Impact of Operating Efficiency on Profitability of Nepalese Commercial Banks

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Abstract

The study examines the effect of operating efficiency on the profitability of Nepalese commercial banks. Return on assets and return on equity are selected as the dependent variables. The selected independent variables are capital adequacy ratio, operating expenses, net interest income, leverage, loan to deposit ratio and bank size. The study is based on secondary data of 16 commercial banks with 112 observations for the period from 2015/16 to 2021/22. The data were collected from Banking and Financial Statistics published by Nepal Rastra Bank, publications and websites of Nepal Rastra Bank (NRB) and annual reports of the selected commercial banks. The correlation coefficients and regression models are estimated to test the significance and importance of operating efficiency on the profitability of Nepalese commercial banks.

The study showed that capital adequacy ratio has a positive impact on return on assets and return on equity. It means that increase in capital adequacy ratio leads to increase in return on assets and return on equity. Similarly, operating expenses has a negative impact on return on assets and return on equity. It means that increase in operating expenses leads to decrease in return on assets and return on equity. Further, the study showed that net interest income has a positive impact on return on assets and return on equity. It means that increase in net interest income leads to increase in return on assets and return on equity. Likewise, leverage has a negative impact on return on assets. It means that increase in leverage ratio leads to decrease in return on asset. Furthermore, loan to deposit ratio has a negative impact on return on asset and return on equity. It indicates that increase in loan to deposit ratio leads to decrease in return on asset and return on equity. In addition, bank size has a negative impact on return on assets and return on equity. It shows that larger the bank size, lower would be the return on assets and return on equity.

Keywords: capital adequacy ratio, operating expenses, net interest income, leverage, loan to deposit ratio, return on equity, return on assets

1. Introduction

Current commercial banking is the main character of present economy as it makes flow of the resources. The primary growth of any country depends upon the robust banking system. Commercial banks are the main pillar of the financial system of any nation as banks provide different opportunity and

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services to clients. The importance of the banking sectors is immense in the progress and richness of any state. The economic development and prosperity come from the well-rounded developed and perfect banking system. Strong banking system plays important role in efficient allocation and utilization of credit (Tariq et al., 2014). Commercial banks are important to the financial segment, particularly in developing economies where capital markets are not well developed and strong. Commercial banks' profitability is important because the soundness of an industry is closely connected to soundness of the whole economy. Profitability of the banking sector is also central as the well-being of the industry is closely associated with the wellness of the whole economy in general. Thus, a proficient and productive banking sector is able and better placed to endure negative economic shocks. Berger (1995) revealed that highly efficient firm can maximize profit relative to its competitors by maintaining its current size and pricing strategy or by reducing prices and expanding its operations. Additionally, Hussein and Ahmad (2007) revealed that efficiency levels are different among the various branches of the bank. The study suggested that bank can reduce employee's expenses and other operating expenses along with an increase in the total loan portfolio by giving focus on operational improvement efforts. The study also explained that interest and non-interest revenues are required to increase to improve profitability efficiency of the whole branch network. The operational efficiency aspect for any type of business is vital and must be considered by managements in order to earn healthy and sustainable financial performances. Improving operational efficiency has direct impact on the organizations profit margins and efficient firms are more cost-effective. Operational efficiency is the proficiency of a corporation to curtail the unwelcome and maximize resource capabilities so as to deliver quality products and services to customers. An organizational operational efficiency depends on factors like skillful and proficient workers, proper technological progression, proper procurement, return to scale etc.

Sihotang et al. (2022) assessed the influence of internal and external factors on profitability as proxied by return on assets in Islamic Commercial Banks for the 2016-2020 period. The results showed that inflation as an external factor does not have a significant effect on the profitability of Islamic Commercial Banks as measured by the Return on Assets (ROA) ratio with a significance level of 0.628 and the money supply has a significant effect on ROA. However, the operating expense ratio as internal factors have a significant effect on ROA. Phan et al. (2020) investigated the factors affecting the profitability of listed commercial banks in Vietnam. The results showed that operating efficiency, loans size, retail loans ratio, state ownership, inflation rate, and GDP growth are factors that have a positive impact on profitability. On the other hand, variables such as capital size, credit risk, liquidity risk, bank size, and revenue diversification are statistically insignificant. Hasan

et al. (2020) explored the determinants of bank profitability with size as moderating variable. Internal ratio and macroeconomics variable are used to determine bank profitability. The study found that net interest margin, ratio of operational expenses to operational profit, capital adequacy ratio and loan to deposits ratio significantly influence the bank profitability. Net interest margin, non-performing loan, ratio of operational expenses to operational profit, and loan to deposits ratio significantly the bank profitability. Sporta *et al.* (2017) analysed operational efficiency as a financial distress factoras well as draw inferences on its relationship with financial performance measured by return on assets (ROA) and return of equity (ROE). The results indicated that there exists a positive significant relationship between operational efficiency and financial performance.

Ariffin and Tafri (2014) examined the various factors which affect the banking operations in Pakistan and to assess the effect of assets quality on the performance of both large banking institutions and small banking institutions. The sudy concluded that the operating efficiency ratio has negative impact on return on assets as performance. Frederick (2015) investigated the factors affecting performance of commercial banks in Unganda. The study found that management efficiency; assets quality, interest income; capital adequacy and inflation are factors affecting the performance of domestic commercial banks in Uganda. The result revealed that operating efficiency ratio has significant and negative impact on return on assets as performance. Christari and Kurnia (2016) examined the impact of capital adequacy ratio (CAR), credit to deposit ratio (CDR), operational efficiency proxies by operational expense to operating income ratio (BOPO) and non-performing loan (NPL) on bank profitability represented by return on assets. The result showed that CAR, CDR, and NPL simultaneously have a significant impact towards ROA. Similarly, the study also revealed that operational expense to operating income ratio has significant impact towards banking profitability. Profitability was one of the main reasons for the existence of business enterprises, and business enterprises continue their operation by making profits.

Rizal and Rofiqo (2020) examined the effect of sharia banking characteristics such as capital adequacy ratio, financing to deposit ratio, non-performing financing, operating expenses to operations revenue on return on assets. The analysis showed that the capital adequacy ratio, non-performing financing, operating expenses to operations revenue variables significantly influence return on assets, but financing to deposit ratio has no effect on return on assets. Belas *et al.* (2019) examined the cost efficiency of banking sectors within the European Union (EU) countries during the period 2008-2017. The study showed that cost efficiency was mainly explained by the capitalization, profitability, loan risk, market structure and conditions of the economy and development of inflation. The study also found that there was

negative and insignificant relationship between efficiency (cost to income ratio) and profitability of banks. Adam *et al.* (2018) analyzed the influence of company size, liquidity and operational efficiency on bank profitability with problem credit risk as a moderating variable at commercial banks that are listed on the Indonesia stock exchange. The results of the study found that the size of the company negatively affected profitability, whereas operational efficiency negatively affected profitability. Moreover, operational efficiency has a positive effect on problem credit risk. Salami and Uthman (2018) examined the impact of bank capital and stability on financial performance of banks. The study showed that there has a negative relationship between cost to income ratio and profitability and stability of banks. The study also found that operating efficiency measured by cost-to income ratio has negative impact on bank performance.

In the context of Nepal, Mahaseth *et al.* (2022) showed that equity capital to total assets, core capital to risk weighted assets, total capital to total assets, bank size and assets to liabilities ratio have positive impact on return on asset of Nepalese commercial banks. Similarly, core capital to total assets, cost income ratio and debt to equity ratio have negative impact on return on asset. Chalise (2019) examined the impact of capital adequacy and cost-income ratio on the performance of Nepalese commercial banks. The study revealed that cost-income ratio has negative significant impact on banks performance and total capital adequacy has negative insignificant impact with bank performance (ROA). However, debt-equity ratio and bank size have positive insignificant impact on bank performance. Similarly, equity ratio has a positive and significant impact on bank performance. Moreover, Shrestha (2020) investigated the determinants of financial performance of Nepalese commercial banks. The study revealed that management efficiency, asset quality and operational efficiency have significant positive impact on the financial performance of Nepalese commercial banks. Bariya *et al*. (2016) revealed that there is a positive relationship of return on assets with financial leverage, asset quality and liquidity ratio which indicates that increase in financial leverage, assets quality and liquidity ratio leads to increase in profitability.

The above discussion shows that empirical evidences vary greatly across the studies concerning on the effect of operating efficiency on the profitability of commercial banks. 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 main purpose of the study is to analyze the effect of operating efficiency on the profitability of Nepalese commercial banks. Specifically, it examines the relationship of capital adequacy ratio, operating expenses, net

interest income, leverage, loan to deposit ratio and bank size with return on equity and return on assets in the context of Nepalese commercial banks.

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 the conclusion.

2. Methodological aspects

The study is based on the secondary data which were gathered from 16 Nepalese commercial banks for the study period from 2015/16to 2021/22, leading to a total of 112 observations. The study has employed purposive sampling method. The main sources of data include Banking and Financial Statistics published by Nepal Rastra Bank, reports published by Ministry of Finance and the annual report of respective banks. This study is based on descriptive as well as causal comparative research designs. Table 1 shows the list of commercial banks selected for the study along with the study period and number of observations.

Table 1

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

S.N.	Name of the commercial banks	Study period	Observations
1	Citizens Bank International Limited	2015/16-2021/22	7
2	Everest Bank Limited Nepal Bank Limited	2015/16-2021/22	7
3	Global IME Bank Limited	2015/16-2021/22	7
4	Himalayan Bank Limited	2015/16-2021/22	7
5	Kumari Bank Limited	2015/16-2021/22	7
6	Laxmi Sunrise Bank Limited	2015/16-2021/22	7
7	Machhapuchchhre Bank Limited	2015/16-2021/22	7
8	Nabil Bank Limited	2015/16-2021/22	7
9	Nepal SBI Bank Limited	2015/16-2021/22	7
10	NIC Asia Bank Limited	2015/16-2021/22	7
11	NMB Bank Limited	2015/16-2021/22	7
12	Siddhartha Bank Limited	2015/16-2021/22	7
13	Prabhu Bank Limited	2015/16-2021/22	7
14	Prime Commercial Bank Limited	2015/16-2021/22	7
15	Sanima Bank Limited	2015/16-2021/22	7
16	Standard Chartered Bank Nepal Limited	2015/16-2021/22	7
Total number of observations			**112**

Thus, the study is based on 112 observations.

The model

The model estimated in this study assumes that the profitability depends on operating efficiency. The dependent variables selected for the study are return on assets and return on equity. Similarly, the selected independent variables are capital adequacy ratio, operating expenses, net interest income, leverage, loan to deposit ratio and bank size. Therefore, the models take the following forms:

$$ROE = \beta_0 + \beta_1\ OE + \beta_2\ NII + \beta_3\ CAR + \beta_4\ LEV + \beta_5\ LTD + \beta_6\ BS + \varepsilon_t$$

$$ROA = \beta_0 + \beta_1\ OE + \beta_2\ NII + \beta_3\ CAR + \beta_4\ LEV + \beta_5\ LTD + \beta_6\ BS + \varepsilon_t$$

Where,

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

ROE = Return on equity as measured by the ratio of net income to total equity, in percent.

OE= Operating expenses as measured by the cost incurred by the bank for its operating activities, in percent.

NII= Net interest income as measured by the difference between interest income and interest expenses, Rs in million.

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

LEV= Leverage ratio as measured by the ratio of total debts to total assets, in percent.

LTD = Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percent.

BS = Bank size as measured by the total assets, Rs in million.

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

Loan to deposit ratio

Loan-to-deposit ratio (LDR) is used to assess a bank's liquidity by comparing a bank's total loans to its total deposits for the same period. High ratio refers to the bank's inadequate liquidity to cover any unforeseen fund requirements. Conversely, lower ratio indicates inadequate lending opportunities or reluctance to accept the available lending risks (McNaughton and Barltrop, 1992). Golubeva *et al.* (2019) showed that loan to deposit ratio has a negative relationship with return on equity. Mohanty and Krishnankutty (2018) showed that return on asset has a negative and significant relationship with loan to deposit ratio. Mehta and Bhavani (2017) concluded that loan to deposit ratio is negatively related to return on assets and return on equity.

Based on it, this study develops the following hypothesis:

H$_1$: There is a negative relationship between loan to deposit ratio and bank profitability.

Operating expenses

Operational efficiency is narrowly defined as the ability to deliver products and services cost effectively without sacrificing quality. More efficient firms tend to maintain more stability levels in terms of output and operating performance compared to their other industry peers (Mills and Schumann, 1985). If firms operate more efficiently, they might expect improved productivity and consequently profitability. Iloska (2014) indicated that staff expenses, bank size and the share of loans in total assets have positive impact on the profitability. Tariq *et al.* (2014) stated that profitability has become a key factor for running the business smoothly and has a significant effect on both performance of the bank and economic development in today's competitive world. Based on it, this study develops the following hypothesis:

H$_2$: There is a positive relationship between operational efficiency and bank profitability.

Net interest income

Net interest income is also used to measure the bank's management capability to generate interest income by taking into account the performance of banks to disburse loans. Rahman et al. (2015) analyzed capital strength, credit risk, ownership structure, bank size, non-interest income, cost efficiency, off-balance sheet activities, liquidity as potential bank specific determinants as well as growth in gross domestic products, inflation as potential macroeconomic determinants of bank profitability by taking 25 commercial banks from Bangladesh for a period range from 2006 to 2013. The empirical findings showed that capital strength (both regulatory capital and equity capital), interest income and loan intensity have positive and significant impact on profitability. Sufian (2012) investigated the performance of 77 commercial banks taken from Pakistan, Sri Lanka and Bangladeshi during the period from 1997 to 2008. The empirical results showed that credit risk, liquidity, capitalization and interest income have significant and positive impacts on the performance of banks Based on it, this study develops the following hypothesis:

H$_3$: There is a positive relationship between net interest income and bank profitability.

Capital adequacy ratio

Al-Sharkas and Al-Sharkas (2022) assessed the potential impact of capital adequacy ratios on bank profitability in a Jordanian context by using

static panel data for a sample of 24 banks covering the period 2008–2018. The study revealed that ROE is positively affected by both core capital to risk-weighted assets ratio and total capital to risk weighted assets ratio. Capraru and Ihnatov (2014) evaluated the main determinants of profitability in five selected Central and Eastern European countries over the period 2004–2011, by using return on assets, return on equity, and net interest margin as proxies for bank profitability. the study revealed that management efficiency and capital adequacy growth influence bank profitability for all performance indicators, while credit risk and inflation impact only return on assets and return on equity. The result also showed that banks tend to be more profitable if higher capital adequacy is enforced. The safety and solvency of the banking institutions are related to the banks' capital. Spaseska et al. (2022) analyzed the impact of the capital adequacy ratio on the banks' profitability in North Macedonia. The empirical study is based on the utilization of the Auto-Regressive Distributed Lag (ARDL) method for time series analysis via EViews v10. The results of the study have showed that there is a positive, yet statistically insignificant relationship between the Capital Adequacy Ratio (CAR) and the Return on Average Assets (ROAA) of the Macedonian banks, both in the short- and long-run. Based on it, this study develops the following hypothesis:

H_4: *There is a positive relationship between capital adequacy ratio and bank profitability.*

Leverage

Leverage is considered to be an important determinant of the bank's profitability. Husna and Satria (2019) determined the effect of return on assets, debt to asset ratio (DAR), current ratio (CR), firm size, and dividend payout ratio (DPR) to the firm value of manufacturing companies listed in Indonesia Stock Exchange for the period 2013-2016. The study found that the return on asset and firm size have effects on firm value. However, current ratio and leverage ratio have negative effects on firm value. In addition, Pham (2021) showed that banks' characteristics, bank size and financial leverage have negative impact on bank performance. Fumani (2015) examined the effect of capital structure on firm value, the rate of return on equity and earnings per share of listed companies in Tehran stock exchange. The study showed that there is a significant negative relationship between return on equity and leverage ratio. Based on it, this study develops the following hypothesis:

H_5: *There is a negative relationship between leverage and bank profitability.*

Bank size

Bank size is also regarded as one of the important determinants of the bank's profitability, but the bank's total assets represent only on-balance

sheet activities and ignore off-balance sheet activities. Larger banks could benefit from economies of scale and greater diversification, which reduces risk and cost, and increases banks' profitability (Sinha and Sharma, 2015). Dietrich and Wanzenried (2014) argued that larger banks, as compared to smaller banks, are likely to have both economies of scale (increased operational efficiency) and economies of scope (higher degree of product and loan diversification) advantages. Larger banks may have better opportunities for income diversification because they can reach out to new markets and reduce income volatility (Ahamed, 2017). Based on it, this study develops the following hypothesis:

H_6: *There is a positive relationship between bank size and bank profitability.*

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of selected dependent and independent variables during the period 2015/16 to 2021/22.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 16 Nepalese commercial banks for the study period of 2015/16 to 2021/22. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percent) and ROE (Return on equity as measured by the ratio of net income to total equity, in percent). The independent variables are OE (Operating expenses as measured by the cost incurred by the bank for its operating activities, in percent), NII (Net interest income as measured by the difference between interest income and interest expenses, Rs in million), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percent), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), BS (Bank size as measured by the total assets, Rs in million) and LEV (Leverage ratio as measured by the ratio of total debts to total assets, in percent).

Variables	Minimum	Maximum	Mean	S.D.
ROE	6.26	22.17	13.85	3.57
ROA	0.70	2.61	1.52	0.45
CAR	10.84	22.99	13.38	1.92
OE	862.71	9780.72	2411.76	1411.88
NII	0.14	4.96	1.97	0.91
LEV	83.03	99.60	89.28	2.37
LTD	63.20	89.79	77.31	5.08
BS	42.74	419.82	146.17	73.52

Source: SPSS output

Correlation analysis

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

Table 3

Pearson's correlation coefficients matrix

This table shows the bivariate Pearson's correlation coefficients of dependent and independent variables of 16 Nepalese commercial banks for the study period from 2015/16 to 2020/21. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percent) and ROE (Return on equity as measured by the ratio of net income to total equity, in percent). The independent variables are OE (Operating expenses as measured by the cost incurred by the bank for its operating activities, in percent), NII (Net interest income as measured by the difference between interest income and interest expenses, Rs in million), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percent), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), BS (Bank size as measured by the total assets, Rs in million) and LEV (Leverage ratio as measured by the ratio of total debts to total assets, in percent).

Variables	ROE	ROA	CAR	OE	NII	LEV	LTD	BS
ROE	1							
ROA	0.754**	1						
CAR	0.146	0.254**	1					
OE	-0.136	-0.222*	-0.046	1				
NII	0.189*	0.197*	0.005	0.360**	1			
LEV	0.231*	-0.334**	-0.482**	0.200*	-0.077	1		
LTD	-0.228*	-0.305**	-0.262**	0.16	0.137	0.14	1	
BS	-0.240*	-0.398**	-0.14	0.481**	0.680**	0.220*	0.402**	1

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

Table 3 shows that capital adequacy ratio has a positive relationship with return on equity. It means that increase in capital adequacy ratio leads to increase in return on equity. Similarly, operating expenses has a negative relationship with return on equity. It means that increase in operating expenses leads to decrease in return on equity. Further, the study shows that there is a positive relationship between net interest income and return on equity. It means that increase in net interest income leads to increase in return on equity. Likewise, leverage has a positive relationship with return on equity. It means that increase in leverage ratio leads to increase in return on equity. Furthermore, there is a negative relationship between loan to deposit ratio and return on equity. It indicates that increase in loan to deposit ratio leads to decrease in return on equity. In addition, bank size has a negative relationship

with return on equity. It shows that larger the bank size, lower would be the return on equity.

On the other hand, the result also shows that capital adequacy ratio has a positive relationship with return on assets. It means that increase in capital adequacy ratio leads to increase in return on assets. Similarly, operating expenses has a negative relationship with return on assets. It means that increase in operating expenses leads to decrease in return on assets. Further, the study shows that there is a positive relationship between net interest income and return on assets. It means that increase in net interest income leads to increase in return on assets. Likewise, leverage has a negative relationship with return on assets. It means that increase in leverage ratio leads to decrease in return on assets. Furthermore, there is a negative relationship between loan to deposit ratio and return on assets. It indicates that increase in loan to deposit ratio leads to decrease in return on assets. In addition, bank size has a negative relationship with return on assets. It shows that larger the bank size, lower would be the return on assets.

Regression analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and the results are presented in Table 4 and Table 5. More specifically, Table 4 shows the regression results of capital adequacy ratio, operating expenses, net interest income, leverage, loan to deposit ratio and bank size with return on equity of Nepalese commercial banks.

Table 4

Estimated regression results of capital adequacy ratio, operating expenses, net interest income, leverage, loan to deposit ratio and bank size on return on equity

The results are based on panel data of 16 Nepalese commercial banks with 112 observations for period 2015/2016-2021/2022 by using linear regression model. The model is $ROE = \beta_o + \beta_1\ OE + \beta_2\ NII + \beta_3\ CAR + \beta_4\ LEV + \beta_5\ LTD + \beta_6\ BS + \varepsilon_t$ where the dependent variables is ROE (Return on equity as measured by the ratio of net income to total equity, in percent). The independent variables are OE (Operating expenses as measured by the cost incurred by the bank for its operating activities, in percent), NII (Net interest income as measured by the difference between interest income and interest expenses, Rs in million), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percent), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), BS (Bank size as measured by the total assets, Rs in million) and LEV (Leverage ratio as measured by the ratio of total debts to total assets, in percent).

Model	Intercept	Regression coefficients of						Adj. R_bar²	SEE	F-value
		CAR	OE	NII	LEV	LDR	BS			
1	17.463 (7.397)	0.270 (1.545)						0.012	3.553	2.374
2	14.679 (22.006)		-0.002 (1.436)					0.009	3.565	2.063
3	12.394 (15.61)			0.739 (2.022)				0.027	3.552	4.039
4	-17.146 (1.379)				0.347 (2.494)			0.045	3.439	6.219
5	26.203 (5.188)					-0.160 (2.451)		0.043	3.493	6.006
6	15.556 (21.163)						-0.012 (2.594)	0.049	3.482	6.733
7	18.497 (7.57)	0.282 (1.622)	-0.014 (1.521)					0.024	3.543	2.365
8	17.122 (7.085)	0.293 (1.742)	-0.097 (2.493)	1.084 (2.852)				0.085	3.413	4.393
9	-28.723 (1.883)	0.019 (0.101)	-0.102 (3.269)	1.280 (3.440)	0.473 (3.040)			0.149	3.294	5.854
10	-11.128 (0.720)	0.160 (0.88)	-0.101 (3.045)	1.394 (3.908)	0.474 (3.190)	-0.209 (3.386)		0.225	3.145	7.436
11	-47.286 (3.549)	0.102 (0.696)	-0.021 (1.622)	3.376 (8.719)	0.742 (5.591)	-0.046 (0.843)	-0.042 (7.638)	0.497	2.537	19.272

Notes:

i. Figures in parenthesis are t-values.

ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.

iii. Return on equity is the dependent variable.

Table 4 shows that the beta coefficients for capital adequacy ratio are positive with return on equity. It indicates that capital adequacy ratio has a positive impact on return on equity. This finding is similar to the findings of Spaseska et al. (2022). Likewise, the beta coefficients for operating expenses are negative with return on equity. It indicates that operating expenses has a negative impact on return on equity. This finding is consistent with the findings of Tariq *et al.* (2014). Similarly, the beta coefficients for net interest income are positive with return on equity. It indicates that net interest income has a positive impact on return on equity. This finding is similar to the findings of Rahman et al. (2015). Further, the beta coefficients for leverage are positive with return on equity. It indicates that leverage has a positive impact on return on equity. This finding is inconsistent with the findings of Husna and Satria (2019). Moreover, the beta coefficients for bank size are negative with return on equity. It indicates that bank size has a negative impact on return on equity. This finding contradicts with the findings of Dietrich and Wanzenried (2014).

Table 5 shows the estimated regression results of capital adequacy ratio, operating expenses, net interest income, leverage, loan to deposit ratio and bank size with return on assets of Nepalese commercial banks.

Table 5

Estimated regression results of capital adequacy ratio, operating expenses,

net interest income, leverage, loan to deposit ratio and bank size on return on assets

The results are based on panel data of 16 Nepalese commercial banks with 112 observations for period 2015/2016-2021/2022 by using linear regression model. The model is ROA = β_o+ β_1 OE + β_2 NII + β_3 CAR + β_4 LEV + β_5 LTD + β_6 BS +ε_t where the dependent variables is ROA (Return on assets as measured by the ratio of net income to total assets, in percent). The independent variables are OE (Operating expenses as measured by the cost incurred by the bank for its operating activities, in percent), NII (Net interest income as measured by the difference between interest income and interest expenses, Rs in million), LTD (Loan to deposit ratio as measured by the ratio of total loans to total deposits, in percent), CAR (Capital adequacy ratio as measured by the ratio of total capital to total risk weighted exposure, in percentage), BS (Bank size as measured by the total assets, Rs in million) and LEV (Leverage ratio as measured by the ratio of total debts to total assets, in percent).

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		CAR	OE	NII	LEV	LDR	BS			
1	19.079 (13.086)	0.154 (0.069)						0.005	1.975	0.484
2	19.865 (49.485)**		-0.231 (0.627)					0.006	1.976	0.393
3	20.016 (75.858)**			0.122 (0.387)				0.008	1.979	0.150
4	20.257 (14.264)**				-0.056 (0.123)			0.001	1.98	0.015
5	19.704 (35.975)**					-0.436 (0.744)		0.004	1.975	0.553
6	28.819 (8.083)**						-9.817 (2.435)*	0.047	1.924	5.930
7	18.919 (12.713)**	0.147 (0.660)	-0.218 (0.588)					0.120	1.982	0.413
8	18.634 (11.921)**	0.167 (0.741)	-0.259 (0.686)	0.200 (0.613)				0.018	1.988	0.399
9	19.027 (9.981)**	0.186 (0.801)	-0.273 (0.171)	0.204 (0.622)	-0.172 (0.363)			0.027	1.997	0.330
10	18.459 (8.951)**	0.181 (0.777)	-0.280 (0.732)	0.213 (0.648)	-1.06 (0.220)	-0.444 (0.733)		0.032	2.002	0.370
11	28.148 (7.062)**	0.212 (0.938)	-0.386 (1.041)	0.497 (1.488)	-0.072 (0.154)	-0.488 (0.833)	-12.070 (2.807)**	0.037	1.933	1.643

Notes:

i. Figures in parenthesis are t-values.

ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.

iii. Return on assets is the dependent variable.

Table 5 shows that the beta coefficients for capital adequacy ratio are positive with return on assets. It indicates that capital adequacy ratio has a positive impact on return on assets. This finding is similar to the findings of Capraru and Ihnatov (2014). Likewise, the beta coefficients for operating expenses are negative with return on assets. It indicates that operating expenses has a negative impact on return on assets. This finding is consistent with the findings of Iloska (2014). Similarly, the beta coefficients for net interest income are positive with return on assets. It indicates that net interest

income has a positive impact on return on assets. This finding is similar to the findings of Sufian (2012). Further, the beta coefficients for leverage are negative with return on assets. It indicates that leverage has a negative impact on return on assets. This finding is consistent with the findings of Fumani (2015). Moreover, the beta coefficients for bank size are negative with return on assets. It indicates that bank size has a negative impact on return on assets. This finding contradicts with the findings of Ahamed (2017).

4. Summary and conclusion

A profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system. The profitability of a financial institution is affected by numerous factors. These factors include elements internal to each financial institution and several important external forces shaping earnings performance. The survival and continuity of the banking business mostly depend on the level of its ability to gain profit while the stability of the banking sector has been a major concern for the economy. The banking sector possesses different kinds of threats and risks. A fragile funding basis accompanied by high exposure to market risk in an environment of reforms and macroeconomic disturbances is the typical precursor of bank distress.

This study attempts to analyze the relationship between operating efficiency and profitability of Nepalese commercial banks. The study is based on secondary data of 16 commercial banks with 112 observations for the period from 2015-16 to 2021/22.

The study showed that capital adequacy ratio and net interest income have positive effect on return on assets and return on equity of Nepalese commercial banks. However, operating expenses, loan to deposit ratio and bank size have negative effect on return on assets and return on equity of Nepalese commercial banks. The study concluded that high operating expenses can reduce the overall profit margins of a bank. If a bank is not efficiently managing its costs, it may find it challenging to generate sufficient profits from its core banking activities. Likewise, the study also concluded that high operating expenses put pressure on a bank to generate higher revenue to maintain profitability. If revenue generation does not keep pace with expenses, it can result in reduced profits or even losses.

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