	2070/71	0.0169	3.912	4.41	12.89	-0.90
43	2071/72	0.0199	4.852	5.01	12.68	-0.06
44	2072/73	0.0170	3.609	6.07	12.35	1.38
45	2073/74	0.0154	3.672	8.13	12.50	4.69
46	2074/75	0.0185	5.464	9.48	11.67	5.82
47	2075/76	0.0177	4.899	11.28	12.31	9.36
48	2076/77	0.0147	7.044	19.02	11.87	10.23
49	2077/78	0.0141	5.208	22.31	13.17	28.73
50	2078/79	0.0149	5.859	26.10	12.72	33.49
Mean		0.016	5.689	8.770	12.983	6.746
Standard Deviation		0.003	2.283	6.062	1.330	10.075
Minimum		0.009	2.657	0.187	10.290	-5.138
Maximum		0.020	16.350	26.102	16.820	33.492
Kurtosis		-0.606	8.560	0.174	1.154	0.244
Skewness		-0.126	2.132	0.879	0.959	0.927

Source: Descriptive analysis SPSS.

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