Impact of Investment Diversification on Profitability of Nepalese Commercial Banks

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Abstract

This study examines the impact of investment diversification on the profitability in the context of Nepalese commercial banks. Return on assets and return on equity are selected as the dependent variables. The selected independent variables are investment on securities, bank capital, loan portfolio, deposit by customer, non-interest income and bank size. The study is based on secondary data of 16 commercial banks with 112 observations for the period from 2016/17 to 2022/23. 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 investment diversification on the profitability of Nepalese commercial banks.

The study showed that bank capital has a positive impact on return on assets. It means that increase in bank capital leads to increase in return on assets. Similarly, loan portfolio has a positive impact on return on assets and return on equity. It shows that increase in loan portfolio leads to increase in return on assets and return on equity. Moreover, deposit by customer has a positive impact on return on assets and return on equity. It indicates that increase in deposit by customer leads to increase in return on assets and return on equity. In addition, non-interest income has a positive impact on return on assets and return on equity. It shows that higher the non-interest income, higher would be the return on assets and return on equity. In contrast, investment on securities has a negative impact on return on assets and return on equity. It indicates that increase in investment on securities leads to increase in return on assets and return on equity. In addition, the study shows that bank size has a positive impact on return on assets and return on equity. It indicates that increase in bank size leads to increase in return on assets and return on equity.

Keywords: return on assets, return on equity, investment on securities, bank capital, loan portfolio, deposit by customer, non-interest income, bank size

1. Introduction

Diversification is the distribution of risk and reward within asset classes because it is impossible to predict which subset of a given asset class will perform better than another. Therefore, diversification describes the method where more assets are added to a portfolio so as to lower the risk associated with investments. Portfolio managers in industrialized countries are becoming more and more interested in banking investments because diversification increases portfolio returns while reducing risk (Purkayastha *et al*., 2012). Additionally, diversification enhances the performance of financial

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institutions in developing countries (Chakrabarti *et al.,* 2007). The motive for diversifying loan portfolios is that banks could reduce the likelihood of idiosyncratic shocks and mitigate the problem of asymmetric information (Beck and De Jonghe, 2013). Despite the upsides of diversification, another line of research suggests that specialization is associated with better expertise in some economic sectors, thus improving customer monitoring efficiency and preventing the adverse selection problem. An important principle of modern finance theory is the concept of diversification. The process of spreading an investment across assets (and thereby forming a portfolio) is called diversification. The principle of diversification tells us that spreading an investment across many assets will eliminate some of the risk (Ross *et al.,* 2016). Banks can potentially reduce the variability of their revenue streams by altering the geographic and loan-type mix of their loan portfolios. Alternatively, banks can diversify by expanding beyond traditional lending activities into a variety of noninterest revenue sources (e.g., service charges, trading account revenue, fiduciary activities, etc.).

In banking system lending is a significant part that needs to be highly concerned to maximize organizational performance. The loan portfolio is treated as a major asset to the banks. Therefore, banks' decision-makers need to properly manage loan portfolios through various strategies such as diversification and concentration. Loan portfolio diversification (LPD) refers to providing loans into different sectors without concentrating on one particular sector. LPD can be based on product, industry, and currency. Product-wise categorization can be identified as a term loan, overdraft, housing loans, credit cards, and leasing. Industry-wise categorization can be shown as agriculture, manufacturing, banking and finance, tourism, and construction. On the other hand, currency, wise categorization refers to a loan given by using various currencies. Loan portfolio concentration (LPC) means concern only specialization area when providing loans. Loan portfolio diversification refers to providing loans into different sectors without concentrating on a particular sector. However, there is no consensus in the literature about the link between loan portfolio diversification and performance of commercial banks. Kumanayake et al. (2019) examined the impact of loan portfolio diversification on the performance of commercial banks in Sri Lanka. The results revealed that there is a significant negative impact of loan portfolio diversification on commercial bank performance. Further, control variables-bank size positively links with commercial bank performance while interest rate spread has a positive insignificant impact on bank performance. In conclusion, it is confirmed that commercial banks should reduce their loan

portfolio diversification as much as possible to increase performance. Because results revealed that a diversified loan portfolio position leads to the poor performance of commercial banks.

Adzobu et al. (2017) examined whether diversification of credit portfolios across economic sectors leads to improved profitability and reduced credit risks for Ghanaian banks that have been characterized by high non-performing loans in recent times. The study showed that loan portfolio diversification does not improve banks' profitability nor does it reduce banks' credit risks. The study emphasizes the need for banks to perform a careful assessment of the effects of their lending policies geared toward increased sectoral diversification on their monitoring efficiency and effectiveness. Dang (2022) analyzed how the effects of loan portfolio diversification on bank profitability differ according to bank size and state ownership. Through data on Vietnamese banks during 2008–2019 and the dynamic panel model, the study strongly confirmed the average adverse impacts of sectoral loan portfolio diversification on bank profitability. Further, the result indicates that the drawback of loan portfolio diversification is mitigated for larger banks rather than smaller counterparts. Regarding the asymmetric effects induced by bank ownership, bank profits increase with loan portfolio diversification at state-owned banks, as opposed to the cost implication found for private banks. Additionally, the study documented the nonlinear inverted U-shaped relationship between loan portfolio diversification and bank returns as a bank risk function. Concretely, increased bank risk could diminish the harmful effects of loan portfolio diversification on bank returns; when the level of risk is exceptionally high, these harmful effects may rise again.

The diversification of the loan portfolio directly affects bank performance. Raei et al. (2016) stated that the US global financial crisis in 2008 is partly due to the concentration of bank lending on the real estate sector. Further, the study stated that many previous bank crises have occurred as a result of the concentration of loan portfolios. Loan portfolio accounts for 70-80% of assets of commercial banks. Therefore, bank managers need to take better loan portfolio decisions to gain more profits. This emerges need for managing loan portfolio decisions to enhance bank performance. Banks have the problem of information asymmetry when providing loans to customers. This is a major vulnerable to adverse selection and moral hazard. Adverse selection can arise when banks are unable to distinguish between solvent and insolvent borrowers. Banks give higher incentives for the less solvent borrowers while discouraging to provide loans to more solvent borrowers. Moral hazard is the risk of misleading information. Moreover,

higher loan concentration can be screen and monitor effectively. Therefore, loan portfolio concentration enhances performance by mitigating information asymmetry which is the main source of all these problems. Tah and Martinez (2016) suggested that loan portfolio diversification reduces the likelihood of bankruptcy and increase the financial performance of a firm. Loan portfolio diversification helps to enhance the financial performance and it uses as a strategy to catch up with the higher performance level. Diversifying the loan, portfolio helps to reduce portfolio risk. Kashian and Tao (2014) stated a more concentrated loan portfolio may lower the return simultaneously higher the credit risk. Meanwhile, Lefcaditis et al. (2014) stated that concentration risk increase bank credit loss because of the probability of default the payments in specialized sectors.

Acharya et al. (2006) examined the effect of loan portfolio focus versus diversification on the return and the risk of 105 Italian banks over the period 1993–99 using data on bank-by-bank exposures to different industries and sectors. The study found that diversification is not guaranteed to produce superior performance and/or greater safety for banks. For high-risk banks, diversification reduces bank return while producing riskier loans. For low-risk banks, diversification produces either an inefficient risk-return trade-off or only a marginal improvement. The findings are consistent with a deterioration in the effectiveness of bank monitoring at high risk-levels and upon lending expansion into newer or competitive industries. Hayden et al. (2007) investigated whether this result is robust to the choice of the sample and to the calculation of the risk variable. The study found little evidence of large performance benefits associated with diversification: For the majority of the data, diversification tends to be associated with reductions in bank returns, even after controlling for risk. Only in a few cases (e.g., high-risk banks and industrial diversification), the study found statistically significant positive relationships between diversification and bank returns. Shim (2019) investigated how the effect of loan diversification on bank stability varies depending on the level of the concentration or the competitiveness of the banking market. The study found that increased loan diversification has a positive impact on the bank's financial strength. The study showed that market concentration is negatively associated with bank insolvency risk, consistent with the "concentration-stability" view. The results using interaction terms between loan portfolio diversification and market concentration indicate that diversifying banks operating in highly concentrated markets are more financially stable compared to those in less concentrated markets.

In the context of Nepal, Maharjan (2023) examined the effect of credit

portfolio diversification on the performance of Nepalese commercial banks. The study showed that real estate loan has a positive impact on return on equity. It reveals that higher the real estate loan, higher would be the return on equity. In addition, the study showed that overdraft loan has a positive impact on return on equity. It indicates that increase in overdraft loans leads to increase in return on equity. Likewise, deprived sector loan has a positive impact on return on equity. It reveals that higher the deprived sector loan, higher would be the return on equity. Gauchan and Upadhyaya (2020) analyzed the credit portfolio management and its relationship with bank financial performance. The study found that, with the exception of consumption and other sectors, all sectors have a favorable impact on banks' financial performance. The study also showed that sector-wise portfolio management provides a good framework for banks to maintain their sustainability. Furthermore, Oli (2021) revealed that there is a negative relationship between real estate investment and return on assets. The study also showed that loan portfolio has a positive impact on return on assets.

The above discussion shows that empirical evidences vary greatly across the studies on the impact of investment diversification on bank profitability. 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 impact of investment diversification on the profitability of Nepalese commercial banks. Specifically, it examines the relationship of investment on securities, bank capital, loan portfolio, deposit by customer, non-interest income and bank size with return on assets and return on equity 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 2016/17 to 2022/23, 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 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 banks	Study period	Observations
1	Global IME Bank Limited	2016/17-2022/23	7
2	Himalayan Bank Limited	2016/17-2022/23	7
3	Kumari Bank Limited	2016/17-2022/23	7
4	Citizens Bank International Limited	2016/17-2022/23	7
5	Machhapuchchhre Bank Limited	2016/17-2022/23	7
6	Nabil Bank Limited	2016/17-2022/23	7
7	Sanima Bank Limited	2016/17-2022/23	7
8	Nepal Bank Limited	2016/17-2022/23	7
9	Siddhartha Bank Limited	2016/17-2022/23	7
10	Nepal SBI Bank Limited	2016/17-2022/23	7
11	NIC Asia Bank Limited	2016/17-2022/23	7
12	Everest Bank Limited	2016/17-2022/23	7
13	Standard Chartered Bank Nepal Limited	2016/17-2022/23	7
14	Prabhu Bank Limited	2016/17-2022/23	7
15	NMB Bank Limited	2016/17-2022/23	7
16	Sunrise Bank Limited	2016/17-2022/23	7
Total number of observations			**112**

Thus, the study is based on the 112 observations.

The model

The model estimated in this study assumes that bank profitability depends on investment diversification. The dependent variables selected for the study are return on assets and return on equity. Similarly, the selected independent variables are investment on securities, bank capital, loan portfolio, deposit by customer, non-interest income and bank size. Therefore, the models take the following forms:

$$ROA_{it} = \beta_0 + \beta_1 IOS_{it} + \beta_2 BC_{it} + \beta_3 LP_{it} + \beta_4 DC_{it} + \beta_5 NII_{it} + \beta_6 BS_{it} + e_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 IOS_{it} + \beta_2 BC_{it} + \beta_3 LP_{it} + \beta_4 DC_{it} + \beta_5 NII_{it} + \beta_6 BS_{it} + e_{it}$$

Where,

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

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

IOS= Investment on securities, Rs in million.

BC= Bank capital as measured by the total capital of bank, Rs in million.

LP=Loan portfolio as measured by the sum of total loan to customers and loan to BFIs, Rs in million.

DC=Deposit from customer as measured by the total deposits collected from the customers, Rs in million.

NII=Noninterest income as measured by the fee and commission-based income, Rs in million.

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

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

Investment on securities

Hailu and Tassew (2018) showed a significant positive relationship between investment on government security and return on asset of banks. Kipleting and Bokongo (2016) indicated that investment on government security such as Treasury bills and Bonds are considered to be significantly safer investments compared to the other asset classes given that the likelihood of a government running out of money and defaulting on its interest payments are very low since it can print more money or borrow more. Default risk, investment and reinvestment risk, business continuation risk, interest rate risk as well as strategic risk can be raised by giving loans and advances. However, investment in T-bills and T-bonds is risk free, so there is positive relationship between investment in government security and profitability (Das, 2014). Based on it, this study develops the following hypothesis:

H_1: There is positive relationship between investment on securities and profitability.

Bank capital

Linh and Trang (2019) investigated the impact of capital on bank profitability with evidence from Vietnamese commercial banks. With a sample of 30 Vietnamese commercial banks, the findings showed a positive relationship between capital and bank profitability during the period of 2012-2018. Lee and Hsieh (2013) analyzed the impact of bank capital on profitability and risk in Asian banking. The results showed a positive association between bank capital and profitability. Ayaydin and Karakaya (2014) shed some crucial light on the determinants of bank risk-taking and analyze its relationship with capital and profitability. The study found the evidence that the effect of

increasing bank capital on bank profitability is significantly positive. Based on it, this study develops the following hypothesis:

H_2: There is positive relationship between bank capital and profitability.

Loan portfolio

According to Mileris (2015), commercial banks should strategically execute their loan portfolio growth strategies so as to minimize the problem of loan losses in subsequent years and also recommended that to enhance financial performance banks should ensure they maintain a high-quality loan portfolio. Boahene et al. (2012) suggested that loans and advances have positive and statistically significant effect on profitability. The results confirmed that commercial banks should increase their loan portfolio diversification as much as possible to increase performance. Dang (2020) evaluated risk-return analysis of loan portfolio diversification in the Vietnamese banking system. The study showed a positive association between loan portfolio diversification and profitability of Vietnamese banking system. Based on it, this study develops the following hypothesis:

H_3: There is a positive relationship between loan portfolio and profitability.

Deposit from customer

Christaria and Kurnia (2016) assessed the impact of financial ratios, operational efficiency and non-performing loan towards commercial bank profitability. The study revealed that capital adequacy ratio, deposit ratio and non-performing loan simultaneously, have a significant positive impact on ROA. Furthermore, Samad (2015) investigated the impact of bank specific characteristics and macroeconomic variables on the banks' profitability of Bangladesh banking industry. The study concluded that deposit ratio has a significant positive impact on the profitability of Bangladesh commercial banks. Likewise, Mahdi and Abbes (2018) found a positive impact of the net interest margin on the liquidity of the banking industry of conventional banks indicating that the most profitable banks maintain higher liquidity ratio and deposits.

H_4: There is positive relationship between deposit from customers and bank profitability.

Non-interest income

Ahamed (2017) concluded that an increased share of non-interest income increases the profitability and risk-adjusted profitability (stability) of Indian banks. We will go one step further and investigate this relationship by dividing

non-interest income into fee and commission income and other non-interest income. Mercieca et al. (2007) showed that there is significant positive impact of non-interest income with bank profitability. Lee et al. (2014) examined the non-interest income, profitability, and risk in banking industry using a cross-country analysis. The study showed a positive association between non-interest income, profitability, and risk in banking industry. Based on it, this study develops the following hypothesis:

H_5: There is positive relationship between non-interest income and bank profitability.

Bank size

Bank size has an impact on various activities of banks including investing opportunities, portfolio diversification, reputation and access to equity capital (Zhang *et al.,* 2008). The size of bank could create economics of scale which lower the average cost and has a positive impact on bank profits. Gul *et al.* (2011) examined the factors affecting bank profitability in Pakistan. The study found a direct relationship between the size of banks and profitability. Matejasak *et al.* (2009) found that a strong negative relationship between risk and bank size which means are larger the bank size, higher would be the risk taking and vice-versa. Larger banks may have better risk management and diversification opportunities. Based on it, this study develops the following hypothesis:

H_6: There is 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 2016/17 to 2022/23.

Table 2

Descriptive statistics

This table shows the descriptive statistics of dependent and independent variables of 16 Nepalese commercial banks for the study period from 2016/17 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage) and ROE (Return on equity as measured by the ratio of net income by total shareholders' equity, in percentage), The independent variables are IOS (Investment on securities, Rs in million), BC (Bank capital as measured by the total capital of bank, Rs in million), LP (Loan portfolio as measured by the sum of total loan to customers and loan to BFIs, Rs in million), DC (Deposit from customer as measured by the total deposits collected from the customers, Rs in million), NII (Noninterest income as measured by the fee and

commission-based income, Rs in million) and BS (Bank size as measured by the total assets of banks, Rs in billion).

Variables	Minimum	Maximum	Mean	Std. Deviation
ROE	6.26	23.20	14.09	3.98
ROA	0.70	2.78	1.52	0.46
IOS	4578.10	300205.65	23637.56	31359.27
BC	4.01	23.80	10.11	3.58
LP	37485.13	310572.59	115214.86	54025.30
DC	43860.31	326222.31	131833.05	59099.53
NII	255.34	2482.87	895.31	364.72
BS	0.11	289.54	71.33	61.96

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 coefficient 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 2016/17 to 2022/23. The dependent variables are ROA (Return on assets as measured by the ratio of net income to total assets, in percentage) and ROE (Return on equity as measured by the ratio of net income by total shareholders' equity, in percentage), The independent variables are IOS (Investment on securities, Rs in million), BC (Bank capital as measured by the total capital of bank, Rs in million), LP (Loan portfolio as measured by the sum of total loan to customers and loan to BFIs, Rs in million), DC (Deposit from customer as measured by the total deposits collected from the customers, Rs in million), NII (Noninterest income as measured by the fee and commission-based income, Rs in million) and BS (Bank size as measured by the total assets of banks, Rs in billion).

Variables	ROE	ROA	IOS	BC	LP	DC	NII	BS
ROE	1							
ROA	0.622**	1						
IOS	-0.055	-0.156	1					
BC	-0.277**	0.385**	0.287**	1				
LP	0.041	0.387**	0.452**	0.795**	1			
DC	0.009	0.357**	0.497**	0.728**	0.976**	1		
NII	0.234*	0.119	0.299**	0.505**	0.711**	0.688**	1	
BS	0.058	0.362**	0.492**	0.764**	0.980**	0.993**	0.694**	1

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

Table 3 shows that bank capital has a positive relationship with return on assets. It means that increase in bank capital leads to increase in return on assets. Similarly, loan portfolio has a positive relationship with return on assets. It shows that increase in loan portfolio leads to increase in return on assets. Moreover, deposit by customer has a positive relationship with return on assets. It indicates that increase in deposit by customer leads to increase in return on assets. In addition, non-interest income has a positive relationship with return on assets. It shows that higher the non-interest income, higher would be the return on assets. In contrast, investment on securities has a negative relationship with return on assets. It indicates that increase in investment on securities leads to increase in return on assets. In addition, the study shows that bank size has a positive relationship with return on assets. It indicates that increase in bank size leads to increase in return on assets.

Similarly, the result also shows that bank capital has a negative relationship with return on equity. It means that increase in bank capital leads to decrease in return on equity. Similarly, loan portfolio has a positive relationship with return on equity. It shows that increase in loan portfolio leads to increase in return on equity. Moreover, deposit by customer has a positive relationship with return on equity. It indicates that increase in deposit by customer leads to increase in return on equity. In addition, non-interest income has a positive relationship with return on equity. It shows that higher the non-interest income, higher would be the return on equity. In contrast, investment on securities has a negative relationship with return on equity. It indicates that increase in investment on securities leads to increase in return on equity. In addition, the study shows that bank size has a positive relationship with return on equity. It indicates that increase in bank size leads to increase in return on equity.

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 investment on securities, bank capital, loan portfolio, deposit by customer, non-interest income and bank size on return on equity.

Table 4

Estimated regression results of investment on securities, bank capital, loan portfolio, deposit by customer, non-interest income and bank size on return on equity

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		IOS	BC	LP	DC	NII	BS			
1	2.788 (16.201)**	-0.445 (4.375)**						0.132	1.243	19.140
2	2.376 (8.988)**		-0.007 (0.06)					0.005	1.338	0.429
3	2.195 (13.135)**			0.002 (0.243)				0.008	1.340	0.059
4	0.181 (0.166)				0.196 (1.874)			0.021	1.321	3.510
5	2.256 (10.577)**					0.002 (0.195)		0.008	1.340	0.038
6	2.261 (5.599) **						0.001 (0.101)	0.008	1.341	0.01
7	2.907 (10.568)**	-0.443 (4.341)**	-0.006 (0.556)					0.127	1.241	9.688
8	2.878 (9.874) **	-0.443 (4.345)**	-0.006 (0.571)	0.003 (0.312)				0.120	1.252	6.428
9	1.213 (1.107)	-0.427 (4.171) **	-0.005 (0.509)	0.004 (0.450)	0.155 (1.559)			0.131	1.244	5.488
10	1.208 (1.089)	-0.428 (4.177)**	-0.006 (0.564)	0.004 (0.470)	0.169 (1.662)	0.006 (0.732)		0.128	1.247	4.480
11	1.222 (1.096)	-0.427 (4.141)**	-0.006 (0.562)	0.004 (0.469)	0.174 (1.662)	0.006 (0.681)	0.003 (0.225)	0.120	1.252	3.711
12	1.310 (1.196)	-0.427 (4.158)**	-0.005 (0.502)		0.170 (1.632)	0.006 (0.670)	0.003 (0.224)	0.124	1.267	4.439

Source: SPSS output

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 non-interest income are positive with return on equity. It indicates that the non-interest income has a positive impact on return on equity. This finding is consistent with the findings of Ahamed (2017). Furthermore, the beta coefficients for deposit by customer are positive with return on equity. It indicates that the deposits by customer have a positive impact on return on equity. This finding is similar to the findings of Samad (2015). Similarly, the beta coefficients for loan portfolio are positive with return on equity. It indicates that loan portfolio has a positive impact on return on equity. This finding is consistent with the findings of Mileris (2015). Likewise, the beta coefficients for bank size are positive with return on equity. It indicates that bank size has a positive impact on return on equity. This finding is similar to the findings of Matejasak *et al.* (2009). However, the beta coefficients for investment on securities are negative with return on equity. It indicates that investment on securities has a negative impact on return on equity. This finding is consistent with the findings of Kipleting and Bokongo (2016).

Table 5 shows the regression results of investment on securities, bank

capital, loan portfolio, deposit by customer, non-interest income and bank size on return on assets.

Table 5

Estimated regression results of investment on securities, bank capital, loan portfolio, deposit by customer, non-interest income and bank size on return on assets

Model	Intercept	Regression coefficients of						Adj. R_bar^2	SEE	F-value
		IOS	BC	LP	DC	NII	BS			
1	21.339 (17.769)**	-2.417 (3.407)**						0.182	8.677	11.605
2	17.511 (9,758)**		0.035 (0.473)					0.007	9.085	0.224
3	18.181 (16.038)**			0.007 (0.108)				0.008	9.093	0.012
4	4.043 (0.544)				1.367 (1.996)*			0.087	8.954	6.710
5	18.299 (12.644)**					0.002 (0.291)		0.008	9.093	0.001
6	16.003 (5.860) **						0.069 (0.869)	0.002	9.064	0.749
7	20.492 (10.645)**	-2.432 (3.416)**	0.44 (0.609)					0.077	8.699	5.957
8	20.370 (10.013) **	-2.432 (3.402)**	0.043 (0.600)	0.006 (0.091)				0.069	8.737	3.941
9	7.767 (1.007)	-2.310 (3.240)**	0.048 (0.674)	0.014 (0.241)	1.176 (1.692)			0.084	8.668	3.720
10	18.518 (5.885)**	-2.457 (3.432)**	0.034 (0.467)			-0.018 (0.316)	0.077 (0.976)	0.069	8.739	3.194
11	7.491 (0.964)	-2.340 (3.256) **	0.040 (0.574)	0.015 (0.250)	1.130 (1.548)	-0.031 (0.532)	0.048 (0.595)	0.072	8.723	2.539

Source: SPSS output

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 asset is the dependent variable.

Table 5 shows that the beta coefficients for non-interest income are positive with return on assets. It indicates that the non-interest income has a positive impact on return on assets. This finding is consistent with the findings of Mercieca et al. (2007). Furthermore, the beta coefficients for deposit by customer are positive with return on assets. It indicates that the deposits by customer have a positive impact on return on assets. This finding is similar to the findings of Christaria and Kurnia (2016). Similarly, the beta coefficients for loan portfolio are positive with return on assets. It indicates that loan portfolio has a positive impact on return on assets. This finding is consistent with the findings of Dang (2020). Likewise, the beta coefficients for bank size are positive with return on assets. It indicates that bank size has a positive impact on return on assets. This finding is similar to the findings of

Gul *et al.* (2011). However, the beta coefficients for investment on securities are negative with return on assets. It indicates that investment on securities has a negative impact on return on assets. This finding is consistent with the findings of Hailu and Tassew (2018).

4. Summary and conclusion

A credit portfolio is an investment portfolio made up of debts such as mortgages and vehicle loans. Diversified credit portfolios influence the risk level of banks with losses in one sector or one location being compensated from the gains obtained from the other sectors or locations. Diversification should be a way to reduce the risk within a portfolio of assets given asymmetric information in banking market.

The study examines the impact of investment diversification on the profitability of Nepalese commercial banks. The study is based on secondary data of 16 commercial banks with 12 observations for the period from 2016/17 to 2022/23.

The study showed that investment on securities and bank capital have negative impact on return on equity of Nepalese commercial banks. However, non-interest income, loan portfolio, deposit from customer and bank size have positive impact on return on equity of Nepalese commercial banks. Similarly, the study also showed that investment on securities has negative impact on return on assets of Nepalese commercial banks. However, non-interest income, loan portfolio, bank capital, deposit from customer and bank size have positive impact on return on assets of Nepalese commercial banks. The study also concluded that diversification across different asset classes and sectors can help to mitigate risks associated with any single investment or market downturn. This can lead to more stable returns and improved overall profitability. The study concluded that investment on securities is the most influencing factor that explain changes in profitability measured by return on assts of Nepalese commercial banks.

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