Indicators of Financial Distress Condition in Nepalese Banking Industry

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Abstract

The study examines the indicators of financial distress condition in Nepalese banking industry. Non-performing loan and Altman Z-score are selected as the dependent variables. The selected independent variables are debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, and loan to deposit ratio. The study is based on secondary data of 10 commercial banks with 100 observations for the period from 2013/14 to 2022/23. The data were collected from Banking and Financial Statistics published by Nepal Rastra Bank and annual reports of the selected commercial banks. The correlation coefficients and regression models are estimated to test the significance and importance of indicators of financial distress condition in Nepalese banking industry.

The major conclusion of this study is that debt ratio has a negative impact on Altman Z-score and non-performing loan. It indicates that higher the debt ratio, lower would be the Altman Z-score and non-performing loan. Similarly, return on assets has a positive impact on Altman Z-score. It indicates that increase in return on assets leads to increase in Altman Z-score. In contrast, return on assets has a negative impact on non-performing loan. It indicates that increase in return on assets leads to decrease in non-performing loan. However, capital adequacy ratio has a positive impact on Altman Z-score. It indicates that higher the capital adequacy ratio, higher would be the Altman Z-score. In contrast, capital adequacy ratio has a negative impact on non-performing loan. It indicates that increase in capital adequacy ratio leads to decrease in non-performing loan. In addition, interest coverage ratio has a positive impact on Altman Z-score. It indicates that higher the interest coverage ratio, higher would be the Altman Z-score. In contrast, interest coverage ratio has a negative impact on non-performing loan. It indicates that increase in interest coverage ratio leads to decrease in non-performing loan. Moreover, loan to deposit ratio has a positive impact on Altman Z-score and non-performing loan. It indicates that higher the loan to deposit ratio, higher would be the Altman Z-score and non-performing loan.

Keywords: debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, total assets, loan to deposit ratio, non-performing loan, Altman Z-score

1. Introduction

Financial distress in the banking sector refers to a situation where banks experience severe financial challenges that threaten solvency capacity and ability to operate effectively. Such condition often arises due to a significant decline in the value of a bank's assets, excessive non-performing loans, inadequate capital reserves, or poor risk management practices. When banks face financial distress, banks may struggle to meet their obligations to depositors, creditors, and other stakeholders, leading to a loss of confidence among customers and investors. This can trigger a liquidity crisis, where banks are unable to access sufficient funds to meet short-term liabilities, further exacerbating the problem. Financial distress occurs because the company is unable to manage and maintain the stability of the company's financial performance, which stems from a failure to promote the products it makes which causes sales to decline, so that the income decreases from the lack of sales,

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which allows the company to experience losses operating and net losses for the current year (Chairunesia *et al.,* 2018).

Financial distress is a situation of a company fails or is unable to fulfill its obligations to the debtor because the company experiences deficiency and insufficient funds in which the total liabilities outweigh the total assets, and it cannot achieve the company's economic goal or profit (Khafid *et al.,* 2019). Every company is founded with the hope that the company will generate profits so that the company can survive or develop in the long term and do not experience liquidity. But in reality, these assumptions do not always work out according to expectations or expectations. Often companies that have been operating for a certain period of time are forced to dissolve or be liquidated due to financial difficulties that have led to bankruptcy (Permana *et al.,* 2017).

Haris *et al.* (2022) investigated the indicators of financial distress condition in banking sector in Indonesia during the period of 2015-2019 with a multiple correlation approach. The study showed that capital, credit risk, profitability and liquidity have a positive impact on financial distress. Similarly, Wahyuni (2021) examined the determinants of financial distress prediction using springate model. The data analysis used is logistic regression with a sample of property and real estate sector companies in 2018-2019 which amounted to 42 issuers. The results revealed that return on assets have a positive and significant impact on financial distress while institutional ownership, the proportion of independent commissioners, number of board directors, and leverage have an strong influence on financial distress but not significantly impact on financial distress. Likewise, Dewi and Hadri (2017) assessed the suitable financial distress prediction model for companies in Indonesia. The population and samples used in this study are listed companies with the data range from 2006 to 2015. The study concluded that financial distress prediction influences by working capital to total assets, current ratio, book value of equity to total liabilities, total debt to total assets, EBIT to current liabilities, and institutional ownership. However, leverage has a negative and an insignificant impact on Z-score.

Candradewi and Rahyuda (2021) analyzed the effect of financial indicators, corporate governance and macroeconomic variables on financial distress of manufacturing companies listed in Indonesian Stock Exchange (IDX) for the period 2016-2018. The study showed that liquidity ratio has a negative but significant impact on financial distress. In contrast, leverage ratio has a positive and significant impact on financial distress whereas activity ratio has a negative but significant impact on financial distress and the size of the board of directors has a negative but significant impact on financial distress. In addition, Dirman (2021) determined the variables of financial distress. The major findings of the study is that leverage has a negative impact on financial distress whereas operating capacity has no impact on financial distress but profit margin has a positive impact on financial distress. Moreover, Madhushani and Kawshala (2018) analyzed the impact of financial distress on financial performance in Srilanka. The study suggested that the financial distressed situation has a significant impact on the financial performance of the listed nonbank financial institutions in Sri Lanka. Similarly, Shahu (2019) examined the banks' specific factors affecting distress risk. The study found that liquidity, profitability and size have a significant positive impact on Z-score indicating lower distress risk of firms.

Return on assets is a measure of a company's ability to generate profits with all the assets owned by the company. These assets are all company assets ranging from own capital

or foreign capital, which have been converted into company assets for the survival of the company. This ratio figure is commonly used to measure company performance by investors (Pernamasari, 2020). Chen *et al.* (2020) revealed that leverage has a positive and significant impact on financial distress, so that the greater the company's activities are financed by debt, the greater the likelihood of it occurring. Similarly, Ayuningtiyas and Suryono (2019) stated that profitability proxies by return on assets has a negative impact on financial distress conditions. It indicates that lower the profit the company gets, the closer it will be to the possibility of the company experiencing financial distress. Likewise, Baldwin and Mason (1983) argued that when a firm's business deteriorates to the point where it cannot meet its financial obligations, the firm is said to have entered the state of financial distress. Non-performing loan is a credit risk, much higher level of the NPL, much higher the cost of the provision for loan losses which is a cost and will obviously reduce profits (Rahman *et al.,* 2004). Liquidity that is proxies by the loan to deposit ratio which is how much credit is distributed to third party funds, so the loan to deposit ratio calculation is the ratio between loans disbursed and third party funds. The higher the ratio indicated the lower level of liquidity of the bank (Keffala, 2018).

Handayani *et al.* (2024) analyzed the effect of non-performing loans and loan to deposit ratio on profitability with inflation as a moderating variable in banking companies listed on Indonesia stock exchange period 2018-2022. The results of this study showed that non-performing loans have a negative effect on profitability and loan to deposit ratio has a positive effect on profitability. Meanwhile, inflation cannot moderate the relationship between non-performing loans and loan to deposit ratio to profitability. Suroso (2022) determined the effect of the capital adequacy ratio and loan to deposit ratio (LDR) on the profitability of banks that go public on the Indonesia Stock Exchange (IDX) for the period 2016 - 2021. The study concluded that capital adequacy ratio and loan to deposit ratio have significant effect on return on assets. Do *et al.* (2020) examined the effect of non-performing loans on profitability of commercial banks of Vietnam in the period of 2008 to 2017. The results showed that when the rate of nonperforming loans increases, the bank's ROA will decrease, meaning that the bank profitability will be lowered. Furthermore, the results have pointed out that in the case of Vietnam, the loans to deposits rate and the growth of GDP both have impact on the bank's performance; while the bank size does not matter. Alshebmi *et al.* (2020) assessed the non-performing loans and their effect on banks profitability in the Saudi Arabia banking sector. The correlation result showed a negative insignificant weak relationship between nonperforming loans ratio (NPLs) and return on assets ratio (ROA), growth gross domestic product (GGDP), bank liquidity risk (BLQ), and credit risk. It further indicates a positive insignificant weak relationship between the NPL and capital adequacy ratio (CAR).

Ndiritu *et al.* (2024) examined the effect of interest rate spread on the performance of commercial banks in Kenya. Using random effects model, the study found a positive and significant relationship between interest rate spread and the performance of the banks. Musah *et al.* (2018) examined the effect of interest rate spread on the profitability of commercial banks in Ghana. The results of the study showed that there is a positive and statistically significant association between interest rate spread and bank profitability in Ghana. The study found that the demand for loans exceed the supply of same allowing banks to charge higher interest on lending relative to deposits to increase profitability. Benkheznadji *et al.* (2024**)** found that the capital adequacy ratio has a significant negative impact on return on

equity. It implies that increase in the capital adequacy standard observed among the banks in the sample drove to a decrease in the banks' ROE. The study concluded that procedures used to raise capital, which also require internal or external financing, which in turn causes the latter to distribute profits and add them to capital over a longer period of time, which cause a decrease in the return on equity ratio. Pinasti and Mustikawati (2018) analyzed the effect of capital adequacy ratio, third party fund, loan to deposit ratio, and bank size to profitability in banking companies listed in Indonesia Stock Exchange by using annual financial reports published in 2016-2018. The study showed that loan to deposit ratio (LDR) has a negative effect and has no significant effect on profitability.

In the context of Nepal, Gyawali (2023) found that Among 16 sampled banks, 6 commercial banks are laid under zone of distress and 10 banks as in undecided zone. Likewise, Gurung *et al.* (2023) analyzed the influence of loan loss provision on the profitability of commercial banks in Nepal. The study found insignificant relation between provisions for loan losses with the Nepalese commercial banks' profitability. The study concluded that the increased provision for loan losses adversely affects profitability of commercial banks. Reshmi (2023) examined the impact of nonperforming loan on the profitability of Nepalese commercial banking sector. The study found that non-performing loan ratio have major effect on the Nepalese commercial bank's profitability. This implies that the burning issue of rise in NPL can be attributed to decline in the Nepalese bank's profits. The study found that the profitability of the commercial banks in Nepal is influenced by other factors such as loan-to-deposit ratio and bank size. Neupane (2020) investigated the key determinants of profitability of Nepalese commercial banks. The study concluded that the profitability of Nepalese commercial banks measured by return on assets is significantly influenced by the external factors. Among external factors, industry specific factors have high degree of impact on return on assets. Further, the profitability measured by net interest margin (NIM) is significantly influenced only by capital adequacy, absolute number of branches and annual inflation rate.

The above discussion shows that empirical evidences vary greatly across the studies on the indicators of financial distress condition in banking industry. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such findings using more recent data exist in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The major objective of the study is to examine the indicators of financial distress condition in Nepalese banking industry. Specifically, it examines the relationship of debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, and loan to deposit ratio with non-performing loan and Z-score.

The remainder of this study is organized as follows. Section two describes the sample, data and methodology. Section three presents the empirical results and the final sections draws conclusion.

2. Methodology aspects

The study is based on the secondary data which were gathered from 10 commercial banks for the period of 2013/14 to 2022/23, leading to a total of 100 observations. The study employed convenience sampling method. The main sources of data include Banking and Financial Statistics published by Nepal Rastra Bank and annual report of respective banks.

Table 1 shows the list of commercial banks for the study along with the study period and number of observations.

Table 1

List of commercial banks selected for the study along with the study period and number of observations

S. N.	Name of the banks	Study period	Observations
1	Agricultural Development Bank Limited	2013/14-2022/23	10
2	NMB Bank Limited	2013/14-2022/23	10
3	Everest Bank Limited	2013/14-2022/23	10
4	Nepal Bank Limited	2013/14-2022/23	10
5	Citizens Bank International Limited	2013/14-2022/23	10
6	Sanima Bank Limited	2013/14-2022/23	10
7	Machhapuchchhre Bank Limited	2013/14-2022/23	10
8	Prime Commercial Bank Limited	2013/14-2022/23	10
9	Siddhartha Bank Limited	2013/14-2022/23	10
10	Himalayan Bank Limited	2013/14-2022/23	10
Total number of observations			**100**

Source: Annual Reports

Thus, the study is based on 100 observations.

The model

The model used in this study assumes that non-performing loan and Z-score depends upon indicators of financial distress condition. The dependent variables selected for the study are non-performing loan and Z-score. Similarly, the selected independent variables are debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, and loan to deposit ratio. Therefore, the model takes the following form:

Altman Z-score = $\alpha + \beta_1 DR_{it} + \beta_2 ROA_{it} + \beta_3 CAR_{it} + \beta_4 ICR_{it} + \beta_5 LDR_{it} + \beta_6 RA + e_{it}$

NPL = $\alpha + \beta_1 DR_{it} + \beta_2 ROA_{it} + \beta_3 CAR_{it} + \beta_4 ICR_{it} + \beta_5 LDR_{it} + \beta_6 RA + e_{it}$

Where,

Altman Z-score = Altman Z-score as measured by $1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4$ where X_1 represents as working capital/total assets, X_2 represents as retained earnings/total assets, X_3 represents as EBIT/total assets, and X_4 represents as market value of equity/total liabilities.

NPL = Non-performing loan as measured by the ratio of non-performing loan to total loans, in percentage.

DR = Debt ratio as measured by the ratio of total debt to total assets, in percentage.

ROA = Return on assets as measured by the ratio of net profit to total assets, in percentage.

CAR = Capital adequacy ratio as measured by the ratio of total capital to total risk weighted assets, in percentage.

ICR = Interest coverage ratio as measured by the ratio of earnings before interest and tax to interest expenses, in percentage.

LDR = Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage.

RA = Retained earnings to total assets as measured by the ratio of retained earnings to total assets, in times.

The following section describes the independent variables used in this study along with hypothesis formulation.

Debt ratio

Arini *et al.* (2021) examined the determinant of financial ratio analysis to financial distress. The study showed that liquidity is influential but not significant to the financial distress. Similarly, Indriaty *et al.* (2019) investigated the effects of financial ratio, local size and local status on financial distress. The study stated that debt ratio has a significant impact on financial distress measured by Altman Z-score. Likewise, Kartika (2018) assessed the impact of financial ratio on financial distress in Indonesia manufacturing companies. The study concluded that there is a positive relationship between debt ratio and financial distress. Further, Supriyanto and Darmawan (2018) assessed the effect of financial ratio on financial distress in predicting bankruptcy. The study stated that debt ratio has a positive and significant impact on bankruptcy. Based on it, this study develops the following hypothesis:

H_1: There is a positive relationship between debt ratio and financial distress.

Return on assets

Aslamiah *et al.* (2023) examined the influence of return on assets, current ratio and debt to asset ratio on financial distress in consumption goods industry sector companies listed on the Indonesia stock exchange in 2017-2021. The study showed that there is a positive and significant relationship between return on assets and financial distress. Similarly, Poniwatie *et al.* (2021) analyzed the effect of current ratio, debt ratio and return on assets on financial distress on manufacturing companies listed on IDX for the 2017-2019 period. The study revealed that current ratio, debt ratio and return on assets have positive impact on financial distress. Likewise, Sasongko *et al.* (2021) assessed the financial ratios and financial distress in retail trade sector companies. The study concluded that return on assets has a positive and significant impact on financial distress. Further, Astuti and Sjarif (2022) analyzed the Effect of current ratio, debt to equity ratio and sales growth on financial distress with return on assets as intervening variable: Study on mining sector companies listed on the Indonesia Stock Exchange 2013-2020 period. Based on it, this study develops the following hypothesis:

H_2: There is a positive relationship between return on assets and financial distress.

Capital adequacy ratio

Buchdadi *et al.* (2020) examined the effect of credit risk and capital adequacy on financial distress in rural banks. The study showed that capital adequacy ratio has a negative impact on financial distress. Similarly, Toby and Danjuma (2021) investigated the liquidity management, Basel capital adequacy and financial distress resolution in the Nigerian banking industry. The study found that capital adequacy ratio has a negative impact on financial distress.

Likewise, Asif (2022) revealed that there is a positive relationship between capital adequacy ratio and financial distress. Based on it, this study develops the following hypothesis:

H$_3$: There is a negative relationship between capital adequacy ratio and financial distress.

Loan to deposit ratio

Haris *et al.* (2022) analyzed the indicators of financial distress condition in Indonesian banking industry. The study stated that there is a positive relationship between loan to deposit ratio and financial distress. Similarly, Amalia *et al.* (2020) investigated the prevention of financial distress on banking financial performance in Indonesia. The study revealed that loan to deposit ratio has a positive impact on financial distress measured by non-performing loan. Likewise, Asyikin *et al.* (2018) assessed the financial performance to predict financial distress in sharia commercial banks in Indonesia. The study revealed that there is a positive relationship between loan to deposit ratio and financial distress. Further, Margaretha and Wijaya (2023) examined the impact of CAR, credit risk, ROA, IDR, and ownership structure towards financial distress. The study showed that loan to deposit ratio has a positive impact on financial distress measured by non-performing loan. Based on it, this study develops the following hypothesis:

H$_4$: There is a positive relationship between loan to deposit ratio and financial distress.

Interest coverage ratio

Setiany (2021) examined the effect of investment, free cash flow, earnings management, and interest coverage ratio on financial distress. The study showed that there is a significant relationship between interest coverage ratio and financial distress. Similarly, Suranta *et al.* (2023) investigated the effect of investment, free cash flow, earnings management, interest coverage ratio, liquidity, and leverage on financial distress. The study revealed that interest coverage ratio has a significant impact on financial distress. Likewise, Restianti and Agustina (2018) assessed the effect of financial ratios on financial distress conditions in sub industrial sector company. The study found that there is a positive and significant relationship between interest coverage ratio and financial distress. Based on it, this study develops the following hypothesis:

H$_5$: There is a positive relationship between interest coverage ratio and financial distress.

Retained earnings to total assets

Pratiwi *et al.* (2022) assessed the effect of financial ratio in the Altman z-score on financial distress. The study showed that there is no significant relationship between retained earnings to total asset and financial distress. Similarly, Kinanti and Muhyarsyah (2023) examined the financial ratio analysis for predicting financial distress. The study stated that retained earnings to total asset has a negative impact on financial distress. Likewise, Kusumawati *et al.* (2024) revealed that there is a negative relationship between retained earnings to total asset and financial distress. Further, Saputri and Santoso (2023) showed that retained earnings to total assets have negative impact on financial distress. Based on it, this study develops the following hypothesis:

H$_6$: There is a negative relationship between retained earnings to total assets and financial distress.

3. Results and discussions

Descriptive statistics

Table 2 presents the descriptive statistics of dependent and independent variables during the period of 2013/14 to 2022/23.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 10 Nepalese commercial banks for the study period of 2013/14 to 2022/23. The dependent variables are Altman Z-score (Altman Z-score as measured by $1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4$ where X_1 represents as working capital/total assets, X_2 represents as retained earnings/total assets, X_3 represents as EBIT/total assets, and X_4 represents as market value of equity/total liabilities) and NPL (Non-performing loan as measured by the ratio of non-performing loan to total loans, in percentage). The independent variables are DR (Debt ratio as measured by the ratio of total debt to total assets, in percentage), ROA (Return on assets as measured by the ratio of net profit to total assets, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted assets, in percentage), ICR (Interest coverage ratio as measured by the ratio of earnings before interest and tax to interest expenses, in percentage), LDR (Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage), and RA (Retained earnings to total assets as measured by the ratio of retained earnings to total assets, in times).

Variables	Minimum	Maximum	Mean	Std. Deviation
Altman Z-score	0.6	1.94	1.33	0.29
NPL	0.12	5.46	1.87	1.35
DR	0	9.29	2.22	2.42
ROA	0.47	3.57	1.69	0.59
CAR	4.55	24.37	14.1	2.92
ICR	0.04	2.72	0.71	0.54
LDR	59.45	107.01	85.74	8.21
RA	-0.05	1.7	0.03	0.17

Source: SPSS Output

Correlation analysis

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and results are presented in Table 3.

Table 3

Pearson's correlation coefficients matrix

This table shows the correlation coefficients of dependent and independent variables of 10 Nepalese commercial banks for the study period of 2013/14 to 2022/23. The dependent variables are Altman Z-score (Altman Z-score as measured by $1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4$ where X_1 represents as working capital/total assets, X_2 represents as retained earnings/total assets, X_3 represents as EBIT/total assets, and X_4 represents as market value of equity/total liabilities) and NPL (Non-performing loan as measured by the ratio of non-performing loan to total loans, in percentage). The independent variables are DR (Debt ratio as measured by the ratio of total debt to total assets, in percentage), ROA (Return on assets as measured by the ratio of net profit to total assets, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted assets, in percentage), ICR (Interest coverage ratio as measured by the ratio of earnings before interest and tax to interest expenses, in percentage), LDR (Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage), and RA

(Retained earnings to total assets as measured by the ratio of retained earnings to total assets, in times).

Variables	Altman Z-score	NPL	DR	ROA	CAR	ICR	LDR	RA
Altman Z-score	1							
NPL	0.189	1						
DR	-0.175	-0.245*	1					
ROA	0.061	-0.313**	0.032	1				
CAR	0.200*	-0.138	0.375**	-0.133	1			
ICR	0.062	-0.032	0.017	-0.080	0.106	1		
LDR	0.018	0.024	0.0590	0.096	0.079	-0.061	1	
RA	0.013	-0.440**	0.524**	0.002	0.187	0.058	-0.050	1

Note: the asterisk signs (**) and (*) indicate that coefficients are significant at one percent and five percent levels of respectively.

Table 3 shows that debt ratio has a negative relationship with Altman Z-score. It indicates that increase in debt ratio leads to decrease in Altman Z-score. Similarly, return on assets has a positive relationship with Altman Z-score. It indicates that increase in return on assets leads to increase in Altman Z-score. Likewise, capital adequacy ratio has a positive relationship with Altman Z-score. It indicates that increase in capital adequacy ratio leads to increase in Altman Z-score. Further, interest coverage ratio has a positive relationship with Altman Z-score. It indicates that increase in interest coverage ratio leads to increase in Altman Z-score. In addition, loan to deposit ratio has a positive relationship with Altman Z-score. It indicates that increase in loan to deposit ratio leads to increase in Altman Z-score. Moreover, retained earnings to total assets has a positive relationship with Altman Z-score. It indicates that higher the retained earnings to total assets, higher would be the Altman Z-score.

Similarly, debt ratio has a negative relationship with non-performing loan. It indicates that increase in debt ratio leads to decrease in non-performing loan. Similarly, return on assets has a negative relationship with non-performing loan. It indicates that increase in return on assets leads to decrease in non-performing loan. Likewise, capital adequacy ratio has a negative relationship with non-performing loan. It indicates that increase in capital adequacy ratio leads to decrease in non-performing loan. Further, interest coverage ratio has a negative relationship with non-performing loan. It indicates that increase in interest coverage ratio leads to decrease in non-performing loan. In addition, loan to deposit ratio has a positive relationship with non-performing loan. It indicates that increase in loan to deposit ratio leads to increase in non-performing loan. Moreover, retained earnings to total assets has a negative relationship with non-performing loan. It indicates that higher the retained earnings to total assets, lower would be the non-performing loan.

Regression analysis

Having analyzed the Pearson's correlation coefficients, the regression analysis has been carried out and the results are presented in Table 4. More specifically, it presents the regression results of debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, and loan to deposit ratio on Altman Z-score.

Table 4

Estimated regression results of debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, and loan to deposit ratio on Altman Z-score

The results are based on panel data of 10 Nepalese commercial banks with 100 observations for the period of 2013/14 to 2022/23 by using the linear regression model and the model is Altman Z-score = $\alpha + \beta_1 DR_{it} + \beta_2 ROA_{it} + \beta_3 CAR_{it} + \beta_4 ICR_{it} + \beta_5 LDR_{it} + \beta_6 RA + e_{it}$ where, the dependent variable is Altman Z-score (Altman Z-score as measured by $1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4$ where X_1 represents as working capital/total assets, X_2 represents as retained earnings/total assets, X_3 represents as EBIT/total assets, and X_4 represents as market value of equity/total liabilities). The independent variables are DR (Debt ratio as measured by the ratio of total debt to total assets, in percentage), ROA (Return on assets as measured by the ratio of net profit to total assets, in percentage), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted assets, in percentage), ICR (Interest coverage ratio as measured by the ratio of earnings before interest and tax to interest expenses, in percentage), LDR (Loan to deposit ratio as measured by the ratio of total loan to total deposit, in percentage), and RA (Retained earnings to total assets as measured by the ratio of retained earnings to total assets, in times).

| Model | Intercept | Regression coefficients of | | | | | | Adj. R_bar² | SEE | F-value |
		DR	ROA	CAR	ICR	LDR	RA			
1	1.354 (33.930)**	-0.011 (0.922)						0.002	0.293	0.849
2	0.960 (11.968)**		0.218 (4.864)**					0.186	0.264	23.655
3	0.587 (4.719)**			0.053 (6.097)**				0.268	0.251	37.179
4	1.328 (27.220)**				0.001 (0.024)			0.011	0.294	0.009
5	0.756 (2.476)*					0.007 (1.880)		0.025	0.289	3.543
6	1.325 (44.259)**						0.101 (0.580)	0.007	0.294	0.336
7	0.964 (10.732)**	-0.001 (0.102)	0.217 (4.732)**					0.178	0.265	11.713
8	0.615 (2.301)*			0.053 (5.670)**		0.210 (0.605)		0.260	0.252	18.41
9	0.981 (10.832)**	-0.001 (0.084)	0.24 (4.978)**		0.081 (1.535)		0.053 (0.335)	0.183	0.265	6.539
10	0.559 (2.178)*	-0.013 (1.276)	0.173 (3.877)**	0.048 (5.334)**	0.072 (1.538)	0.001 (0.429)	0.045 (0.323)	0.370	0.232	10.682

Notes:

  i.   Figures in parenthesis are t-value
  ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
  iii. Altman Z-score is the dependent variable.

Table 4 shows that the beta coefficients for debt ratio are negative with Altman Z-score. It indicates that debt ratio has a negative impact on Altman Z-score. This finding is not consistent with the findings of Kartika (2018). In contrast, the beta coefficients for return on assets are positive with Altman Z-score. It indicates that return on assets has a positive impact on Altman Z-score. This finding is consistent with the findings of Aslamiah *et al.* (2023). Similarly, the beta coefficients for capital adequacy ratio are positive with Altman Z-score. It indicates that capital adequacy ratio has a positive impact on Altman Z-score. This finding is not consistent with the findings of Toby and Danjuma (2021). Likewise, the beta coefficients for interest coverage ratio are positive with Altman Z-score. It indicates that interest coverage ratio has a positive impact on Altman Z-score. This finding is consistent

with the findings of Haris *et al.* (2022). Further, the beta coefficients for loan to deposit ratio are positive with Altman Z-score. It indicates that loan to deposit ratio has a positive impact on Altman Z-score. This finding is similar to the findings of Setiany (2021). In addition, the beta coefficients for retained earnings to total assets are positive with Altman Z-score. It indicates that retained earnings to total assets has a positive impact on Altman Z-score. This finding is not similar to the findings of Kinanti and Muhyarsyah (2023).

Table 5 shows the estimated regression results of debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, and loan to deposit ratio on non-performing loan.

Table 5

Estimated regression results of debt ratio, return on assets, capital adequacy ratio, interest coverage ratio, retained earnings to total assets, and loan to deposit ratio on non-performing loan

Model	Intercept	Regression coefficients of						Adj. R_bar²	SEE	F-value
		DR	ROA	CAR	ICR	LDR	RA			
1	1.893 (10.242)**	-0.010 (0.179)						0.010	1.359	0.032
2	1.777 (4.309)**		-0.055 0.240					0.012	1.359	0.058
3	1.485 (2.209)*			-0.027 (0.585)				0.007	1.357	0.343
4	1.7091 (7.591)**				-0.240 (0.951)			0.001	1.353	0.904
5	0.756 (0.529)					0.013 (0.783)		0.004	1.355	0.613
6	1.886 (13.651)**						-0.487 (0.606)	0.007	1.357	0.367
7	1.805 (3.908)**	-0.008 (0.136)	-0.049 (0.209)					0.021	1.366	0.038
8	0.714 (0.494)			-0.016 (0.314)		0.011 (0.605)		0.013	1.362	1.353
9	1.766 (3.765)**	-0.01 (0.165)	-0.014 (0.056)		-0.231 (0.854)		-0.435 (0.532)	0.029	1.372	0.296
10	0.216 (0.142)	-0.028 (0.461)	-0.0096 (0.362)	-0.017 (0.324)	-0.283 (1.025)	0.017 (0.895)	-0.520 (0.630)	0.038	1.378	0.397

Notes:

i. Figures in parenthesis are t-value
ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.
iii. Non-performing loan is the dependent variable.

Table 5 shows that the beta coefficients for debt ratio are negative with non-performing loan. It indicates that debt ratio has a negative impact on non-performing loan. This finding is inconsistent with the findings of Supriyanto and Darmawan (2018). Similarly, the beta coefficients for return on assets are negative with non-performing loan. It indicates that return on assets has a negative impact on non-performing loan. This finding is not consistent with the findings of Poniwatie *et al.* (2021). Likewise, the beta coefficients for capital adequacy ratio are negative with non-performing loan. It indicates that capital adequacy ratio has a negative impact on non-performing loan. This finding is consistent with the findings of Buchdadi *et al.* (2020). Further, the beta coefficients for interest coverage ratio are negative with non-performing loan. It indicates that interest coverage ratio has a negative impact on non-performing loan. This finding is not consistent with the findings of Suranta *et al.* (2023).

In addition, the beta coefficients for loan to deposit ratio are positive with non-performing loan. It indicates that loan to deposit ratio has a positive impact on non-performing loan. This finding is similar to the findings of Margaretha and Wijaya (2023). Moreover, the beta coefficients for retained earnings to total assets are negative with non-performing loan. It indicates that retained earnings to total assets has a negative impact on non-performing loan. This finding is similar to the findings of Kusumawati *et al.* (2024).

4. Summary and conclusion

Financial distress in the banking sector refers to a situation where banks experience severe financial challenges that threaten solvency capacity and ability to operate effectively. Such condition often arises due to a significant decline in the value of a bank's assets, excessive non-performing loans, inadequate capital reserves, or poor risk management practices. When banks face financial distress, banks may struggle to meet their obligations to depositors, creditors, and other stakeholders, leading to a loss of confidence among customers and investors. This can trigger a liquidity crisis, where banks are unable to access sufficient funds to meet short-term liabilities, further exacerbating the problem. Financial distress is a situation in which a company's operating cash flow is not sufficient to cover current obligations, such as trade credits or interest expenses, and the company is forced to take corrective action and undergo financial restructuring. Financial distress occurs because the company is unable to manage and maintain the stability of the company's financial performance, which stems from a failure to promote the products it makes which causes sales to decline, so that the income decreases from the lack of sales, which allows the company to experience losses operating and net losses for the current year.

This study attempts to examine the indicators of financial distress condition in Nepalese banking industry. This study is based on the secondary data 10 commercial banks out of 18 commercial banks leading to a total of 100 observations.

The major conclusion of this study is that debt ratio has a negative impact on Altman Z-score and non-performing loan. It indicates that higher the debt ratio, lower would be the Altman Z-score and non-performing loan. Similarly, return on assets has a positive impact on Altman Z-score. It indicates that increase in return on assets leads to increase in Altman Z-score. In contrast, return on assets has a negative impact on non-performing loan. It indicates that increase in return on assets leads to decrease in non-performing loan. However, capital adequacy ratio has a positive impact on Altman Z-score. It indicates that higher the capital adequacy ratio, higher would be the Altman Z-score. In contrast, capital adequacy ratio has a negative impact on non-performing loan. It indicates that increase in capital adequacy ratio leads to decrease in non-performing loan. In addition, interest coverage ratio has a positive impact on Altman Z-score. It indicates that higher the interest coverage ratio, higher would be the Altman Z-score. In contrast, interest coverage ratio has a negative impact on non-performing loan. It indicates that increase in interest coverage ratio leads to decrease in non-performing loan. Moreover, loan to deposit ratio has a positive impact on Altman Z-score and non-performing loan. It indicates that higher the loan to deposit ratio, higher would be the Altman Z-score and non-performing loan. The study also concluded that return on assets followed by capital adequacy ratio is the most influencing factor that explains the changes in the Altman Z-score in the context of Nepalese commercial banks. Likewise, the study also concluded that retained earnings to total assets followed by interest coverage ratio is the most influencing factor that explains the changes in the non-performing loan in the

context of Nepalese commercial banks.

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