Factors Affecting Non-Performing Loans of Nepalese Commercial Banks

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ABSTRACT

This study attempts to examine the factors affecting the non-performing loans (NPLs) in the selected commercial banks of Nepal over the period of 2015/16 to 2019/20. A sample of 25 Nepalese commercial banks has been selected and data are analysed using the factor analysis, correlation analysis and regression analysis. The study finds that the annual growth rate of GDP and inflation rate have statistically insignificant negative effect on NPLs whereas, the weighted average interest spread and ownership dummy have statistically significant positive effect on NPLs

I. Introduction

The banking sector is an engine of economic growth through its funding of productive investment (Schumpeter, 1934). It works as a facilitator for achieving sustained economic growth through providing efficient monetary intermediation (Jha & Hui, 2012). A sound economic system results in a strong financial system and absorb the financial crises (Dash & Kabra, 2012). After the financial crises in the US due to the financial credit crunch (Subprime mortgages occurred in 2007 and 2008), non-performing loan (NPL) issues are being mainly taken into account by the government and bank's management (Ghosh, 2015). The Central bank of a country has the key role to play in this regard to prepare the financial institutions for such financial crises (Khan, Siddique, & Zahid, 2020).

The non-performing loan (NPL) means the amount of loans that banks had provided to their customers, who are unable to make scheduled payments (i.e., interest and principal amount) for a period of ninety days or more. In the context of Nepal, the Nepal Rastra Bank (Central Bank of Nepal) has classified the loans based on the period of the overdue of the loans into five categories, viz. standard, watch-list, sub-standard, doubtful, and loss, or bad loan (NRB Unified Directives, 2022). The standard loans can be defined as loans in which interest and principal payments are not overdue or overdue up to three months. While the sub-standard loans are those loans whose interest and principal payments are due up to six months. Whereas the watch list loans refer to that loans

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that principal and interest have not been paid within the repayment period. The doubtful loans are loans that payments are due from six months to one year. Loss loans are those loans that interest and principal payments are overdue from the year.

A bank should have a way of scrutinising its borrowers while extending credit so that it would minimise NPLs that do not generate income for a relatively long-period of time (Caprio & Klingebiel, 1996; & Hennie, 2003). If banks are unable to manage NPLs, it generally results high loan loss provisioning that leads to drop-in profits of many banks (Kithinji, 2010). Similarly, poorly managed banking institutions result in bad quality loans, and therefore, escalates the level of non-performing loans (Karim & Hassan, 2010). Thus, it has been suggested that banks need to strengthen their applicant screening criteria and due diligence assessment to select potential risk-taking applicants and adopt appropriate pre and post credit assessments with the intention of the reducing the occurrence of loan default. Further, banks prerequisite to make sure that borrowed funds are being used for the intended purpose through enhanced credit monitoring (Asfaw, Bogale, & Teame, 2016).

The NPLs have been considered as an immense issue among banks and financial institutions that cause the greater risk to the banking industry globally (Onsarigo, 2013). In many countries, banks are not able to generate adequate profit out of the loans provided due to the non-performing loans (Petersson & Wadman, 2004). So, the controlling NPLs are very important for the performance of an individual bank and the economy's financial environment (McNulty, Akhigbe, & Verbrugge, 2001).

Given the fact that banks performance largely depends on performing loans, unmanaged or high level of NPLs may precipitate the collapse of not only one bank, but also the entire banking system and the economy (Waweru & Kalani, 2009). Lending without differentiating markets, products and borrowers' creditworthiness and excessive loan exposure to real estate were the important factors that results high level of NPLs of banks in Nepal (Sapkota, 2011). The publicly owned banks (disperse ownership) reduce the banks' performance and enhance the banks riskiness (Ahmad, 2013). Similarly, in case of government owned bank, the NPLs would be higher than that of the private owned banks (Bhattarai, 2015).

The NPLs are affected by different bank-specific and macro-economic factors such as return on equity (ROE), loans to total assets, total loans, ratio of operating expense to operating income, capital adequacy ratio (CAR), net interest margin (NIM), Liquidity (LIQ), Banks' Size (LnTA), loan loss provision (LLP), cost of credit, interest rate, economic growth, inflation, unemployment rate, exchange rate, etc. These factors have been examined by different studies (Fama, 1985; Sinkey & Walt, 1991; Jimenez & Saurina, 2006**;** Dash & Kabra, 2010; Bofondi & Ropele,2011; and Bhattarai,2015) in various countries. Though numerous studies have examined the factors affecting NPLs in several countries, however, most of the studies were conducted with reference to developed countries like USA, Spain, Italy, Greece, Nigeria, and the like. Nevertheless, the results of those studies were inconsistent and might be attributable to the analysis methods used by different scholars and in the countries' economic conditions in which banking sectors are operating. However, very limited studies are found on the determinants of NPLs for emerging market context particularly in

Nepal (Gnawali, 2018 & Bhattarai, 2020). Furthermore, there is a lacking in consensus among the prior studies regarding the factors determining the NPLs. Therefore, this study aims to examine the factors affecting the non-performing loans (NPLs) of selected Nepalese commercial banks.

The rest of this paper has been organised as follows. Section II provides the review of literature on NPLs and its determining factors in banking sector. Section III describes the methodology used in the study. Section IV presents the results and discussion. The conclusion and scope for the future research are incorporated in Section V.

II. Literature Review

The literature on determinants of NPLs have been identified into two broad categories viz., macroeconomic (systematic) factors and bank specific (unsystematic) factors (Chaibi, 2015). The theoretical models of business cycles with a financial role offer a good foundation for modeling NPLs as they explain the cyclical nature of the business and the risk of failure in repayment of the loans (Williamson, 1987). The macroeconomic developments enhance economic agents' ability to pay their debts that causes lower NPLs (Bangia, Diebold, Kronomus, Schagen & Schuermann, 2002). Increase in real GDP results increment in borrowers' revenue that improves their ability to payback loan on maturity (Fofack, 2005). The quality of banking credits in Greek is tied with macroeconomic factors such as GDP, unemployment norm and interest norm as well as the management quality. Since the effect of macroeconomic variables and the quality of loans has been the concern of many researchers (Nkusu, 2011; Louzis, Vouldis, & Metaxas, 2012), it has been mentioned that at the expansionary stage of the economy, there would be lower bad loans as borrowing companies have adequate incomes to cover their debts obligations in pre-arranged time. However, in an economy which is under the contraction phase of its business cycle, companies are not performing well, which has a positive effect on NPLs. Messai and Jouini (2013) finds that NPLs are negatively associated with the growth rate of GDP and profitability of banks, and positively with the unemployment rate, the loan loss reserves to total loans, and the real interest rate. Khan et al. (2020) shows that GDP growth rate, exchange rate, tax rate, inflation, and unemployment effect NPLs in a different manner respectively.

Keeton and Morris (1987) reveals that economic condition and poor performance of certain sectors were significant determinants of loan losses. Similarly, Sinkey and Walt (1991) provides evidence that both internal and external factors explain the loan-loss rate (i.e., net loan charge of plus NPLs divided by total loans plus net charge offs) of these banks. Ahmed, Takeda and Shawn (1998) reveal that loan loss provision has a significant positive influence on NPLs. Ewert, Schenk and Szczesny (2000) find that high interest rate and inadequate collateral had significant positive relationship on the banks' poor lending performance in Germany. According to Kroszner (2002), NPLs generate a vicious effect on banking survival and growth, and if not managed properly leads to banking failures. Rajan and Dhal (2003) finds that favourable macroeconomic conditions and financial factors such as banks size, cost of credit, credit maturity, and credit orientation have significant impact on the non-performing loans of Indian commercial banks.

Micco and Panizza (2004) states that state-owned banks tend to have higher levels of NPLs, due to their weak credit recovery capacity compared to privately owned banks. Further, Jimenez and Saurina (2005) provides evidence that NPLs are determined by GDP growth, high interest rate and lenient credit terms. Waweru and Kalani (2008) reveals that customer failure to disclose vital information during the loan application process was considered to be the main customer specific factor. Further, they find that lack of an aggressive debt collection policy was perceived as the main bank specific factor, contributing to the non- performing debt problem in Kenya.

Dash and Kabra (2010) finds that the real effective exchange rate had a strong positive impact on the level of NPLs and growth in real GDP had inverse relationship with NPLs. However, the size of the bank and inflation are not important determinants of NPLs in the Indian commercial banking system. Bofondi and Ropele (2011) finds that NPLs are positively associated with the unemployment rates, lending rates and negatively associated with the GDP growth rate. Ekanayake and Azeez (2015) reveals that NPLs tend to increase with deteriorating banks efficiency and there was a positive correlation between loan to asset ratio and NPLs. Cuccinelli (2015) shows that there is a negative impact of credit risk on bank lending behaviour of Italian banks with regard to both credit risk measures such as the NPLs and the loan loss provision ratio. Asfaw, Bogale and Teame (2016) shows that poor credit assessment and credit monitoring are the major causes for the occurrence of NPLs. Murthy, Kamil, Mariadas and Devi (2017) finds that three factors influencing NPLs in Malaysia are consumers' income, the economy of the country and bank interest rate.

Oynaka (2019) indicates that the bank specific factors include bank size and performance, credit size, poor credit assessment, poor credit terms, lack of aggressive credit collection system, inadequate nature of collateral were identified as bank specific factors affecting NPLs. On the other hand, unwillingness of borrower to pay back loan, customers funds diversion for unexpected purpose were identified as customer specific factors affecting NPLs. Khan et al., (2020) concludes that the operating efficiency and profitability indicators have a negative association with NPLs but were statistically significant, while capital adequacy and income diversification have a negative association with NPLs but were statistically insignificant.

III. Data and Methodology

This study is based on secondary data that have been collected from banks' financial statements, Nepal Stock Exchanges Ltd. (NEPSE), Nepal Rastra Bank, and Central Bureau of Statistics over the period of five years (i.e., 2015/16 to 2019/20). This time period is chosen as it has not been considered in previous studies to examine the determinants of NPLs in the Nepalese banking sector. Previous studies have only considered the time period ranging from 2002/3 to 2017/18 in different studies (Bhattarai, 2015 & Gnawali, 2019). For the purpose of study, descriptive research design is used and twenty-five commercial banks out of twenty-seven (as of mid-July 2020, NRB) are selected using the judgmental sampling. However, remaining two banks (i.e., Rastrya

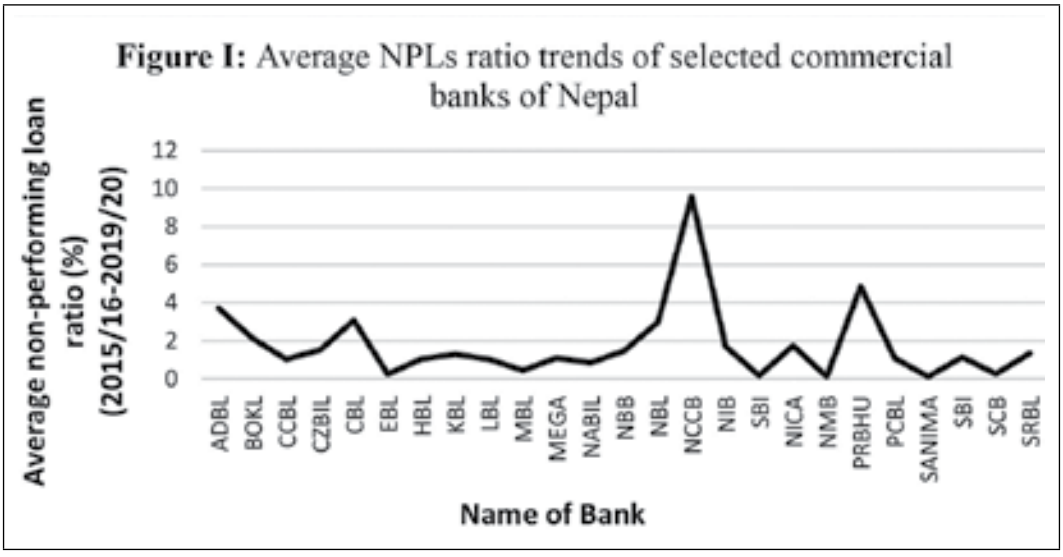
Banijaya Bank Ltd. and Global IME Bank Ltd.) have been excluded for the analysis purpose as their required data of study's variables over the study period were not available.

After the literature review, following key variables (i.e., factors) have been identified that might influence the NPLs: Natural logarithm of total assets of commercial banks 'i' during 't' period, Liquidity 'i' during 't' period, =Capital adequacy ratio 'i' during 't' period, =Credit to Deposits ratio, = Net income to loans ratio 'i' during 't' period, =Weighted average interest rate 'i' during 't' period, Return on asset 'i' during 't' period,= Annual growth rate of gross domestic product 'i' during 't' period, Inflation rate 'i' during 't' period, and Ownership Dummy (Government owned bank=1,otherwise 0). For the data analysis purpose, the statistical techniques of Principal Component Factor analysis, Correlation and multiple regression analysis have been employed to identify and explain the factors affecting loans.

IV. Result and Discussion

Figure I shows the average of NPL ratios in percentage over the study period of five years (i.e., 2015/16-2019/20):

Figure I: Average NPLs ratio trends of selected commercial banks of Nepal



Factor Analysis

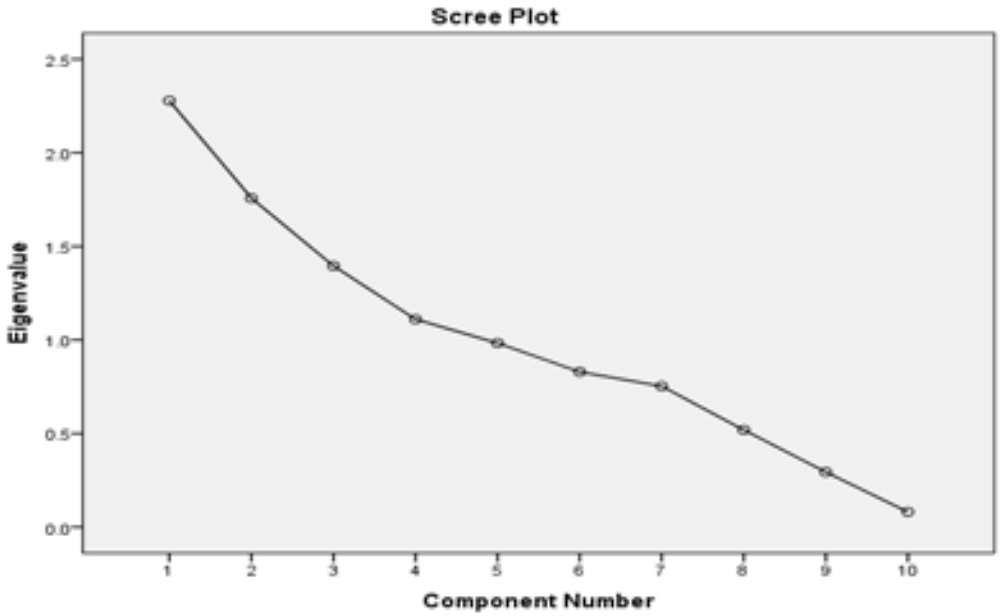
The determinants of NPLs have been analysed at three levels viz., factor analysis, correlation analysis and multiple regression analysis. Table I depicts the details of factor analysis results. The four components have been extracted as their eigenvalues are higher than one (Kaiser's Criterion) viz., 2.278, 1.757, 1.395 and 1.110. The remaining factors having eigenvalues lower than one are not taken into account (Kaiser, 1960). The clustering of decision factors affecting NPLs within four components generated normalised cumulative sums of square loading of 65.408 percent. It means that 65.408 of the total variation in the level of NPLs determination has been explained by the cumulative effect of these four components extracted.

Table I
Factor analysis results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)						0.404
Bartlett's Test of Sphericity					Approx. Chi-Square	341.959
df						45
Sig.						0.000
Component matrix					Communality	Specific
Factors		Factor loadings			h_i^2 (%)	variance
	f_1	f_2	f_3	f_4		Ψ_i^2(%)
$SIZE_{it}$	0.057	0.151	0.105	0.139	.452	0.5476
LIQ_{it}	0.186	0.166	0.022	0.204	.578	0.4216
CAR_{it}	0.301	0.005	0.003	0.048	.357	0.6430
CDR_{it}	0.265	0.198	0.108	0.110	.681	0.3190
$NILR_{it}$	0.274	0.046	0.112	0.073	.505	0.4947
$WAIS_{it}$	0.021	0.036	0.524	0.190	.771	0.2287
ROA_{it}	0.000	0.214	0.229	0.215	.659	0.3415
ΔGDP_{it}	0.463	0.398	0.034	0.016	.911	0.0885
INF_{it}	0.526	0.357	0.002	0.002	.888	0.1122
Ownership Dummy	0.184	0.187	0.254	0.112	.738	0.2624
Eigenvalue	2.278	1.757	1.395	1.110		
$\sum f_i^2$	22.780	17.572	13.953	11.103	$\sum h_i^2 = 65.408$	$\sum \Psi_i^2$=34.592
% of total variance $[\sum \frac{f_i^2}{10} \times 100]$						

As per the communalities value, most of the variables seem completely fit with the factor solution apart from these variables viz., size of bank and capital adequacy ratio as their extracted values are lower than 0.50 (i.e., 0.452 and 0.357). However, communalities values of four variables viz., annual rate of GDP (i.e., 0.911), annual inflation rate (0.888), weighted average interest spread (i.e., 0.771), and ownership dummy (0.738) seem to be higher than other variables.

The component matrix provides the loadings of the ten variables on the four extracted factors viz., annual rate in GDP, annual inflation rate, weighted average interest rate and ownership dummy, which have been identified as the most critical factors affecting non-performing loan (NPLs). The four extracted factors are also shown in the Scree Plot, which is a grap of the eignvalues against all the factors.



It has been observed from the above screen plot that four factors having eignvalue greater than one. Hence, a set of these factors have been chosen for the purpose of further analysis, which consequences about 65.408 percent variations in the data.

Correlation Analysis

The results of correlations among the extracted factors relating to their relationship with NPLs of selected commercial banks over the study period of five years (i.e. 2015/2016 to 2019/2020) with a total of 125 observations are shown in Table II:

Table II

Matrix of simple correlation coefficients

Variables	NPL_{it}	ΔGDP_{it}	INF_{it}	$WAIS_{it}$	Ownership Dummy
NPL_{it}	1	-0.026	0.026	1.000*	0.226**
		(0.777)	(0.776)	(0.000)	(0.011)
ΔGDP_{it}		1	-.856**	-.026	0.000
			(0.000)	(0.777)	(1.000)
INF_{it}			1	0.026	0.000
				(0.776)	(1.000)
$WAIS_{it}$				1	0.226*
					(0.011)
Ownership					1

Note. p-values are shown in parentheses under of the correlation coefficients; Asterisks (*) and (**) denote significant at 1% and 5% levels respectively.

The correlation results show that NPLs have statistically significant positive relationship with both weighted average interests spread rate (1.000) and ownership dummy (0.226) at 1% and 5% significant levels respectively. There exists no significant negative relationship between NPLs and annual growth rate of GDP (-0.026). Similarly, a low non-significant positive relationship exists between NPLs and annual inflation rate (0.026).

Regression Analysis

The multiple regression technique has been applied to validate the correlation results and regression results on extracted variables are shown in the Table III. In the regression model, natural logarithm of NPLs () has been used as dependent variable. The independent variables are: change in annual growth rate of domestic product (), annual inflation rate (), weighted average interest spread () and ownership dummy.

Table III
Regression results on extracted factors

Model	$lnNPL_{it} = \beta_0 + \beta_1 \Delta GDP_{it} + \beta_2 INF_{it} + \beta_3 WAIS + \beta_4$ Ownership dummy $+ e_{it}$					
Dependent Variable: $lnNPL_{it}$	Unstandardised Coefficients				Collinearity Statistics	
		Std. Error	t-statistic	p-value	Tolerance	VIF
Constant	-.577	0.665	-.868	.387		
ΔGDP_{it}	-.031	0.039	-.804	.423	.267	3.748
INF_{it}	-.035	0.087	-.398	.692	.267	3.748
$WAIS_{it}$	.448*	0.042	10.599	.000	.948	1.054
Ownership dummy	.604***	0.323	1.868	.064	.949	1.054
R-square = 0.526 Adj. R-square = 0.510 F-statistics = 33.242 (0.000) SEE =0.954						

Note. Asterisks (*) and (***) denote significant at 1%, 5%, and 10% levels respectively.

It has been observed from the Table III that the value of adjusted R square is 0.510, which shows that 51% variability of the NPLs can be explained by the extracted variables viz., GDP, INF, WAIS and ownership dummy. The regression model is significant as the computed F-value of 33.242 (p-value-0.000<0.01). The coefficients of annual GDP and annual inflation rate are not found statistically significant variables affecting NPLs at 5% level of significant. While the coefficients of weighted average interest spread and ownership dummy have positive effect on NPLs and are found statistically significant at 1% and 10% levels respectively.

The regression results show that there is negative effect of annual GDP and inflation rate on NPLs, but they are not found significant. The results contradict with Ryan & Dhal, 2003 and Fofack, 2005) which concludes that increase in GDP results in increment in borrowers' ability to meet their loan obligations on maturity. However, the studies like Messi & Jouini (2013) and Dash & Kara

(2010) shows that the there is a negative effect of growth rate of GDP on NPLs. And their findings are to some extent consistent with this study. It may be because of the nature of Nepalese economy in which GDP mainly depends on agriculture and remittance that seem to be unstable and poor. Further, the increment in inflation rate results in higher interest rate and causes decreases in borrowers' ability to meet their financial obligations is consistent with the study conducted by Ahmad in 2009 (Ahmad, 2009). This may be due to the decrease in volume of loans granted by banks, which would be more selective of high-quality borrowers during high inflation period. Further, this study shows that the weighted average interest spread and ownership dummy have positive significant effect on NPLs. The findings of (Micco et al., 2004) also shows that in public owned banks' managers can take higher risks due to the weak supervision and monitoring, which increase in loan portfolio riskiness and thus results in the growth of future NPLs. Similarly, Bhattarai (2015) shows that ownership dummy has positive effect on NPLs, which mean that government owned banks would have higher NPLs as compared to private owned banks.

V. Conclusion and Scope for Future Research

This study empirically examines the factors affecting NPLs of selected commercial banks of Nepal. For the analysis purpose, at first, factor analysis has been applied to identify the most critical factors that affect NPLs. Then, the correlation analysis is carried out among the extracted factors (i.e., variables) with NPLs. Further, in order to validate the correlation results, multiple regression analysis has also been made to validate the correlation results. It has been observed from the component matrix that the factor loadings of the 10 factors (i.e., variables) on the four extracted factors such as annual growth rate in GDP, annual inflation rate, weighted average interest rate and ownership dummy are identified as the most critical factors affecting NPLs . The results of correlation analysis shows that NPLs have statistically significant positive relationship with the weighted average interest rate and ownership dummy. However, there exists non-significant negative relationship with the GDP growth rate and inflation rate. The results of multiple regression analysis depict that the GDP growth rate and inflation rate have statistically insignificant negative effect on NPLs. While the weighted average interest spread and ownership dummy have statistically significant positive effect on NPLs respectively.

The results of this study may be useful to bankers and policy makers for managing nonperforming loans. Since the commercial banks of Nepal are relatively very small in terms of their size and market capitalisation as compared to other countries' banks, it may not be appropriate to generalise these study results for other emerging economies. There are several avenues for future research in the area of factors affecting the NPLs in Nepalese banking sector. The study can be made more extensive by including a large sample size and study period considering other macro-economic factors, such as, exchange rate, public expenditures, and unemployment rate.

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Appendix-I
List of Selected Commercial Banks of Nepal
(2015/16 to 2019/20)

S.N.	Symbol	Company Name	No. of Observations
1	ADBL	Agricultural Development Bank Ltd.	5
2	BOKL	Bank of Kathmandu Ltd.	5
3	CCBL	Century Commercial Bank Ltd.	5
4	CZBIL	Citizens Bank International Ltd.	5
5	CBL	Civil Bank Ltd.	5
6	EBL	Everest Bank Ltd.	5
7	HBL	Himalyan Bank Ltd.	5
8	KBL	Kumari Bank Ltd.	5
9	LBL	Laxmi Bank Ltd.	5
10	MBL	Machhapuchchhre Bank Ltd.	5
11	MEGA	Mega Bank Ltd.	5
12	NABIL	Nabil Bank Ltd.	5
13	NBB	Nepal Bangladesh Bank Ltd.	5
14	NBL	Nepal Bank Ltd.	5
15	NCCB	Nepal Credit & Commerce Bank Ltd.	5
16	NIB	Nepal Investment Bank Ltd.	5
17	SBI	Nepal SBI Bank Ltd.	5
18	NICA	NIC Asia Bank Ltd.	5
19	NMB	NMB Bank Ltd.	5
20	PRVU	Prabhu Bank Ltd.	5
21	PCBL	Prime Commercial Bank Ltd.	5
22	SANIMA	Sanima Bank Ltd.	5
23	SBL	Siddhartha Bank Ltd.	5
24	SCB	Standard Chartered Bank Nepal Ltd.	5
25	SRBL	Sunrise Bank Ltd.	5
		Total	**125**

Appendix-II
Non-performing loans (NPLs) ratio of selected commercial banks over the study period

S.N.	Bank	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Av-NPL
1	ADBL	4.36	4.6	3.5	3.29	2.84	3.718
2	BOKL	2.51	1.29	3.04	1.54	2.28	2.132
3	CCBL	0.22	1.15	0.5	1.14	2.11	1.024
4	CZBIL	1.38	2.02	1.48	1.19	1.55	1.524
5	CBL	4.49	3.96	2.63	2.37	1.9	3.07
6	EBL	0.38	0.25	0.2	0.16	0.22	0.242
7	HBL	0.85	0.85	1.4	1.12	1.01	1.046
8	KBL	1.15	1.86	1.05	1.01	1.39	1.292
9	LBL	0.8	0.93	1.29	1.11	1.04	1.034
10	MBL	0.55	0.38	0.44	0.37	0.52	0.452
11	MEGHA	1.74	0.83	0.82	0.98	1.15	1.104
12	NABIL	1.14	0.79	0.55	0.74	0.98	0.84
13	NBB	0.71	0.76	1.27	1.74	2.89	1.474
14	NBL	3.11	3.32	3.37	2.64	2.47	2.982
15	NCCB	7.44	9.32	11.92	10.23	9.03	9.588
16	NIBL	0.68	0.83	1.36	2.78	2.91	1.712
17	SBI	0.14	0.1	0.2	0.2	0.23	0.174
18	NICA	1.79	2.03	1.1	2	1.76	1.736
19	NMB	0.41	0.11	0.04	0.01	0.01	0.116
20	PRVU	8.83	4.55	3.98	3.76	3.15	4.854
21	PCBL	1.23	0.88	0.85	1	1.48	1.088
22	SANIMA	0.019	0.01	0.03	0.08	0.45	0.1178
23	SBL	1.47	1.03	1.09	0.95	1.38	1.184
24	SCBL	0.32	0.19	0.18	0.15	0.44	0.256
25	SRBL	1.22	1.37	1.24	1.03	1.86	1.344

Source: Banks' annual report

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