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Factors Influencing the Efficiency of Commercial Banks in Nepal

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Abstract

This study examines the factors influencing the efficiency of commercial banks in Nepal. The research focuses on how selected financial indicators relate to overall bank efficiency, using the DEA-CCR model for measurement. The analysis draws on panel data from 20 commercial banks in Nepal over a period of seven years, resulting in 140 observations. The study employs descriptive statistics, stationarity tests, and panel regression analysis to assess the relationship between the dependent variable (efficiency) and five independent variables: cost to income ratio, capital adequacy ratio, asset size, asset quality, and non-performing loan ratio. The results reveal that asset size and asset quality have a statistically significant positive impact on efficiency, suggesting that larger banks with higher-quality assets are more efficient in utilizing their resources. On the other hand, the non-performing loan ratio has a statistically significant negative effect on efficiency, indicating that rising default levels erode operational performance. Both the cost to income ratio and capital adequacy ratio show no significant relationship to efficiency, implying that these factors may not directly influence productivity in Nepalese commercial banks. These findings highlight the need for banks to grow responsibly, focus on maintaining high-quality assets, and take proactive steps to reduce default risk. For bank managers, regulators, and policymakers, this study offers useful insights into what really drives efficiency and where efforts can be best directed to strengthen the overall banking sector in Nepal.

Keywords: bank efficiency, profitability, capital adequacy, non-performing loan, financial performance, regulatory framework, asset size

Introduction

Commercial banks serve as vital intermediaries in the financial services sector, facilitating the transfer of funds between individuals and organizations and thereby supporting economic activities. Their critical role has led to substantial research interest in identifying the determinants of bank efficiency, which is fundamental to sustaining financial stability and economic growth.

In the context of Nepal, the banking sector has experienced considerable growth and structural transformation since the economic liberalization of the 1990s (Mishra et al., 2021). Studies indicate that Nepalese commercial banks have displayed mixed efficiency levels influenced by technical progress, scale efficiency, and operational factors. For instance, research applying the Malmquist Index reveals that productivity improvements in

Nepalese banks over time are largely attributable to technological advancements rather than improvements in pure efficiency components.

Empirical analyses using Data Envelopment Analysis and stochastic frontier models suggest that bank-specific attributes—such as size, capital adequacy, leverage, and profitability—play significant roles in shaping cost and technical efficiencies in Nepalese banks. Larger banks with stronger capital bases and efficient loan portfolios tend to perform better. Moreover, it is observed that joint venture and private banks generally outperform state-owned and development banks in efficiency measures, partly due to better resource utilization, adoption of advanced technology, and motivated human capital.

Several studies also emphasize that efficiency is influenced by management quality, asset quality, liquidity, and credit risk (Shrestha, 2020). Efficient banks not only achieve higher profitability but also contribute to the overall stability of the financial system by reducing operational costs and optimizing resource allocation (Mishra & Aithal, 2023).

Thus, the efficiency of Nepalese commercial banks is a multifaceted construct shaped by technological, managerial, financial, and structural factors. Given the ongoing competitive and regulatory pressures, continuous efforts toward operational optimization, technological integration, and prudent risk management remain paramount for advancing bank efficiency and sustaining Nepal's economic development.

This liberalization opened opportunities for the establishment of numerous commercial banks, which now form a vital part of the country's financial infrastructure (NRB, 2023). With increasing competition and expanding services, commercial banks face growing pressure to optimize their operations and improve efficiency. Efficient banks can better mobilize savings, allocate capital, and extend credit, thereby playing a pivotal role in driving Nepal's economic development. At the same time, the sector must maintain stability to build public trust and withstand financial shocks. Bank efficiency reflects how effectively banks use their resources to generate profits and sustain financial health. Factors like capital adequacy, size, credit risk, and operational management have a strong influence on bank performance (Athanasoglou et al., 2008). How banks manage these internal factors can make a real difference in their success.

To measure efficiency, researchers apply various methods, ranging from financial ratios to advanced models like Data Envelopment Analysis (DEA), which can highlight where banks might be underperforming (Bandarnayake & Jayasinghe, 2013). Studies from different countries show that internal characteristics matter a lot: for instance, higher capital levels tend to improve profitability, while the impact of bank size is sometimes less clear (Ben Naceur & Goaied, 2008). Meanwhile, controlling credit risk and operating costs remains essential for profitability, especially in more challenging environments (Flamini et al., 2009). Exploring these factors within Nepal's banking sector offers valuable insights for managers and policymakers looking to enhance bank efficiency and strengthen the overall financial system.

Problem Statement

Nepal's banking sector has grown rapidly due to financial reforms, rising competition, and technological progress. As banks face increasing pressure to improve operational efficiency, understanding the key factors that drive this efficiency is essential for sustaining profitability and competitiveness. However, there is a notable gap in existing literature specifically examining how financial indicators such as cost-to-income ratio, capital adequacy, asset size, asset quality, and non-performing loans influence bank efficiency in Nepal. Most prior studies focus broadly on profitability without isolating these critical operational factors. This study aims to address this gap by examining the relationship between these

financial variables and the efficiency of commercial banks in Nepal.

International research shows that bank-specific characteristics significantly affect efficiency, but their impact varies by economic context. Capital strength and asset quality play important roles (Athanasoglou et al., 2008), while banks in emerging markets face unique operational challenges that influence efficiency (Kosmidou, 2008). Additionally, high levels of non-performing loans reduce cost efficiency due to increased recovery costs (Berger & DeYoung, 1997). Despite these insights, limited empirical work has explored these relationships in Nepal's banking sector. This study seeks to fill this gap by providing evidence-based insights on how these financial indicators shape bank efficiency, aiding decision-makers to enhance performance and stability.

Research Objective

The major objective of this study is to analyze the key financial factors influencing the efficiency of commercial banks in Nepal.

Literature Review

The efficiency of commercial banks has been widely studied across both developed and developing economies, with researchers emphasizing various financial and operational indicators as key determinants. Among these, asset size, asset quality, cost-to-income ratio, capital adequacy, and the non-performing loan (NPL) ratio have emerged as central to understanding how banks manage resources and sustain profitability. Asset size has often been linked to operational efficiency through the concept of economies of scale. Larger banks are generally better positioned to distribute fixed costs across a broader asset base, allowing them to reduce average operating costs. Larger institutions tend to be more efficient due to these scale advantages (Allen & Rai, 1996). Similarly, Neupane (2013) supported this idea in the context of Nepal, finding that bigger banks typically showed stronger technical efficiency. However, very large banks may face diseconomies of scale, where operational complexity and bureaucratic overhead reduce efficiency instead of enhancing it (Drake & Hall, 2001).

Asset quality also plays a crucial role in determining bank efficiency. Poor-quality assets, often reflected in a high NPL ratio, directly impact profitability through increased provisioning and reduced income. Inefficiency can lead to deteriorating loan performance, as weak internal processes may contribute to poor lending decisions (Berger & DeYoung, 1997). Non-performing assets had a significant negative effect on the financial health of Indian banks (Amitava, 2006), a finding echoed by Alshatti (2016), who reported that rising loan loss provisions led to declining profitability in Jordanian banks. Poor asset quality reduced both income and operational efficiency in Greek banks (Kosmidou, 2008).

Another important indicator is the cost-to-income ratio, which serves as a widely accepted measure of operational efficiency. A lower ratio indicates better cost control and stronger income generation. Banks with more efficient cost structures consistently outperform their peers in terms of profitability (Maudos & Pastor, 2001). In the Indian context, reducing operational costs and increasing non-interest income significantly contributed to efficiency improvements (Kumar & Gulati , 2010). Foundational models for measuring efficiency based on input-output relationships continue to be used in banking efficiency studies (Charnes et al., 1978). Income-based efficiency measures have been validated by linking them to real output performance (Fixler & Zieschang,, 1990).

Capital adequacy has also been found to influence efficiency outcomes. Banks with higher capital levels are more resilient to financial shocks and better able to manage risk. Well-capitalized banks tend to allocate resources more effectively and maintain financial discipline (Berger & Humphrey, 1997). Strong capital positions are

positively associated with both cost and profit efficiency, particularly in environments with stringent regulatory standards (Pasiouras, 2009). The Nepal Rastra Bank (2019) noted that low capital adequacy ratios among some state-owned banks contributed to weak performance and limited competitiveness. These findings underscore the role of capital strength in ensuring operational soundness and long-term growth.

The NPL ratio itself is a critical indicator of both credit risk and operational efficiency. Higher NPL levels suggest weaknesses in credit appraisal, loan monitoring, and recovery mechanisms. A cyclical relationship exists where inefficiency and poor asset quality reinforce each other (Berger & DeYoung, 1997). Effective management of NPLs is essential for maintaining long-term cost and profit efficiency (Maudos et al., 2002). Similarly, rising NPL ratios tend to limit banks' ability to expand credit and invest in technology, thereby reducing overall performance (Sufian & Habibullah, 2014).

In addition to financial indicators, bank ownership and market structure have also been identified as influencing efficiency outcomes. Foreign-owned banks generally exhibited higher efficiency due to better governance practices and advanced technologies (Havrylchyk, 2005). A similar trend was observed in India, where foreign banks consistently outperformed domestic banks in terms of earnings quality and operational efficiency (Bodla & Verma, 2009). These findings suggest that market competition, technological capacity, and managerial practices associated with different ownership structures can influence how efficiently banks operate. However, such benefits are not guaranteed and often depend on the broader regulatory and institutional context.

Several studies have also examined how external shocks influence efficiency. Banks in peripheral Eurozone economies experienced sharp declines in efficiency due to rising defaults and shrinking margins during the crisis (Asimakopoulos et al. , 2018). Efficiency improvements in post-communist countries were closely tied to financial reforms and better internal controls (Fries & Taci, 2005). In Nepal, inefficiencies were driven largely by weak cost structures, rising NPLs, and limited capital buffers (Panta & Bedari, 2015). Despite regulatory reforms, many banks continue to face challenges related to operational costs and credit risk (NRB, 2022). Other researchers have emphasized the importance of internal systems and ratio-based assessments in identifying inefficiency. Credit quality, capital use, and cost control are more important than external size or market share (Berg et al., 1993). Financial ratio analysis remains a valuable tool for comparing performance across institutions and markets (Goldberg and Rai, (1996).

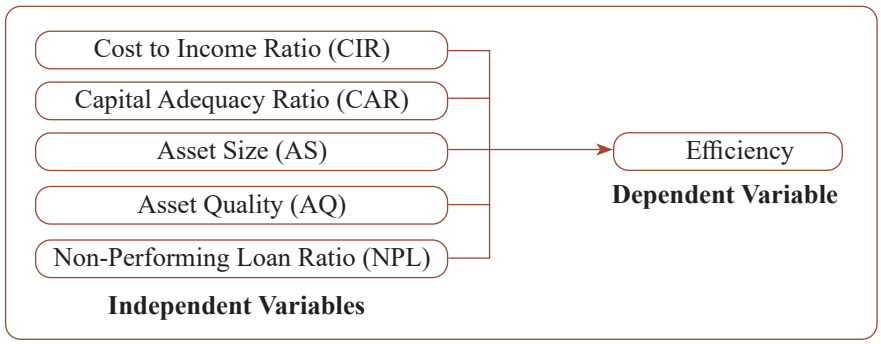
While international studies provide valuable insights, Nepal-specific research on the combined effects of asset size, asset quality, capital adequacy, NPL ratios, cost-to-income ratios, and ownership remains limited. Existing studies have typically focused on individual indicators or used broad efficiency models without integrating these key financial and structural variables. Therefore, this study aims to address this gap by investigating how these internal and structural factors collectively influence the efficiency of commercial banks in Nepal, providing a more nuanced understanding of performance drivers in a developing economy.

Conceptual Framework

In this study, the conceptual framework illustrates how bank specific variables and external environmental factors influence the efficiency of commercial banks in Nepal. By mapping out these relationships, the framework not only supports the overall research design but also helps in understanding the dynamic interplay between internal operations and external conditions affecting bank performance.

Figure 1

Conceptual Framework



Methodology

Research Philosophy and Design

This study adopts a quantitative research design to examine how various financial factors influence the efficiency of commercial banks in Nepal. A quantitative approach is appropriate as it allows the use of numerical data to objectively analyze the relationships between selected financial indicators, such as capital adequacy, asset size, asset quality, cost-to-income ratio, and non-performing loans, and their impact on bank efficiency.

The research design incorporates both descriptive and correlational analysis. Descriptive analysis is used to present a clear overview of the financial performance of commercial banks. Correlational analysis helps explore the nature and strength of the relationships between the financial factors and overall bank's efficiency.

To measure efficiency, the study applies Data Envelopment Analysis (DEA), a well-established technique for evaluating how effectively banks convert inputs into outputs. DEA helps identify the most efficient banks and sets benchmarks for others, providing practical insights into areas where efficiency can be improved within Nepal's commercial banking sector.

Sample and Data Description

The population targeted in this study consists of commercial banks operating in Nepal. As of 2023, there are 20 commercial banks licensed by the Nepal Rastra Bank (NRB). Financial data for all these banks over a 7-year period was collected for analysis. The dataset consists of a total of 140 observations. Data were obtained from secondary sources such as financial statements, balance sheets, income statements, and annual reports of the commercial banks. These banks serve as the sample units for the efficiency analysis conducted in this research. Table 1 presents the list of commercial banks included in the study, providing an overview of the institutions analyzed.

Table 1

Lists of Commercial Banks in Nepal

S.N.	Name	Symbol	No. of Observation
1	Agriculture Development Bank Ltd.	ADBL	7
2	Citizens Bank International Ltd.	CBIL	7
3	Everest Bank Ltd.	EBL	7
4	Global IME Bank Ltd.	GIMEBL	7
5	Himalayan Bank Ltd.	HBL	7

S.N.	Name	Symbol	No. of Observation
6	Kumari Bank Ltd.	KBL	7
7	Laxmi Sunrise Bank Ltd.	LSBL	7
8	Machhapuchhre Bank Ltd.	MBL	7
9	Nabil Bank Ltd.	NABIL	7
10	Nepal Bank Ltd.	NBL	7
11	NIC Asia Bank Ltd.	NICA	7
12	Nepal Investment Mega Bank Ltd.	NIMBL	7
13	NMB Bank Ltd.	NMB	7
14	Nepal SBI Bank Ltd.	NSBI	7
15	Prabhu Bank Ltd.	PBL	7
16	Prime Commercial Bank Ltd.	PCBL	7
17	Rastriya Banijya Bank Ltd.	RBBL	7
18	Sanima Bank Ltd.	SANIMA	7
19	Siddhartha Bank Ltd.	SBL	7
20	Standard Chartered Bank Nepal Ltd.	SCB	7

Variables and Financial Tools

This study uses the following financial variables to analyze the factors influencing the efficiency of commercial banks in Nepal.

Table 2

Relationships between Financial Factors and Efficiency

Variables	Types	Measurement
Efficiency	Dependent	$E = \frac{Loan + Interest\ Income}{Fixed\ Assets + Deposits}$
Cost to Income Ratio	Independent	$CIR = \frac{Operating\ Expenses}{Operating\ Income}$
Capital Adequacy Ratio	Independent	$CAR = \frac{Total\ Capital\ Fund}{Risk\ Weighted\ Assets}$
Assets Size	Independent	$AS = \log(\text{Total Assets})$
Assets Quality	Independent	$AQ = \frac{Total\ Advance\ or\ Loan}{Total\ Assets}$
Non-Performing Loan Ratio	Independent	$NPL = \frac{Non\text{-}performing\ Loan}{Total\ Loan}$

Data Collection

Secondary data is collected from annual reports, balance sheets, income statements, and financial statements of the commercial banks. The sources of this data include the Nepal Rastra Bank (NRB), individual bank websites, and other regulatory authorities.

Method of Data Analysis

This study analyzes the data through descriptive statistics, correlation analysis, regression analysis, and Data Envelopment Analysis (DEA).

Descriptive Statistics

These summarize and highlight the basic characteristics of the data, including the mean, standard deviation, minimum, maximum, and coefficient of variation (CV) for each variable. This approach offers a clear overview of the financial performance and variability among the commercial banks.

Correlation Analysis

This examines the strength and direction of relationships between the independent financial variables and bank efficiency. Correlation coefficients reveal whether these financial metrics have positive or negative associations with efficiency, providing insights into potential connections before deeper analysis.

Regression Analysis

Panel data regression models (fixed-effects or random-effects) estimate the impact of financial variables such as capital adequacy, asset size, cost-to-income ratio, and non-performing loans on bank efficiency. The Hausman test guides the selection between fixed or random effects. The t-statistic assesses the significance of individual variables, while the F-test evaluates the overall fit of the model.

Data Envelopment Analysis (DEA)

DEA evaluates the relative efficiency of commercial banks by comparing how effectively they convert inputs into outputs. This method identifies the best-performing banks and establishes benchmarks for others to enhance their operational efficiency. DEA complements traditional statistical methods by providing a more comprehensive assessment of performance.

Specification of the Model

This study uses panel data methodology, combining cross-sectional and time-series data to analyze variations between banks and changes within banks over time. This approach increases the number of observations, improving the reliability of results and helping to identify trends in bank efficiency. The study examines how financial factors like capital adequacy, asset size, asset quality, cost to income ratio, and non-performing loans affect the efficiency of commercial banks in Nepal. A panel data regression model is applied to explore these relationships.

The following study framework explains how the dependent variable is defined and measured:

Efficiency = f (CIR, CAR, AS, AQ, NPL)

Where,

CIR = Cost to Income Ratio

CAR = Capital Adequacy

AS = Asset Size

AQ = Asset Quality

NPL = Non-Performing Loan Ratio

Model Assumption

This study aims to examine the relationship between various financial factors and the efficiency of banks. In the model, bank efficiency is the dependent variable, while the independent variables are key financial metrics that influence a bank's performance. These include Cost to Income Ratio (CIR), Capital Adequacy Ratio (CAR), Asset Size (AS), Asset Quality (AQ), and Non-Performing Loan Ratio (NPL). The model is designed to analyze how these factors affect the efficiency of banks. The study uses the following regression model:

$$E = \beta_0 + \beta_1 CIR + \beta_2 CAR + \beta_3 AS + \beta_4 AQ + \beta_5 NPL + e$$

Where:

Dependent Variable

E = Efficiency

Independent Variables

CIR = Cost to Income Ratio

CAR = Capital Adequacy Ratio

AS = Asset Size

AQ = Asset Quality

NPL = Non-Performing Loan Ratio

β_0 = Constant term (intercept)

β_1 to β_5 = Beta coefficients of the independent variables

e = Error term

Hypothesis

The following hypotheses are formulated to examine the relationships between financial factors and the efficiency of commercial banks in Nepal:

H1: There is a significant relationship between cost to income ratio and the efficiency of commercial banks in Nepal.

H2: There is a significant relationship between capital adequacy ratio and the efficiency of commercial banks in Nepal.

H3: There is a significant relationship between asset size and the efficiency of commercial banks in Nepal.

H4: There is a significant relationship between asset quality and the efficiency of commercial banks in Nepal.

H5: There is a significant relationship between non-performing loan ratio and the efficiency of commercial banks in Nepal.

Results and Discussion

The findings are organized under different sub-headings based on the tests performed. These tests provide the key results needed for this study's conclusions. The tests include the stationary test, model test, cross-sectional dependence test, regression analysis, and hypothesis test.

Table 3

Stationary Test

Variable	Level	Levin, Lin & Chut t*	Prob.
Efficiency	Level	-21.2709	0.00001
CIR	Level	-10.6388	0.00001
CAR	Level	-9.47362	0.00001
AS	Level	-12.7181	0.00001
AQ	Level	-24.9387	0.00001
NPL	1st difference	-18.4009	0.00001

Table 3 presents the results of the Levin, Lin & Chu (LLC) test, which show that most financial variables in the study are stationary at their level form. This is essential for conducting meaningful and reliable econometric analysis, as stationary variables ensure consistent trends over time without the need for further transformation.

The efficiency variable has a strong LLC test statistic of -21.2709 (p = 0.00001), confirming its stability. This suggests that efficiency fluctuates around a long-term average, making it a dependable measure for evaluating bank performance. It supports consistent productivity assessments and informed decision-making by stakeholders.

The Cost to Income Ratio (CIR) is also stationary (LLC = -10.6388, p = 0.00001), indicating that changes in operational efficiency are temporary. This reinforces CIR's role as a stable metric for cost control and profitability management. Similarly, Capital Adequacy Ratio (CAR) shows stationarity (LLC = -9.47362), ensuring it remains a reliable indicator of financial strength and risk resilience for banks and regulators.

Asset Size (AS) and Asset Quality (AQ) are both found to be stationary at the level, with test statistics of -12.7181 and -24.9387 respectively. Their stability allows for more accurate assessments of bank growth and credit risk management, providing confidence in long-term strategic planning and financial comparisons.

However, the Non-Performing Loan Ratio (NPL) is only stationary after first differencing

(LLC = -18.4009), meaning its original form shows persistent trends. This highlights the need for banks to implement more rigorous credit monitoring and loan recovery practices, as persistent NPLs can signal deeper financial instability. The stationarity of most variables ensures the robustness of the analysis and supports the validity of regression results. Except for NPL, all indicators are suitable for further modeling, enhancing the study's ability to provide reliable insights into the efficiency of Nepalese commercial banks.

Table 4

Unit Root Test

Test Summary	Chi-sq. Statistic	Chi-sq. d.f.	Prob.
Cross-section random	11.701467	5	0.0391

The test summary presents the results of a statistical test for cross-sectional dependence, likely a test to determine the appropriateness of a random effects model for cross-sectional data. The Chi-Square Statistic is 11.701467, with 5 degrees of freedom, and the corresponding p-value is 0.0391. Since the p-value is below the 0.05 threshold, the null hypothesis is rejected. This indicates that the random effects model may be appropriate for the data, suggesting that the relationships among the variables exhibit significant cross-sectional dependence. This suggests that the random effects model is suitable for analyzing the relationships among the variables.

Regression Analysis

Regression analysis is a method used to explore and clarify the relationship between a dependent variable and one or more independent variables. Unlike correlation, which assesses the strength of a linear relationship between two variables without distinguishing between them, simple linear regression identifies one variable as dependent and the other as independent. This allows regression analysis to provide a more specific understanding of how changes in the independent variable influence the dependent variable, providing valuable insights for prediction and decision-making in various fields.

Table 5

Regression Analysis (Efficiency)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.038526	0.320737	-1.201181	0.2321
CIR	-0.010339	0.092674	-0.111568	0.9114
CAR	-0.343319	0.36577	-0.938619	0.3499
AS	0.13526	0.035952	3.762243	0.0003
AQ	0.448093	0.079741	5.619366	0.0000
NPL	-2.335032	0.512934	-4.552308	0.0000

Note. R-square= 0.702183 Adjusted R-Square= 0.640029 F-Statistic= 11.29761
Prob(F-Statistic) = 0.000001 Durbin-Watson stat = 1.799374

Table 5 presents the regression results analyzing the impact of CIR, CAR, AS, AQ, and NPL on bank efficiency. The intercept (-0.0385, p = 0.2321) is statistically insignificant. Asset Size (AS) and Asset Quality (AQ) show a positive and significant relationship with efficiency, with coefficients of 0.1353 (p = 0.0003) and 0.4481 (p = 0.0000), respectively. This indicates that larger banks and those with better-quality assets tend to be more efficient. Conversely, Non-Performing Loans (NPL) have a significant negative effect on efficiency (coefficient = -2.3350, p = 0.0000), suggesting that high NPLs harm bank performance.

On the other hand, Cost to Income Ratio (CIR) and Capital Adequacy Ratio (CAR) have negative coefficients of -0.0103 and -0.3433, respectively, but their p-values of 0.9114 and 0.3499 indicate that neither CIR nor CAR has a statistically significant effect on efficiency in this model. The R-squared value of 0.7022 indicates that the model explains 70.2% of the variation in efficiency, while the adjusted R-squared of 0.6400 confirms the model's robustness even after adjusting for the number of predictors. The F-statistic of 11.2976, with a p-value of 0.000001, confirms that the overall model is statistically significant.

Durbin-Watson Test

The Durbin-Watson statistic of 1.7994 detects mild positive autocorrelation in the residuals, indicating some correlation between errors across observations. While not severe, this suggests the model could be improved by adding lagged variables or adjusting its specification to reduce autocorrelation and enhance predictive accuracy. A Durbin-Watson value close to 2 indicates no autocorrelation, while values below 2 suggest positive autocorrelation (where residuals follow a pattern), and values above 2 indicate negative autocorrelation (where residuals move in the opposite direction).

The regression results show that Asset Size, Asset Quality, and Non-Performing Loans significantly affect efficiency, whereas Cost to Income Ratio and Capital Adequacy Ratio do not. The Durbin-Watson statistic indicates mild positive autocorrelation, which suggests that some model refinements may be needed to address residual correlation and further enhance the accuracy of the analysis.

Cost to Income Ratio (CIR)

The analysis reveals that the Cost to Income Ratio does not have a significant impact on firm efficiency, with a coefficient of -0.0103 and a p-value of 0.9114. This suggests that, in the context of this study, CIR may not be a strong determinant of efficiency compared to other financial indicators. Although CIR is commonly used to assess operational efficiency, its influence might be limited here due to differences in operational structures, firm-specific practices, or external economic factors affecting the firms under study.

Capital Adequacy Ratio (CAR)

Capital Adequacy Ratio also shows no significant relationship with firm efficiency, with a coefficient of -0.3433 and a p-value of 0.3499. Despite being an important indicator of a firm's financial stability and resilience, CAR does not appear to directly influence operational efficiency in the sample analyzed. This may suggest that capital buffers, while critical for risk management and regulatory compliance, do not necessarily translate into improved day-to-day efficiency.

Asset Size (AS)

Asset Size has a significant positive impact on firm efficiency, with a coefficient of 0.1353 and a highly significant p-value of 0.0003. Larger asset sizes contribute positively to enhancing operational efficiency by providing firms with greater resources and capabilities to optimize processes. This highlights the importance of scaling asset bases as a strategic factor for performance improvement, allowing firms to achieve economies of scale and improve productivity.

Asset Quality (AQ)

Asset Quality demonstrates a strong positive relationship with firm efficiency, with a coefficient of 0.4481 and a p-value of 0.0000. Improved asset quality reduces the risk of financial losses and operational inefficiencies, making it a critical area for management focus. Firms with high-quality assets tend to experience better operational outcomes and more sustainable performance, reinforcing the importance of stringent asset management and credit risk control.

Non-Performing Loans (NPL)

Non-Performing Loans exhibit a significant negative relationship with firm efficiency, with a coefficient of -2.3350 and a p-value of 0.0000. Elevated levels of NPLs negatively affect efficiency by draining financial resources, reducing liquidity, and limiting operational flexibility.

This underscores the critical need for effective management of bad loans to maintain operational health and prevent efficiency losses. High NPLs can signal underlying financial distress, making their control vital for sustainable firm performance.

Model Fit and Significance

The overall regression model demonstrated a strong fit, with an R-squared value of 0.702183, indicating that approximately 70.2% of the variation in firm efficiency can be explained by the independent variables included in the model. The Adjusted R-squared value of 0.640029 further confirms the robustness of the model by accounting for the number of predictors. The F-statistic of 11.29761, with a p-value of 0.000001, indicates that the model is statistically significant and that the combination of variables considered collectively influences firm efficiency.

Autocorrelation Concerns

The Durbin-Watson statistic of 1.799374 suggests mild positive autocorrelation in the residuals. While not extremely high, this indicates some degree of correlation in the errors, which could be addressed by refining the model or including lagged variables for more accurate predictions. Positive autocorrelation suggests that the residuals from one observation are somewhat correlated with those from the next, implying that the model might benefit from further refinement, such as addressing temporal effects or re-specifying the model to account for time-related dependencies in the data.

This study investigated the main financial factors influencing the efficiency of commercial banks in Nepal. The results showed that the Cost to Income Ratio and Capital Adequacy Ratio had no significant effect on efficiency, suggesting that cost-cutting and capital buffers alone are insufficient to improve performance. Rather, efficiency appears to depend more on how banks manage and utilize their resources. Whereas, Asset Size had a strong positive impact on efficiency, indicating that larger banks benefit from economies of scale, better technology use, and broader service capabilities.

Asset Quality also emerged as a major contributor to efficiency, with higher-quality assets supporting better operational outcomes. Banks that maintain strong risk assessment and responsible lending practices tend to perform more efficiently. In contrast, a higher Non-Performing Loan Ratio was significantly associated with lower efficiency, highlighting the importance of managing credit risk effectively. These findings emphasize that operational efficiency is best achieved through a combination of growth strategies, strong asset quality, and effective risk management rather than relying solely on cost control or regulatory capital adequacy.

Conclusion

This study examined the key financial factors influencing the efficiency of commercial banks in Nepal, focusing on cost to income ratio, capital adequacy ratio, asset size, asset quality, and non-performing loans. The findings revealed that asset size and asset quality significantly enhance efficiency, while cost to income ratio and capital adequacy ratio have no notable impact. Larger banks benefit from economies of scale, and high asset quality supported by effective risk management contributes to better operational performance. On the other hand, a high level of non-performing loans negatively affects efficiency, emphasizing the need for stronger credit assessment, lending policies, and recovery strategies.

For bank managers, improving efficiency involves more than cost-cutting. It requires strategic expansion, digital transformation, and a focus on asset quality. Policymakers should look beyond capital adequacy regulations and instead promote responsible lending, robust risk practices, and digital innovation. Supporting financial technology adoption and reducing non-performing loans can enhance overall sector performance. Future research could explore the role of emerging technologies and assess efficiency in smaller banks and microfinance institutions, supporting broader financial inclusion and long-term economic stability in Nepal.

Recommendations

Following are the key recommendations to improve the efficiency of commercial banks in Nepal:

- Banks should focus on enhancing their asset quality management by implementing stronger credit assessment policies and improving loan recovery processes to reduce default risks and ensure long-term financial stability.
- Banks need to address non-performing loans (NPLs) by strengthening their credit risk management practices and adopting proactive loan monitoring strategies to minimize the negative impact of high NPL levels on operational efficiency.
- Banks with smaller asset bases should explore strategic growth opportunities, such as mergers or acquisitions, to leverage economies of scale and improve their operational efficiency.
- Policymakers should strengthen the regulatory framework to encourage effective credit risk management and ensure overall financial stability. Increased supervision of non-performing loans is essential for maintaining a healthy banking sector.
- The banking sector should embrace technological advancements by investing in digital banking solutions and financial technologies to streamline operations, enhance customer service, and improve overall efficiency.

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