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Effect of debt financing on profitability of selected commercial banks in Nepal

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Abstract
This study analyzes the effect of debt financing on profitability of selected Nepalese commercial banks, focusing on key debt-related ratios and their relationship with Return on Assets (ROA) and Return on Equity (ROE). This study employs both descriptive and causal research designs, utilizing secondary data from 10 commercial banks in Nepal over a 10-year period (2070/71 to 2079/80). A simple random sampling method was used to select the 10 banks from a total of 20, resulting in 100 observations. Data analysis was conducted using SPSS 20 and Microsoft Office Excel 2003. The findings indicate that ratios like Debt to Equity Ratio (DER) and Interest Coverage Ratio (ICR) significantly influence profitability, with ICR showing a positive correlation and DER a negative correlation with both ROA and ROE. Regression analysis reveals that ICR and DER are key predictors of ROA and ROE, with ICR having a positive effect and DER a negative one. Short-term debt also appears to have a positive influence on profitability, while long-term debt ratios show weak or no significant correlation. The study highlights the importance of efficient debt management, particularly in balancing short-term and long-term liabilities, to enhance the financial performance of Nepalese banks.

Keywords: Debt financing, profitability, debt assets ratio, short term debt ratio, long term debt ratio, debt equity ratio, interest coverage ratio

Introduction

The history of banking in Nepal began with the establishment of Rastriya Banijya Bank (RBB) in 1950, followed by the creation of Nepal Rastra Bank (NRB) in 1956 as the central bank responsible for regulating the country's financial system (Acharya, 2001) [1]. In 1937, the Nepal Bank Limited (NBL), Nepal's first commercial bank, marked the start of modern banking in the country, providing financial services to both the government and the business community. The banking sector grew with the establishment of key commercial and development banks, including Nabil Bank in 1984 and Himalayan Bank in 1993. The 1990s liberalization of Nepal's economy allowed private and foreign banks to enter the market, increasing competition and diversifying financial services (Sharma, 2000). Technological advancements, such as mobile and internet banking, have further transformed the industry. Today, the banking sector continues to evolve with a focus on financial inclusion, digital banking, and consolidation to improve efficiency and accessibility, playing a significant role in Nepal's economic development (NRB, 2020).

Debt financing refers to the use of borrowed funds by companies, encompassing both short-term and long-term external financing. It involves raising capital from external sources such as bondholders, banks, and financial institutions to support business growth and day-to-day operations. Deciding between debt and equity is a critical aspect of shaping a company's capital structure. In the current corporate finance environment, managers face the dual challenge of improving their companies' financial performance while selecting the optimal funding strategy. They must also balance the competing demands of generating wealth for investors, ensuring smooth business operations, managing the trade-off between risk and return, and contributing to broader economic growth. While evidence supports the idea that debt is a key source of financing for a company's long-term activities and significantly influences performance, determining the ideal capital structure remains a complex and ongoing challenge (Nyamita, 2014) [16, 17].

The profitability is a wide subject of study as its relation with performance is of great concern in the construction to all other industry including banking. It can be determined in terms of return on assets (ROA), return on equity (ROE), return on capital employed and net interest margin (Chilwal & Mishra, 2018) [6]. Size of bank, capital, loan, and deposit were independent variables for profitability. There exists a relationship between total assets and bank profitability. As the size (natural logarithm of total assets) of bank increases, return on assets decreases. This signifies that bank profitability also decreases because Return on Assets had a direct relation with bank profitability. This clearly indicated that it was not true that, only banks with the highest assets have high profitability. It was also examined that total deposits and total equity have inverse relationship with bank profitability. As a deposit of bank increases, return on Assets decreases. Similarly, as the capital of banks increases, return on Assets decreases. Since, there was a direct association between Return on Assets and profitability of the bank, it was clear those banks with highest total deposits, and total equity does not possess the highest profitability (Mishra & Aithal, 2022) [11].

The effect of debt financing on the profitability of selected Nepalese commercial banks is a crucial area of study, as it significantly affects the financial stability and risk exposure of these institutions. While debt financing can provide banks with the necessary capital for growth, it also introduces the burden of fixed interest payments, which can negatively impact profitability if not properly managed. Given the competitive nature of Nepal's banking sector and the challenges posed by economic fluctuations and loan defaults, understanding this dynamic is essential. The researcher selected this topic because, despite the growing reliance on debt financing in Nepalese banks, there is

limited research on how it specifically influences their profitability. This study could offer valuable insights for policymakers, bankers, and investors on how to effectively balance debt usage with profitability, especially in a volatile economic environment (Pradhan & Khadka, 2017) [18].

Nepalese commercial banks have shown strong performance in both debt financing and profitability, driven by increasing demand for credit and rising interest rates. According to the Nepal Rastra Bank (NRB), the total loans and advances provided by commercial banks grew by about 12.5% year-on-year in the 2022/2023 fiscal year, reflecting robust activity in debt financing (NRB, 2023). At the same time, the profitability of these banks has benefited from higher interest rates. In the same period, the sector's return on assets (ROA) averaged 1.2%, while the return on equity (ROE) reached 13.5% (NRB, 2023). This profitability trend can be attributed to both strong lending performance and the effective management of interest rate differentials. Although non-performing loans (NPLs) increased to 2.6% by the end of the fiscal year (NRB, 2023), the banking sector has shown resilience and continued profitability despite economic challenges.

Problem statement

In Nepal, the banking sector plays an essential role in supporting economic growth, and understanding how debt financing affects bank profitability is vital for both financial managers and regulators. While debt financing can boost a bank's return on equity and aid in business expansion, it also carries risks. Excessive debt increases the financial burden, raising costs related to debt servicing and potentially reducing profitability (Bhandari & Sharma, 2020). Thus, it is important to explore the impact of debt financing on the profitability of Nepalese commercial banks to assess its broader implications for financial stability and economic development.

Given the rapidly changing landscape of Nepal's banking sector and the growing importance of debt in financial strategies, it is crucial to examine its impact on profitability. This research seeks to provide valuable insights into finding the optimal balance between debt and equity in the capital structures of commercial banks. By analyzing selected banks in Nepal, the study aims to offer practical recommendations for financial managers and regulators to improve profitability and ensure long-term sustainability. The results will enhance understanding of how debt financing affects bank performance and inform policy decisions that strengthen the Nepalese banking sector, supporting more effective management and growth strategies (Thapa & Shrestha, 2022). These insights will not only assist in optimizing capital structure strategies but also guide banks in navigating the complexities of financial management. The research questions of the study are as follows:

- What is the relationship between debt financing and profitability of Nepalese commercial banks?
- What is the effect of debt financing on profitability of Nepalese commercial banks?

Objectives of the study

The major objective of the study is to analyze the effect of debt financing on profitability of selected Nepalese commercial banks. However, the specific objectives of the study are as follows:

- To examine the relationship between debt financing and profitability of Nepalese commercial banks.
- To analyze the effect of debt financing on profitability of Nepalese commercial banks.

Hypothesis

H_1: There is a significant relationship between DAR and ROA.
H_2: There is a significant relationship between STDR and ROA.
H_3: There is a significant relationship between LTDR and ROA.
H_4: There is a significant relationship between DER and ROA.
H_5: There is a significant relationship between ICR and ROA.
H_{01}: There is a significant relationship between DAR and ROE.
H_{02}: There is a significant relationship between STDR and ROE.
H_{03}: There is a significant relationship between LTDR and ROE.
H_{04}: There is a significant relationship between DER and ROE.
H_{05}: There is a significant relationship between ICR and ROE.

Rationale of the study

The rationale for this study lies in understanding how debt financing influences the profitability of commercial banks in Nepal. Debt financing is a common way for banks to raise capital, which can be used for lending and other business operations. While debt can boost a bank's ability to expand and generate profits, it also carries risks, especially if the bank becomes over-leveraged. The study aims to assess the relationship between different levels of debt and the profitability of selected commercial banks in Nepal, providing insight into whether debt financing helps or hinders financial performance in this specific context. By analyzing this relationship, the research will shed light on the effectiveness of debt financing strategies used by banks in Nepal and their impact on key profitability indicators.

This research will focus on important profitability measures such as Return on Assets (ROA) and Return on Equity (ROE) to assess the effect of debt financing on bank performance. By analyzing data from selected commercial banks over a set period, the study will provide empirical evidence to support or challenge existing theories on debt's role in profitability within the Nepalese banking sector. The findings of this study will be valuable for banks in Nepal to adjust their financial strategies, ensuring they use debt in a way that maximizes profitability while minimizing risk. Additionally, the study will contribute to the broader body of knowledge on banking profitability in emerging markets, offering practical insights that can guide future banking policies and practices in Nepal.

Empirical review

Nyamita (2014) [16, 17] examines the factors affecting debt financing and its influence on the financial performance of state-owned enterprises in Kenya. The study primarily focuses on the "financial leverage" ratio, which measures the proportion of debt to total assets, covering the period from 2007 to 2011. By combining primary data from

surveys and secondary data from financial statements of 50 state-owned corporations, the study employs both descriptive and inferential statistical methods, including regression analysis and cross-sectional pooling. The findings show that profitability, asset tangibility, and corporate growth are significant determinants of debt financing. Additionally, a negative relationship is identified between debt financing and financial performance, indicating that excessive debt can harm the financial health of state-owned corporations. The study also notes that, while advanced debt instruments such as bonds, swaps, and options are commonly used in developed economies, these are not widely adopted by Kenyan state-owned corporations.

Yazdanfar and Öhman (2015) [21] analyze the relationship between debt financing and performance in small and medium-sized enterprises (SMEs) in Sweden, using data from 15,897 firms across five industries from 2009 to 2012. They apply advanced econometric techniques, including three-stage least squares (3SLS) and fixed-effects models, to address issues of endogeneity and simultaneity. The study finds a negative correlation between various forms of debt trade credit, short-term debt, and long-term debt and profitability. This suggests that higher debt levels increase agency costs and the risk of losing control over the business, which in turn negatively impacts firm performance. The research emphasizes the importance of finding an optimal debt level, as excessive debt can hinder firm value and survival. This study contributes to the literature by focusing on SMEs, an under-explored group, and offers useful insights for both academics and practitioners regarding the impact of debt management on business performance.

Pradhan and Khadka (2017) [18] examine the effect of debt financing on the profitability of Nepalese commercial banks, utilizing return on assets, return on equity, and net interest margin as measures of profitability. The independent variables include short-term debt to total assets, long-term debt to total assets, total debt to total assets, debt-to-equity ratio, interest coverage ratio, and bank size. Data were collected from the annual reports of 22 commercial banks in Nepal, covering the period from 2008 to 2014. The regression analysis reveals that short-term debt to total assets, interest coverage ratio, and bank size are positively associated with profitability, indicating that an increase in these factors enhances the profitability of banks. On the other hand, long-term debt to total assets, total debt to total assets, and debt-to-equity ratio have a negative relationship with profitability, suggesting that higher levels of long-term debt and financial leverage can reduce profitability. These findings highlight the complex impact of debt financing on the financial performance of commercial banks in Nepal, emphasizing the importance of managing debt structure to optimize profitability.

Ngo *et al*. (2020) [15] explore the impact of debt on corporate profitability in non-financial listed companies in Vietnam, using data from 118 firms during the period 2009–2017. They apply the Generalized Method of Moments (GMM) to address econometric issues and find a statistically significant negative relationship between debt and profitability. The study also reveals that the effect of debt on profitability is non-linear and concave, meaning that beyond an optimal debt ratio of 38.87%, further increases in debt reduce profitability. These findings offer valuable insights for managers, stressing the importance of maintaining an optimal level of debt to improve profitability, particularly in emerging markets like Vietnam.

Nazir *et al*. (2021) [13] analyze the relationship between debt financing and firm performance on the Pakistan Stock Exchange (PSX) by examining data from 30 companies in the automobile, cement, and sugar sectors from 2013 to 2017. Using pooled ordinary least squares regression along with fixed- and random-effects models, the study finds that both short-term and long-term debt have significant negative effects on profitability, suggesting that high levels of debt can lead to agency problems and lower firm performance. However, the study also identifies that sales growth and firm size positively impact profitability, indicating that larger firms and those with higher growth can offset some of the negative effects of debt. The study advises that managers should focus on finding an optimal level of debt to avoid the performance-diminishing effects of excessive leverage. The authors suggest that future research could explore additional sectors, such as textiles, fertilizers, and pharmaceuticals, to gain a broader understanding of the impact of debt financing on profitability.

Fasasi *et al*. (2022) [8] explore the effect of debt financing on the profitability of listed agricultural companies in Nigeria, using a sample of five listed agricultural firms on the Nigerian Stock Exchange. The study utilizes secondary data extracted from the annual reports of these companies and employs multivariate regression analysis to analyze the relationship between debt financing and profitability. The findings indicate that long-term debt has a significant negative effect on the profitability of these firms, while short-term debt has a significant positive effect. This suggests that while short-term debt can enhance profitability, excessive reliance on long-term debt may negatively impact financial performance. The study concludes that debt financing does affect profitability and recommends that agricultural companies manage their debt levels carefully, keeping long-term debt at moderate levels to avoid adverse effects on profitability.

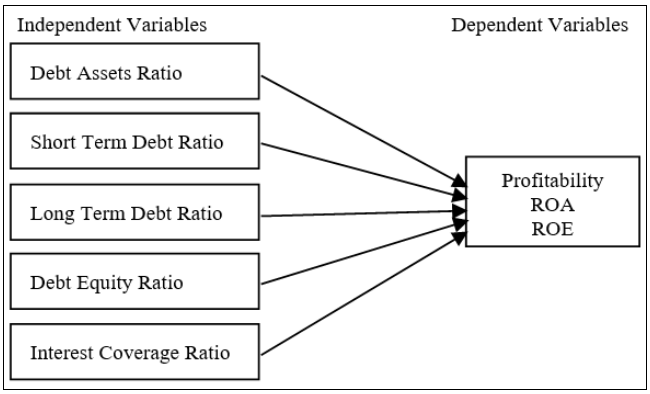
Lidovolo and Atieno (2023) [10] examine the effect of long-term debt financing on the profitability of commercial airlines in Kenya, guided by the pecking order theory. Using a cross-sectional research design and a census sampling technique, the study analyzes secondary data collected from audited financial statements of Kenyan airlines. Panel data is analyzed through both descriptive and inferential statistical methods, including correlation analysis and Hausman tests for fixed and random effects. The findings show that long-term debt financing has a negative and statistically significant effect on profitability, with a regression coefficient of -0.2318 and a p-value of 0.038. This indicates that higher levels of long-term debt financing reduce the profitability of commercial airlines in Kenya. Based on these results, the study recommends that airline executives aim to maintain a manageable level of long-term debt, ensuring that the debt load is compatible with a favorable debt ratio to minimize the risk of default and support long-term financial stability.

Muhammad *et al*. (2023) [12] examine the effect of debt financing on the profitability of manufacturing companies in Selangor, Malaysia. The study highlights that debt financing plays a crucial role in funding business expansion, technological investments, and market growth in Malaysia's industrial sector. However, it also introduces financial risks, which need to be managed carefully to optimize

profitability. The study finds that prudent debt management enhances profitability, while excessive debt can reduce profitability due to high interest expenses. The impact of macroeconomic conditions and government policies is also emphasized, suggesting that manufacturing companies in Selangor should balance debt use with effective risk mitigation strategies. The research concludes that companies must strike a balance between leveraging debt for growth and managing the associated risks. The study recommends that manufacturing firms regularly assess their debt-to-equity ratios, manage costs efficiently, and explore alternative financing options to reduce reliance on traditional debt and enhance financial resilience.

Theoretical framework and definition of variables

The dependent variable of this study is profitability, which is measured by return on assets (ROA) and return on equity (ROE). The independent variables, which potentially influence these profitability metrics, include the debt-assets ratio, short-term debt ratio, long-term debt ratio, debt-equity ratio, and interest coverage ratio. A theoretical framework outlines the relationships between these variables in the research.



Note: Obtained from Pradhan & Khadka (2017) [18]

Fig 1: Theoretical framework of dependent and independent variables

a. Return on Assets

The Return on Assets (ROA) ratio is an important performance indicator that evaluates how efficiently a bank uses its total assets to generate profits, providing insights into its operational effectiveness and overall profitability. By dividing net income by total assets, ROA shows how well the bank's management is leveraging its resources to create value for shareholders (Sarkar *et al*., 1998) [20]. A higher ROA indicates that the bank is effectively converting its assets into profits, whereas a lower ratio may suggest inefficiencies or suboptimal use of assets. Factors like liquidity management can impact ROA, as holding more liquid assets may lower returns due to their lower profitability. Nevertheless, this effect on overall profitability is usually minor, and a bank can still maintain a solid profit margin if other areas of its operations are well-managed (Almumani, 2013) [2]. ROA is a crucial metric for comparing banks with different sizes or business models, as it helps stakeholders assess how well a bank is optimizing its asset base to generate net income.

$$\text{Return on Assets (ROA)} = \frac{Net\ \text{Pr}\ ofit}{Total\ Assets} \times 100$$

b. Return on Equity

Return on Equity (ROE) is an essential financial metric that evaluates a company's ability to generate profits from its shareholders' equity, offering an indication of the potential return investors can expect on their investment. It is calculated by dividing net profit by the average shareholders' equity, reflecting how effectively a company uses its equity capital to generate earnings. Although ROE does not directly determine the cash return to shareholders—since this depends on factors like dividends and stock price movements—it serves as a key indicator of a company's profitability in relation to the equity invested by shareholders (Berman *et al*., 2013) [3]. A high ROE suggests the company is efficiently utilizing equity capital to drive profit growth, signaling strong management and operational effectiveness. On the other hand, a low ROE may indicate inefficiencies or an underuse of equity capital to generate returns, which could raise concerns about the company's ability to meet investor expectations. As such, ROE is a crucial measure for investors, providing valuable insights into the risk-reward profile of an investment and whether the company's performance justifies the risks associated with owning its equity.

$$\text{Return on Equity (ROE)} = \frac{Net\ \text{Pr}\ ofit}{Shareholder's\ Equity} \times 100$$

c. Debt Assets Ratio

The debt-to-assets ratio (D/A ratio) is an important financial metric that indicates the proportion of a company's assets funded through debt, providing insight into the level of financial leverage the company uses. It is calculated by dividing total debt by total assets, and the result shows how much of the company's assets are financed by borrowed funds as opposed to equity. A higher D/A ratio suggests that the company depends more on debt to finance its operations, which can increase financial risk, especially if the company faces difficulties in meeting its debt obligations during economic downturns or periods of declining cash flow. In contrast, a lower D/A ratio reflects a more conservative financial structure, where the company relies more on equity financing and may face less risk during financial challenges. The D/A ratio is commonly used by investors, creditors, and analysts to evaluate a company's financial stability, capital structure, and risk exposure, offering a clear view of how much debt the company holds in relation to its total assets and helping assess its vulnerability to economic changes (Brigham & Ehrhardt, 2016) [5].

$$\text{Debt Assets Ratio (DAR)} = \frac{Total\ Debt}{Total\ Assets} \times 100$$

d. Short term debt ratio

The short-term debt ratio is a financial metric that indicates the proportion of a company's total debt that is due for repayment within the next year, relative to its total assets. It is calculated by dividing short-term debt by total assets, and it serves as a measure of the company's liquidity and its ability to meet short-term financial obligations without depending on long-term debt or external funding sources. A higher short-term debt ratio may signal potential liquidity challenges, as it suggests a large portion of the company's debt is due soon, which could create difficulties in refinancing or repaying the debt if the company lacks

sufficient cash flow or liquid assets. On the other hand, a lower short-term debt ratio typically indicates a more manageable short-term debt burden, reducing the likelihood of liquidity problems and improving the company's ability to handle short-term financial stresses. This ratio is commonly used by investors and analysts to assess a company's financial flexibility and its ability to manage short-term liabilities while maintaining long-term financial stability (Brigham & Ehrhardt, 2016) [5].

$$\text{Short Term Debt Ratio (STDR)} = \frac{Short Term\ Debt}{Total\ Debt} \times 100$$

e. Long Term Debt Ratio

The long-term debt ratio is an important financial metric that measures the proportion of a company's total debt due for repayment beyond one year, relative to its total assets. It is calculated by dividing long-term debt by total assets and offers valuable insights into the company's capital structure and its dependence on long-term debt to finance its operations, investments, and growth strategies. A higher long-term debt ratio indicates that the company relies more on long-term debt, which increases financial leverage and exposes it to greater risk. This is because the company will have future debt obligations, which could limit its ability to adapt to changes in interest rates, economic conditions, or cash flow fluctuations. In contrast, a lower long-term debt ratio suggests a more conservative approach to financing, where the company is less reliant on debt and may have a more stable financial outlook in the long run. Investors and analysts closely monitor this ratio, as it helps assess the company's risk level, financial flexibility, and long-term solvency, providing a clearer understanding of its capacity to manage future obligations (Ross *et al*., 2016).

$$\text{Long Term Debt Ratio (LTDR)} = \frac{Long\ Term\ Debt}{Total\ Debt} \times 100$$

f. Debt equity ratio

The debt-to-equity ratio is a key financial leverage indicator that compares a company's total debt to its equity, offering insights isnto its financial structure and the level of risk tied to its capital financing. It is calculated by dividing total liabilities by shareholders' equity, providing a clear view of how much of the company's operations are funded through debt versus equity. A higher debt-to-equity ratio indicates that the company is more heavily leveraged, meaning it relies more on borrowing to finance its activities. While this can boost returns in favorable conditions, it also heightens financial risk, as the company must meet its debt obligations regardless of its earnings, which could be problematic during economic downturns or cash flow challenges. On the other hand, a lower debt-to-equity ratio suggests that the company uses less debt and is more reliant on equity financing, which can lower its financial risk and offer greater stability over the long term. This ratio is frequently used by investors, analysts, and creditors to evaluate a company's capacity to meet long-term financial obligations, assess its risk profile, and gauge its overall solvency (Koller, 2015) [9]. It is an essential tool for understanding the balance between debt and equity in the company's capital structure and evaluating the sustainability of its financial strategies.

$$\text{Debt Equity Ratio (DER)} = \frac{Total\ Debt}{Total\ Equity}$$

g. Interest coverage ratio

The interest coverage ratio is a crucial financial metric that evaluates a company's ability to meet its interest payments on outstanding debt, offering insights into its financial health and solvency. It is calculated by dividing earnings before interest and taxes (EBIT) by the company's interest expenses, indicating how many times a company's earnings can cover its interest obligations. A higher interest coverage ratio suggests the company has a strong ability to meet its interest payments, indicating robust earnings and financial stability, with a lower risk of default. In contrast, a lower ratio signals potential challenges in covering interest payments, which may imply that the company is overleveraged or struggling to generate enough income to meet its debt obligations. This raises the risk of default or difficulties in refinancing. Investors, creditors, and analysts frequently use the interest coverage ratio to assess a company's financial resilience and creditworthiness, as it provides a clear view of how well the company can manage its debt and whether it faces potential financial distress (Damodaran, 2012) [7]. This ratio is particularly important for evaluating a company's long-term sustainability, especially for those with substantial debt or operating in industries sensitive to economic changes.

$$\text{Interest Coverage Ratio (ICR)} = \frac{Earning\ before\ Interest\ \&\ Taxes}{Interest\ Expenses}$$

Research methodology

This study uses both descriptive and casual research designs. Descriptive research is used to analyze the average and standard deviation, and to describe the nature and features of research variables like ROA, ROE, DAR, STDR, LTDR, DER and ICR the causal comparative research design is used to analyze the correlation coefficient and regression analysis of the sampled banks. The data for this study comes from secondary sources. Using simple random sampling methods, this study selects 10 commercial banks are Everest Bank Limited, NMB Bank Limited, Global IME Bank Limited, Nepal SBI Bank Limited, Siddhartha Bank Limited, Agriculture Development Bank Limited, NIC Asia Bank Limited, Himalayan Bank Limited, Prime Commercial Bank Limited and Sanima Bank Limited out of a total of 20 commercial banks in Nepal among the 100 observations. The main sources of data include various issues of Banking and Financial Statistics, Quarterly Economic Bulletin, and Bank Supervision Report published by Nepal Rastra Bank, as well as the Annual Reports of the selected commercial banks. This section provides data that is analyzed for this study. Without any data, nothing can be studied. Therefore, for any statistical investigation, the collection of data is crucial. SPSS 20 and M/S Office Excel 2003 are used for data analysis.

Model specification

For regression model is designed as independent variables are debt assets ratio (DAR), short term debt ratio (STDR), long term debt ratio (LTDR), debt equity ratio (DAR) and interest coverage ratio (ICR) and return on assets (ROA) and return on equity (ROE) are taken as dependent variables. The study utilizes two regression models for data analysis, as outlined below.

First model

In this first model, ROA is taken as dependent variable and debt assets ratio (DAR), short term debt ratio (STDR), long term debt ratio (LTDR), debt equity ratio (DAR) and interest coverage ratio (ICR) are taken as independent variables. The first model is presented as follows:

$ROA_{it} = \beta_0 + \beta_1 DAR_{it} + \beta_2 STDR_{it} + \beta_3 LTDR_{it} + \beta_4 DER_{it} + \beta_5 ICR_{it} + \varepsilon.$

Second model

In this second model, ROE is taken as dependent variable and debt assets ratio (DAR), short term debt ratio (STDR), long term debt ratio (LTDR), debt equity ratio (DAR) and interest coverage ratio (ICR) are taken as independent variables. The second model is presented as follows:

$ROE_{it} = \beta_0 + \beta_1 DAR_{it} + \beta_2 STDR_{it} + \beta_3 LTDR_{it} + \beta_4 DER_{it} + \beta_5 ICR_{it} + \varepsilon.$

β = Constant Term
ROA_{it} = Net income divided by total assets
ROE_{it} = Net income divided by common shareholder equity
DAR_{it} = Total debt divided by total assets
$STDR_{it}$ = Short term debt divided by total debt
$LTDR_{it}$ = Long term debt divided by total debt
DER_{it} = Total debt divided by total equity
ICR_{it} = Earning before income tax divided by interest expenses
$\beta_1 - \beta_5$ = Beta coefficient
it = Time period
ε = Error term

Descriptive statistics of research variables

Descriptive statistics is a branch of statistics that focuses on analyzing and summarizing data to provide a clear and concise overview of its key characteristics. In this study, statistical tools were used to analyze variables such as ROA, ROE, DAR, STDR, LTDR, DER, and ICR, with a focus on key measures like the minimum, maximum, mean, and standard deviation. These summary statistics are presented in table 9.

Table 1: Descriptive statistics of research variables

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	100	.47	3.57	1.5259	.45104
ROE	100	2.40	28.40	14.8276	4.32910
DAR	100	76.87	98.03	87.5336	4.60793
STDR	100	89.51	100.00	98.1150	1.89517
LTDR	100	.00	10.49	1.8850	1.89517
DER	100	1.06	15.56	8.7918	2.32523
ICR	100	.11	1.93	.5765	.31596

Table 1 shows the descriptive statistics of research variables are ROA, ROE, DAR, STDR, LTDR, DER and ICR which is analyzed from minimum value, maximum value, mean and standard deviation from 100 observation. The minimum value indicates 0 in long term debt ratio and maximum value indicates the short-term debt ratio which 100. The average value is high in short term debt ratio i.e. 98.1150 and lowest in interest coverage ratio i.e. 0.5765. The standard deviation is high in debt assets ratio which is greater variability and less in interest coverage ratio which is lower variability indicates to nearest the mean point of data set.

Normality Test

A normality test is used to determine whether the distribution of a variable follows a normal distribution. In this case, the normality test would assess whether the dependent variables, ROA and ROE, as well as the independent variables DAR, STDR, LTDR, DER, and ICR, are normally distributed. This is important because many statistical methods, such as regression analysis, assume that the data is normally distributed. The results of the normality test help decide whether parametric techniques can be used or if data transformation is necessary to meet normality assumptions.

Table 2: Normality Test

N		ROA	ROE	DAR	STDR	LTDR	DER	ICR
		100	100	100	100	100	100	100
Normal Parameters[a, b]	Mean	1.526	14.828	87.534	98.115	1.885	8.792	.576
	Std. Deviation	.451	4.329	4.608	1.895	1.895	2.325	.316
Most Extreme Differences	Absolute	.070	.049	.089	.164	.164	.071	.124
	Positive	.063	.049	.052	.160	.164	.071	.124
	Negative	-.070	-.047	-.089	-.164	-.160	-.044	-.093
Kolmogorov-Smirnov Z		.698	.488	.892	1.644	1.644	.708	1.243
Asymp. Sig. (2-tailed)		.715	.971	.404	.009	.009	.698	.091

a. Test distribution is Normal
b. Calculated from data

Figure 2 presents the results of a normality test for various variables, including ROA, ROE, DAR, STDR, LTDR, DER, and ICR. The test uses the Kolmogorov-Smirnov statistic to assess how closely each variable's distribution matches a normal distribution. The p-values (Asymp. Sig.) indicate the level of deviation from normality: for ROA, ROE, DAR, and DER, the p-values are greater than 0.05, suggesting that these variables follow a normal distribution. However, for STDR and LTDR, the p-values are 0.009, indicating significant deviation from normality. ICR has a p-value of 0.091, suggesting a borderline normal distribution. The most extreme differences (both positive and negative) for each variable are also reported, with STDR and LTDR showing the largest deviations. Overall, the normality test suggests that most variables, except STDR and LTDR, are normally distributed, allowing for the use of parametric statistical methods for further analysis.

Inferential statistics

This study examines the effect of debt financing on profitability of Nepalese commercial banks, using data from 10 fiscal years (2070/71 to 2079/80) and a sample of 100

observations from 10 commercial banks. The data are analyzed using M/S Office Excel and SPSS 20. Correlation analysis is employed to assess the direction of the relationship between the dependent and independent variables, along with regression analysis.

a. Relationship between Independent Variables with ROA and ROE

A positive Pearson's correlation suggests that as one variable increases, the other tends to increase as well, indicating a direct relationship. Conversely, a negative correlation means that an increase in one variable is associated with a decrease in the other. The strength of the correlation is important: values close to +1 or -1 indicate a strong relationship, while values near 0 imply a weak or no relationship. This concept helps in understanding the relationships between ROA, ROE, and the independent variables like DAR, STDR, LTDR, DER, and ICR.

Table 3: Relationship between Independent Variables with ROA and ROE

		ROA	ROE	DAR	STDR	LTDR	DER	ICR
	Sig. (2-tailed)	.000						
DAR	Pearson Correlation	.020	.410**	1				
	Sig. (2-tailed)	.843	.000					
STDR	Pearson Correlation	.383**	.325**	.268**	1			
	Sig. (2-tailed)	.000	.001	.007				
LTDR	Pearson Correlation	-.383**	-.325**	-.268**	-1.000**	1		
	Sig. (2-tailed)	.000	.001	.007	.000			
DER	Pearson Correlation	-.342**	.536**	.590**	.002	-.002	1	
	Sig. (2-tailed)	.000	.000	.000	.984	.984		
ICR	Pearson Correlation	.622**	.539**	.210*	.377**	-.377**	-.007	1
	Sig. (2-tailed)	.000	.000	.036	.000	.000	.943	

****.** Correlation is significant at the 0.01 level (2-tailed)

***.** Correlation is significant at the 0.05 level (2-tailed)

c. Listwise N=100

Table 3 shows the relationships between various independent variables and two dependent variables, Return on Assets (ROA) and Return on Equity (ROE). For other independent variables, the correlation with ROA varies: a weak positive correlation with Debt to Asset Ratio (DAR, 0.020, $p = 0.843$), a positive correlation with Short-Term Debt Ratio (STDR, 0.383, $p < 0.01$), and a negative correlation with Long-Term Debt Ratio (LTDR, -0.383, $p < 0.01$). Debt to Equity Ratio (DER) has a moderate negative correlation with ROA (-0.342, $p < 0.01$), while Interest Coverage Ratio (ICR) shows a strong positive correlation with both ROA (0.622, $p < 0.01$) and ROE (0.539, $p < 0.01$). These results highlight the complex relationships between leverage ratios, profitability, and financial performance indicators.

b. Regression Analysis

The regression analysis is carried out to determine whether the dependent variable is Influence by the given independent variables or not. In this analysis ROA and ROE are dependent variables and DAR, STDR, LTDR, DER and ICR are independent variables. There is regression model is divided by two parts are model 1 and model 2. The equation of regression model is as follow:

1. First Model

In the first model, return on assets is taken as dependent variable and debt assets ratio, short term debt ratio, long term debt ratio, debt equity ratio and interest coverage ratio are taken as independent variables. The model is presented as follows:

$$ROA = \beta_0 + \beta_1 DAR + \beta_2 STDR + \beta_3 LTDR + \beta_4 DER + \beta_5 ICR + \varepsilon.$$

Table 4: Regression Coefficient of Model 1 (ROA)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.670	1.764		-1.514	.133
	DAR	.010	.009	.101	1.080	.283
	STDR	.036	.019	.153	1.950	.054
	DER	-.077	.017	-.398	-4.467	.000
	ICR	.771	.110	.540	7.040	.000

a. Dependent Variable: ROA

Table 4 presents the regression coefficients for Model 1, with ROA as the dependent variable. The results show that DER and ICR are significant predictors of ROA. DER has a negative and significant effect on ROA ($B = -0.077$, $p = 0.000$), while ICR has a positive and significant effect ($B = 0.771$, $p = 0.000$). STDR shows a marginally significant positive effect ($B = 0.036$, $p = 0.054$), and DAR has an insignificant effect ($B = 0.010$, $p = 0.283$). The standardized coefficients (Beta) indicate that ICR has the strongest impact on ROA, followed by DER.

2. Second model

In the second model, return on equity is taken as dependent variable and debt assets ratio, short term debt ratio, long term debt ratio, debt equity ratio, and interest coverage ratio are taken as independent variables. The model is presented as follows:

$$ROE = \beta_0 + \beta_1 DAR + \beta_2 STDR + \beta_3 LTDR + \beta_4 DER + \beta_5 ICR + \varepsilon.$$

Table 5: Regression Coefficient of Model 2 (ROE)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	-27.005	15.610		-1.730	.087
	DAR	-.080	.081	-.085	-.987	.326
	STDR	.359	.165	.157	2.173	.032
	DER	1.097	.153	.589	7.169	.000
	ICR	6.878	.969	.502	7.094	.000

a. Dependent Variable: ROE

Table 5 show the regression coefficient of Model 2 presents the results with ROE as the dependent variable. The analysis shows that DER and ICR have a significant positive impact on ROE, with both having p-values of 0.000, indicating they are statistically significant. STDR also shows a positive relationship with ROE, with a p-value of 0.032, making it significant as well. However, DAR does not significantly affect ROE, as its p-value of 0.326 exceeds the typical significance level of 0.05. These results suggest that DER and ICR are the most important factors influencing ROE in this model, while DAR appears to have little to no impact.

Discussion

The discussion of the study is analyzing the effect of debt financing on profitability of selected Nepalese commercial banks. The results of this study reveal complex and nuanced relationships between various debt financing ratios and the profitability of Nepalese commercial banks, as measured by Return on Assets (ROA) and Return on Equity (ROE). The correlation analysis suggests that some debt-related variables, such as the Debt to Equity Ratio (DER) and Interest Coverage Ratio (ICR), are significantly linked to profitability, while others, like Debt to Asset Ratio (DAR) and Long-Term Debt Ratio (LTDR), show weak or no significant correlation. Notably, the ICR exhibits a strong positive correlation with both ROA and ROE, suggesting that banks with better ability to cover interest payments tend to be more profitable. Conversely, DER shows a negative correlation with ROA, indicating that higher debt levels relative to equity may detract from asset profitability. These findings align with previous literature suggesting that excessive leverage can negatively affect profitability, particularly when debt servicing becomes challenging.

The regression analysis further corroborates these relationships. For ROA, the ICR and DER are significant predictors, with ICR having a positive and strong effect, while DER has a negative and significant effect. This implies that an increase in interest coverage improves asset profitability, whereas a higher debt-equity ratio hampers it. The regression model explains over 50% of the variation in ROA, suggesting that debt financing factors, particularly ICR and DER, are crucial determinants of profitability. For ROE, the model explains over 60% of the variation, and both ICR and DER also show strong relationships with ROE, with ICR having a positive and DER a negative effect. The significance of the short-term debt ratio (STDR) in both models suggests that short-term liabilities might have a relatively positive influence on profitability, possibly due to the liquidity benefits they offer in financing day-to-day operations.

However, the analysis also reveals that some ratios, like DAR and LTDR, are not significant predictors of profitability. The exclusion of LTDR from both models further confirms that long-term debt may not be as influential on profitability as other forms of debt. This finding highlights the importance of distinguishing between different types of debt when analyzing their impact on financial performance. Additionally, the hypothesis testing results reinforce the idea that certain debt ratios, such as DER and ICR, significantly influence profitability, while others, like DAR, do not. Overall, the study underscores the importance of efficient debt management in enhancing the profitability of commercial banks in Nepal, with particular emphasis on the role of short-term debt and interest coverage in fostering better financial performance.

Conclusion

In conclusion, this study highlights the significant impact of debt financing on the profitability of Nepalese commercial banks, with key financial ratios such as the Debt to Equity Ratio (DER) and Interest Coverage Ratio (ICR) playing crucial roles in determining both Return on Assets (ROA) and Return on Equity (ROE). The findings suggest that while excessive debt, particularly in the form of high DER, negatively affects profitability, a strong ability to cover interest payments (ICR) positively influences both asset and equity returns. Short-term debt, as indicated by the positive relationship with profitability, appears to offer liquidity advantages, while long-term debt and Debt to Asset Ratio (DAR) do not show significant effects. These results emphasize the importance of managing debt structure carefully, particularly balancing short-term and long-term liabilities, to optimize profitability in the banking sector.

Implications

The implications of the study are conduct from effect of debt financing on profitability of Nepalese commercial banks are as presented in the following points.

- The study highlights the importance of managing debt structure effectively, as certain debt ratios (e.g., Debt to Equity Ratio) negatively impact profitability, while others (e.g., Interest Coverage Ratio) enhance it.
- Short-term debt appears to have a more favorable impact on profitability compared to long-term debt, suggesting that banks may benefit from focusing on shorter-term financing strategies for better liquidity management.
- Banks should prioritize improving their Interest Coverage Ratio (ICR), as a higher ability to meet interest obligations is strongly associated with improved profitability (both ROA and ROE).
- Excessive leverage, particularly reflected in high Debt to Equity Ratios, may harm profitability. This suggests the need for commercial banks to adopt a more conservative approach to borrowing and equity management.

- Financial ratios such as DER and ICR should be closely monitored as key indicators for assessing the financial health and profitability potential of banks in Nepal.
- Regulators may consider encouraging banks to maintain optimal debt ratios to promote financial stability and profitability, potentially incorporating these findings into regulatory frameworks or lending guidelines.
- Bank managers should make informed strategic decisions about capital structure, balancing short-term and long-term debt, to optimize financial performance and minimize risks associated with high leverage.
- Future research could explore the impact of different types of debt (e.g., convertible debt, subordinated debt) on bank profitability, as well as the potential moderating effects of macroeconomic factors and regulatory changes on the relationship between debt financing and financial performance.

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