Efficiency and Productivity of Banking Sector in Nepal

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Abstract

This study examines the efficiency and productivity of banking sector in Nepal. Efficiency and productivity are the selected dependent variables. The selected independent variables are capital, deposit, human resource cost, loan and advances, bank credit, and bank size. The study is based on secondary data of 10 commercial banks with 100 observations for the study period from 2014/15 to 2023/24. The data were collected from Bank Supervision Report published by 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 efficiency and productivity of banking sector in Nepal.

The study showed that capital has a positive impact on efficiency and productivity. It indicates that increase in capital leads to increase in efficiency and productivity. Similarly, deposit has a positive impact on efficiency and productivity. It indicates that increase in deposit leads to increase in efficiency and productivity. Likewise, human resource cost has a positive impact on efficiency and productivity. It indicates that increase in expenses on human resource leads to increase in efficiency and productivity. Further, loan and advance have positive impact on efficiency and productivity. It indicates that higher the loan and advances, higher would be the efficiency and productivity. In addition, bank size has a positive impact on efficiency and productivity. It indicates that larger the bank size, higher would be the efficiency and productivity.

Keywords: capital, deposit, human resource cost, loan and advances, bank credit, bank size, efficiency, productivity

1. Introduction

The banking sector plays a vital role in the economic development of a country through the efficient intermediation of funds. The efficient intermediation of funds from savers to users enables the application of available resources to their most productive uses. A strong banking sector effectively channels funds and financial products in such a way as to strengthen the financial and economic system of any nation (Sharma *et al.,* 2013). The significant fluctuations in interest in efficiency may be associated with economic crises, which have considerably sharpened the focus on efficiency in the banking sector (Ghertescu *et al.,* 2024). The banks need to be efficient not only for the greater goal of economic growth but also for survival against its competitors. The banks have to invest in the cost-efficient technology and innovation to compete in the dynamic business (Ullah *et al.,* 2024). With the growth in banking activities, the efficiency has been the growing concern of commercial banks in order to remain competitive. So, due to the importance of the financial sector and its impact to the whole economy, financial sector development study and efficiency analysis is necessary. Evaluating profitability performance, it is merely easy to measure the efficiency and effectiveness of a bank's resource utilization during a specific period of time (Ngurah and Panji, 2021). Banking institutions of any nation play a significant role in structuring economic development and economic growth via the efficient intermediation of funds from borrowers to savers. A strong banking sector effectively channels funds and financial products in such a way as to strengthen the financial and economic system of any nation. Therefore, the sound performance of the banking sector has always been a key issue for researchers and policy

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makers charged with ensuring a strong and economically developed nation. Traditionally, the performance and efficacy of banking institutions is measured by financial ratios, but this approach has a major demerit in terms of its subjectivity and reliance on benchmarking ratios (Yeh, 1996).

The efficiency and productivity of the banking sector are fundamental to ensuring a robust financial system and sustained economic growth. Efficiency in banking refers to the ability of banks to minimize costs while maximizing outputs, such as deposits, loans, and profits. It encompasses operational efficiency, cost efficiency, and technical efficiency, all of which focus on optimal resource utilization. Factors such as the adoption of digital technology, effective internal controls, trained human resources, and strategic management significantly influence banking efficiency. On the other hand, productivity in the banking sector measures how effectively inputs like labor and capital are converted into valuable outputs. Higher productivity indicates that banks are generating more services or revenue with fewer resources. Labor productivity, capital productivity, and total factor productivity are commonly used measures to assess performance in this regard. The financial technology can improve profitability and decrease the leverage risk of any sized banks (Supiyevna, 2024). Similarly, Hasmiana and Pintor (2022) examined the effect of financial risk, capital structure, and liquidity on profitability through operational efficiency at state-owned banks and private commercial banks. The results showed that the financial risk, capital structure, liquidity, and operational efficiency have a significant effect on bank profitability. Likewise, Anggraeni *et al.* (2022) showed that operational efficiency ratio has a significant negative impact on both profitability. Further, Uddin (2022) revealed that operating efficiency has a negative and insignificant impact on profitability.

Shalehanti *et al.* (2021) revealed that ROA positively impacts efficiency, whereas technology exerts a notable negative influence on efficiency of banks. Similarly, Lestari (2021) examined the relationship between debt securities issuance and operational performance: An empirical study of banks in Indonesia. The study revealed that return on assets is influenced by efficiency proxies as net interest margin. Likewise, Rahma and Mayasari (2021) concluded that substantial size of a bank correlates with its large total assets, enabling such banks to conduct daily operations more effectively and optimize their available resources to a greater extent. Further, Otero *et al.* (2020) stated that the large banks tend to have better resources, relatively cheap transaction costs, can face competition, and can withstand economic shocks. The low bank efficiency can undermine profit generation potential, posing a significant risk to the bank's long-term sustainability (Ganefi *et al.,* 2020). In addition, 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 have positive impact on profitability. Moreover, Shah *et al.* (2019) evaluated the performance and productivity of sustainable banks. The study revealed that sustainable banks are more efficient and productive. The study also revealed that productivity of sustainable banks and non-sustainable banks are influenced by external and internal factors. Similarly, Fatema *et al.* (2019) investigated the relative technical efficiency and productivity change of Bangladeshi commercial banks during the period 2013 to 2017. The study found that listed commercial banks in Bangladesh were technically inefficient and also only 3 among the 19 banks employed in the study were displayed an overall improvement in productivity and sixteen banks presented an overall decline in productivity.

Osuagwu *et al.* (2018) examined the measuring technical efficiency and productivity

change in the Nigerian banking sector: A comparison of nonparametric and parametric techniques. The study revealed that the mean technical efficiency under SFA and total factor productivity change in DEA decreases as bank output moves toward non-interest or fee-based income. Similarly, Grmanova and Ivanova (2018) revealed that the largest banks in the Slovak national banking market are more efficient than other banks. Likewise, Bahrini (2017) analyzed the technical efficiency of Islamic banks in the Middle East and North Africa region during the period. The results showed that Islamic banks had stable efficiency scores during the global financial crisis and in the early post-crisis period. Further, Garamu (2016) assessed the technical efficiency and productivity of Ethiopian commercial banks using a Malmquist productivity index approach. The study showed that the total factor productivity change is 0.956% which showed a regress in total factor productivity. In addition, Gayval and Bajaj (2015) found a moderate consistency between parametric and nonparametric frontier methods in efficiency scores rankings, identification of best and worst performing banks, the stability of efficiency scores over time and correlation between frontier efficiency and accounting-based performance measures. Moreover, Adjei-Frimpong *et al.* (2015) found that New Zealand retail banks generally have high levels of efficiency.

In the context of Nepal, Gajurel (2023) examined the cost efficiency and its determinants for Nepalese commercial banks by using semi-parametric methodology. The study showed that the level and sources of bank efficiency helps reduce inefficiencies, formulate regulations to enhance the overall efficiency of the banking system, and develop policies to promote competition and financial stability. Likewise, Adhikari and Pradhan (2023) investigated the effect of innovation and technology on productivity and profitability of Nepalese commercial banks. The study showed that mobile banking, e- payment, internet banking, ATM banking, and POS banking have positive impact on productivity and profitability of commercial banks. Further, Pradhan and Sah (2023) analyzed the impact of capital ratios and bank operating efficiency on financial performance of Nepalese commercial banks and found that bank operating efficiency, loan ratio, total deposit to total assets, and loan loss provision to total equity have positive and significant impact on performance of Nepalese commercial banks. 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.

The above discussion shows that empirical evidences vary greatly across the studies on the efficiency and productivity of banking sector. Though there are above-mentioned empirical evidence 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 efficiency and productivity of banking sector in Nepal. Specifically, it examines the relationship of capital, deposit, human resource cost, loan and advances, bank credit and bank size with efficiency and productivity of banking sector in Nepal.

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 section draws the conclusion.

2. Methodological aspects

The study is based on the secondary data which were collected from 10 Nepalese commercial banks for the study period from 2014/15 to 2023/24, leading to a total of 100 observations. The main sources of data collected from the Bank Supervision Report published by Nepal Rastra Bank (NRB) and annual reports of the selected commercial 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 banks	Study period	Observation
1	Nepal SBI Bank Limited	2014/15-2023/24	10
2	Prime Commercial Bank Limited	2014/15-2023/24	10
3	Everest Bank Limited	2014/15-2023/24	10
4	Agricultural Development Bank Limited	2014/15-2023/24	10
5	Sanima Bank Limited	2014/15-2023/24	10
6	Himalayan Bank Limited	2014/15-2023/24	10
7	Nepal Bank Limited	2014/15-2023/24	10
8	Kumari Bank Limited	2014/15-2023/24	10
9	Standard Chartered Bank Nepal Limited	2014/15-2023/24	10
10	Rastriya Banijya Bank Limited	2014/15-2023/24	10
Total number of observations			**100**

Thus, the study is based on the 100 observations.

The model

The model used in this study assumes that efficiency and productivity depend upon capital, deposit, human resource cost, loan and advances, bank credit and bank size. The dependent variables selected for the study are efficiency and productivity. Similarly, the selected independent variables are capital, deposit, human resource cost, loan and advances, bank credit and bank size. Therefore, the models take the following forms:

$$EFI = \beta_0 + \beta_1 C + \beta_2 D + \beta_3 HC + \beta_4 LA + \beta_5 BC + \beta_6 BS + e_{it}$$

$$PRD = \beta_0 + \beta_1 C + \beta_2 D + \beta_3 HC + \beta_4 LA + \beta_5 BC + \beta_6 BS + e_{it}$$

Where,

PRD = Productivity as measured by the ratio of net interest margin, in percentage.

EFI = Efficiency as measured by the ratio of operating expenses to operating revenue, in percentage.

CAP = Capital, Rs. in billion.

DEP = Deposit, Rs. in billion.

HRC = Human resource cost, Rs. in million.

LA = Loan and advances, Rs. in million.

BC = Bank credit, Rs. in million.

BS = Bank size as measured by total assets of bank, Rs. in billion.

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

Capital

Capital is the investment of owners and profit accumulated in all the time of the activity of an enterprise. According to Boisso *et al*. (2000), the larger public capital stock is relative to private sector capital stock the greater the positive impact on changes in productivity, efficiency and technical innovation. With regards to the relationship between risk, capital and bank productivity, the results suggest that banks with higher liquidity levels are more capitalized (Tan and Floros, 2013). The less efficient banks seem to have higher capital levels (Williams, 2004). Similarly, Alhassan *et al.* (2016) showed a positive impact of capital on productivity of banks. The study also revealed that human capital efficiency and capital employed efficiency as the components that drive productivity growth in the banking industry. Likewise, Ozkan *et al.* (2017) concluded that capital employed efficiency (CEE) and human capital efficiency (HCE) have positive impact on the financial performance of banks. Similarly, Raharja and Purwanto (2021) stated that financial performance is positively affected by Human Capital Efficiency (HCE). The human capital efficiency and capital employed efficiency have a positive and significant effect on the financial performance of banking companies listed on the Indonesia Stock Exchange between 2018 and 2022 (Nurseha, 2024). Based on it, this study develops the following hypothesis:

H_1: Capital has a positive relationship with efficiency and productivity.

Deposit

Deposit is customer funds whose withdrawals are made within a period of time whose availability is easily estimated and the compensation paid by the bank for deposits is greater than bank deposits of other funds such as current accounts and funds such as current accounts and savings (Ismail and Ak, 2010). Similarly, Atukalp (2022) revealed that there is a long-term cointegration relationship between the bank deposits. Likewise, Holod and Lewis (2011) concluded that deposit has a positive impact on bank's efficiency. Further, Fatai and Alenoghena (2024) revealed that deposit growth has a positive and significant impact on overall organizational productivity In addition, Edem (2017) investigated the effect of liquidity management on the performance of deposit money banks in Nigeria. The study revealed a significant positive correlation between liquidity management and the performance of deposit money banks in Nigeria. Moreover, Tuyishime *et al.* (2015) showed a positive changes in deposit volume and rates charged positively impacted the bank performance measures. Similarly, Košak and Zajc (2006) assessed the determinants of efficiency in the new EU member countries. The study found that deposit per capita and population are positively associated with cost efficiency. Based on it, this study develops the following hypothesis:

H_2: Deposit has a positive relationship with efficiency and productivity.

Human resource cost

Efficient human resource management is one of the most essential requirements for survival in this competitive world (Fathima, 2015). The effective Human Resource

Management (HRM) in the banking sector significantly enhances operational efficiency, customer satisfaction, and financial performance (Radha and Aithal 2024). Similarly, Al-Tarawneh and Tarawneh (2012) revealed that there is a significant impact of human resources information systems on organizational performance. Likewise, Al-Ghazawi (2012) pointed out that investment in human resources activities has a significant impact on the effectiveness of investment in human capital in commercial banks. The study also showed a significant impact of staffing, training and development, incentives and retention policy on the effectiveness of investment in human capital. Further, Al-bahussin and El-Garaihy (2013) revealed that the human resource management practices have positive impact on organizational performance. In addition, Al-Hyasat (2006) investigated the efficiency and effectiveness of HRMS and the relationship between these strategies and organization performance. The study found a positive relationship between efficiency and effectiveness of (human resource planning strategies, testing and appointment strategies, strategies of personnel performance evaluation, training strategies) and institutional performance. Moreover, Moideenkutty *et al.* (2011) showed that high involvement human resource management practices are significantly and positively related to organizational performance. Based on it, this study develops the following hypothesis:

H_3: Human resource cost has a positive relationship with efficiency and productivity.

Loan and advances

Loan and advances are dominant assets of commercial banks (Birhanu *et al.,* 2021). Hasan (2016) concluded that the total amount of continuous loans and advances has increased and sometimes decreased but the recovery is favorable. Similarly, Birhanu *et al.* (2021) revealed that liquidity ratio has a significant and negative impact on efficiency and productivity of commercial banks. Likewise, Kashif (2016) revealed that efficiency ratio has a positive and direct relationship with NPLs (non-performing loans), which suggests that the loan loss provision increases because of extensive lending activities. Based on it, this study develops the following hypothesis:

H_4: There is a positive relationship between loan and advances with efficiency and productivity.

Bank credit

Bank credit stands for credit extended by banks to borrowers. The bankers frequently use the term in the plural, meaning advances made to their borrowing customers. The bank credit also mean that a bank is commonly able to make loans in excess of the amount of cash received from shareholders and depositors. Shamshur and Weill (2019) showed that bank efficiency is negatively related to the cost of credit. Likewise, Diallo (2018) revealed that bank efficiency is associated with lower cost of credit. The study also showed that the great but overlooked importance of bank efficiency in mitigating the negative effects of financial crises on growth for industries that are most dependent on external financing. Further, Chow *et al.* (2018) found that bank credits showed a negative impact on economic growth. Based on it, this study develops the following hypothesis:

H_5: Bank credit has a negative relationship with efficiency and productivity.

Bank size

Bank size is estimated using the natural logarithm of the bank's asset size (Nartey *et al.,* 2019). Bank size is one of the two independent variables and is measured as the natural logarithm of total assets of a rural bank (Amidu and Wolfe, 2013). Likewise, De Haan and

Poghosyan (2012) revealed that bank size reduces returns volatility. However, the effect is non-linear: when bank size exceeds some threshold, size positively impacts returns volatility. Similarly, Asongu and Odhiambo (2019) examined the connection between bank size and efficiency to understand whether that relationship is influenced by exploitation of market power or economies of scale. The study found two key results. First, bank size increases bank interest rate margins with an inverted U-shaped nexus. Second, market power and economies of scale do not increase or decrease the interest rate margins significantly. Moreover, Ginting *et al.* (2021) showed that total assets have positive and significant relationship with profitability in the banking sector, especially when the assets are effectively deployed in income-generating activities. According to Melitz (2003), productivity is the main (exogenous) source of heterogeneity across firms, and it is perfectly correlated with bank size. Similarly, Hasan *et al.* (2020) found that banks with higher total assets, when properly managed, tend to generate better returns. Based on it, this study develops the following hypothesis:

H_6: Bank size has a positive relationship with efficiency and productivity.

3. Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics of the selected dependent and independent variables during the period 2014/15 to 2023/24.

Table 2

Descriptive statistics

This table shows the descriptive statistics of the dependent and independent variables of 10 Nepalese commercial banks for the study period of 2014/15 to 2023/24. Dependent variables are EFI (Efficiency as measured by the ratio of operating expenses to operating revenue, in percentage) and PRD (Productivity as measured by the ratio of net interest margin, in percentage). The independent variables are CAP (Capital, Rs. in billion), DEP (Deposit, Rs. in billion), HRC (Human resource cost, Rs. in million), LA (Loan and advances, Rs. in million), BC (Bank credit, Rs. in million) and BS (Bank size as measured by total assets of bank, Rs. in billion).

Variables	Minimum	Maximum	Mean	Std. Deviation
EFI	0.050	1.500	0.383	0.210
PRD	1.060	9.440	4.491	1.897
CAP	6.780	10.419	9.861	0.498
DEP	8.161	11.664	10.902	0.567
HRC	6.401	9.586	8.866	0.473
LA	7.744	11.433	10.282	0.915
BS	8.161	11.732	11.027	0.597
BC	0.000	9.864	4.060	4.220

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 10 Nepalese commercial banks for the study period from 2014/15 to 2023/24. Dependent variables are EFI (Efficiency

as measured by the ratio of operating expenses to operating revenue, in percentage) and PRD (Productivity as measured by the ratio of net interest margin, in percentage). The independent variables are CAP (Capital, Rs. in billion), DEP (Deposit, Rs. in billion), HRC (Human resource cost, Rs. in million), LA (Loan and advances, Rs. in million), BC (Bank credit, Rs. in million) and BS (Bank size as measured by total assets of bank, Rs. in billion).

Variables	EFI	PRD	CAP	DEP	HRC	LA	BS	BC
EFI	1							
PRD	0.150	1						
CAP	0.054	0.127	1					
DEP	0.114	0.037	0.834**	1				
HRC	0.190	0.345**	0.742**	0.648**	1			
LA	0.076	0.408**	0.431**	0.299**	0.657**	1		
BS	0.093	0.095	0.871**	0.874**	0.740**	0.418**	1	
BC	-0.174	-0.004	-0.046	0.012	-0.116	-0.167	-0.023	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 has a positive relationship with efficiency. It indicates that increase in capital leads to increase in efficiency. Similarly, deposit has a positive relationship with efficiency. It indicates that increase in deposit leads to increase in efficiency. Likewise, human resource cost has a positive relationship with efficiency. It indicates that increase in human resource cost leads to increase in efficiency. Further, loan and advance has a positive relationship with efficiency. It indicates that higher the loan and advances, higher would be the efficiency. In addition, bank size has a positive relationship with efficiency. It indicates that larger the bank size, higher would be the efficiency. However, bank credit has a negative relationship with efficiency. It indicates that increase in bank credit leads to decrease in efficiency.

Similarly, the study shows that capital has a positive relationship with productivity. It indicates that increase in capital leads to increase in productivity. Similarly, deposit has a positive relationship with productivity. It indicates that increase in deposit leads to increase in productivity. Likewise, human resource cost has a positive relationship with productivity. It indicates that increase in human resource cost leads to increase in productivity. Further, loan and advance has a positive relationship with productivity. It indicates that higher the loan and advances, higher would be the productivity. In addition, bank size has a positive relationship with productivity. It indicates that larger the bank size, higher would be the productivity. However, bank credit has a negative relationship with productivity. It indicates that increase in bank credit leads to decrease in productivity.

Regression analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been computed and the results are presented in Table 4. More specifically, it shows the regression results of capital, deposit, human resource cost, loan and advance, bank size, and bank credit on efficiency of Nepalese commercial banks.

Table 4

Estimated regression results of capital, deposit, human resource cost, loan and advance, bank size, and bank credit on efficiency

The results are based on panel data of 10 commercial banks with 100 observations for the period from 2014/15 to 2023/24 by using the linear regression model and the model is $EFI = \beta_0 + \beta_1 C + \beta_2 D + \beta_3 HC + \beta_4 LA + \beta_5 BC + \beta_6 BS$

+ e_{it} where, the dependent variable is EFI (Efficiency as measured by the ratio of operating expenses to operating revenue, in percentage). The independent variables are CAP (Capital, Rs. in billion), DEP (Deposit, Rs. in billion), HRC (Human resource cost, Rs. in million), LA (Loan and advances, Rs. in million), BC (Bank credit, Rs. in million) and BS (Bank size as measured by total assets of bank, Rs. in billion).

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		CAP	DEP	HRC	LA	BS	BC			
1	0.159 (0.379)	0.023 (0.532)						0.007	0.211	0.283
2	0.843 (2.080)*		0.042 (1.137)					0.003	0.209	1.293
3	1.133 (2.896)**			0.085 (1.920)				0.026	0.207	3.688
4	0.562 (2.355)*				0.017 (0.755)			0.004	0.210	0.569
5	0.743 (1.904)					0.033 (0.925)		0.001	0.210	0.856
6	0.419 (14.381)**						-0.009 (1.745)	0.020	0.208	3.045
7	0.045 (1.090)	0.206 (2.774)**	0.193 (2.962)**					0.067	0.203	4.539
8	0.838 (2.049)*	0.341 (4.256)**	0.176 (2.846)**	0.214 (3.506)**				0.164	0.191	7.476
9	0.834 (2.030)*	0.338 (4.204)**	0.169 (2.676)**	0.236 (3.158)**	0.015 (0.516)			0.158	0.193	5.630
10	0.808 (1.952)	0.362 (4.126)**	0.141 (1.865)	0.225 (2.920)*	0.016 (0.538)	0.056 (0.682)		0.153	0.193	4.572
11	0.899 (2.191)*	0.358 (4.146)**	0.132 (1.176)	0.237 (3.118)**	0.012 (0.418)	0.054 (0.663)	-0.009 (2.021)*	0.183	0.190	4.651

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. Efficiency is the dependent variable.

Table 4 shows that the beta coefficients for capital are positive with efficiency. It indicates that capital has a positive impact on efficiency. This finding is consistent with the findings of Alhassan *et al.* (2016). Similarly, the beta coefficients for deposit are positive with efficiency. It indicates that deposit has a positive impact on efficiency. This finding is similar to the findings of Atukalp (2022). Likewise, the beta coefficients for human resource cost are positive with efficiency. It indicates that human resource cost has a positive impact on efficiency. This finding is consistent with the findings of Al-Tarawneh and Tarawneh (2012). Further, the beta coefficients for loan and advances are positive with efficiency. It indicates that loan and advances have positive impact on efficiency. This finding is similar to the findings of Hasan (2016). In addition, the beta coefficients for bank size are positive with efficiency. It indicates that bank size has a positive impact on efficiency. This finding is consistent with the findings of Shamshur and Weill (2019). However, the beta coefficients for bank credit are negative with efficiency. It indicates that bank credit has a negative impact on efficiency. T This finding is similar to the findings of Asongu and Odhiambo (2019).

Table 5 shows the regression results of capital, deposit, human resource cost, loan and advance, bank size, bank credit on productivity of Nepalese commercial banks.

Table 5

Estimated regression results of capital, deposit, human resource cost, loan and advance, bank size, bank credit on productivity

The results are based on panel data of 10 commercial banks with 100 observations for the period from 2014/15

to 2023/24 by using the linear regression model and the model is $PRD = \beta_0 + \beta_1 C + \beta_2 D + \beta_3 HC + \beta_4 LA + \beta_5 BC + \beta_6 BS + e_{it}$ where, the dependent variable is PRD (Productivity as measured by the ratio of net interest margin, in percentage). The independent variables are CAP (Capital, Rs. in billion), DEP (Deposit, Rs. in billion), HRC (Human resource cost, Rs. in million), LA (Loan and advances, Rs. in million), BC (Bank credit, Rs. in million) and BS (Bank size as measured by total assets of bank, Rs. in billion).

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		CAP	DEP	HRC	LA	BS	BC			
1	0.278 (0.074)	0.484 (1.266)						0.006	1.891	1.603
2	5.837 (1.584)		-0.123 (0.366)					0.009	1.905	0.134
3	7.783 (2.303)*			1.384 (3.638)**				0.110	1.789	13.232
4	4.220 (2.138)*				0.847 (4.430)**			0.158	1.740	19.262
5	1.148 (0.325)					0.303 (0.949)		0.001	1.897	0.901
6	4.503 (16.887)**						0.002 (0.039)	0.010	1.907	0.002
7	2.113 (0.561)	1.969 (2.934)**	-1.563 (2.656)**					0.064	1.835	4.377
8	2.150 (0.600)	0.472 (0.673)	-1.750 (3.239)**	2.377 (4.444)**				0.215	1.680	10.064
9	2.284 (0.646)	0.397 (0.574)	-1.545 (2.841)**	1.675 (2.601)**	0.472 (1.902)			0.236	1.657	8.658
10	2.236 (0.627)	0.355 (0.469)	-1.596 (2.447)*	1.654 (2.491)*	0.471 (1.886)	0.103 (0.144)		0.228	1.666	6.860
11	2.655 (0.743)	0.405 (0.538)	-1.619 (2.498)*	1.640 (2.472)*	0.530 (2.110)*	0.059 (0.083)	0.047 (1.172)	0.236	1.658	6.037

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. Productivity is the dependent variable.

Table 5 shows that the beta coefficients for capital are positive with productivity. It indicates that capital has a positive impact on productivity. This finding is consistent with the findings of Ozkan *et al.* (2017). Similarly, the beta coefficients for deposit are positive with productivity. It indicates that deposit has a positive impact on productivity. This finding is similar to the findings of Edem (2017). Likewise, the beta coefficients for human resource cost are positive with productivity. It indicates that human resource cost has a positive impact on productivity. This finding is consistent with the findings of Moideenkutty *et al.* (2011). Further, the beta coefficients for loan and advances are positive with productivity. It indicates that loan and advances have positive impact on productivity. This finding is similar to the findings of Kashif (2016). In addition, the beta coefficients for bank size are positive with productivity. It indicates that bank size has a positive impact on productivity. This finding is consistent with the findings of Chow *et al.* (2018). However, the beta coefficients for bank credit are negative with productivity. It indicates that bank credit has a negative impact on productivity. This finding is similar to the findings of Ginting *et al.* (2021).

4. Summary and conclusion

The banks carry a huge risk of loan default and difficulty in payment to depositors which may be affiliated to various factors such as instability in the government, instable economic condition or other bank related factors that may or may not be avoided. These risks may hinder efficiency, productivity and ultimately the stability of banking system. The banks must analyze the factors that may be associated with their efficiency and productivity to come

up with a way to minimize the negative effects so that the overall financial system (in general) and economy (as a whole) will be stable.

This study attempts to analyze the efficiency and productivity of banking sector in Nepal. The study is based on secondary data of 10 commercial banks with 100 observations for the study period from 2014/15 to 2023/24.

The major conclusion of this study is that capital, deposit, human resource cost, loan and advances and bank size have positive impact on efficiency and productivity. It indicates that increase in capital, deposit, human resource cost, loan and advances and bank size leads to increase in efficiency and productivity. However, bank credit has a negative impact on efficiency and productivity. It indicates that increase in bank credit leads to decrease in efficiency and productivity. Likewise, the study also concluded that human resource cost followed by bank credit is the most influencing factor that explains the changes in efficiency in the context of Nepalese commercial banks. Similarly, the study also concluded that loan and advances followed by human resource cost is the most influencing factor that explains the changes in productivity in the context of Nepalese commercial banks.

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