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Exploring the factors that influence commercial banks lending decisions: An analysis of the determinants of lending behavior in Nepal

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Abstract
This study aims to identify the factors that influence the lending behavior of commercial banks in Nepal. The study has used a combination of descriptive and causal relationship research design and taken major ten commercial banks of Nepal sample over a ten-year period (2011/12-2020/21 A.D.). The results of the study show that bank size, interest rate spread, and exchange rate has a positive and significant impact on commercial bank lending in Nepal, while GDP growth rate and inflation rate has a negative and significant impact. In contrast, the cash reserve ratio has an insignificant and negative impact on lending. Based on these findings, the researcher recommended that policies should be developed to support the growth of commercial banks and encourage lending, with a focus on improving interest rate spreads and increasing the size of banks.

Keywords: loan and advance, bank size, interest rate spread¸ cash reserve ratio, gdp growth rate¸ inflation rate and exchange rate

Introduction

Lending is not as simple as taking money and then just giving it back. Often there is a charge for borrowing money because ultimately, lending has a cost to the lender (Charalambakis & Psychoyios, 2012) [12]. Commercial banks are such most essential financial institutions that play decisive roles in economic growth and development of a country (Yakubu & Affoi, 2014) [30].

Lending function of commercial banks is influenced by different internal and external factors. Internal factors of lending behavior of banks are established by their directors while external factors arise from the regulatory actions of national (central) banks, other regulatory authorities in the financial sector of the economy and from the general macroeconomic event (Richard &Okoye, 2014) [54].

Lending behavior of banks generally depends on the type of bank, capital base, deposit base, deposit density, interest rate, exchange rate, inflation, gross domestic product, portfolio investment, liquidity, monetary and fiscal phenomena, and regular issued credit guidelines by the supervisory authority and the internal guidelines of the banks as well as other non-economic factors (Timisina, 2016).

Previous researchers conducted various studies to determine the factors influencing commercial bank lending behavior in the international and Nepalese context. The study addressing commercial banks' lending behavior in Nepal by Timsina (2016) [58], Y.R. Bhattarai (2016), B.P. Bhattarai (2019; 2020). However, results from previous studies do not appear to be consistent. While some researchers such as Olumuyiwa, Oluwatosin and Chukwuemeka (2012) [52]; Djiogap and Ngomsi (2012) and Alkhazaleh (2017) [2] found that gross domestic product has a positive coefficient and a significant with loan and advance. Similarly, Mukhanyi (2016) found a negative relationship between GDP and loans and advances. Some studies have found that bank lending is determined by bank size, liquidity ratio, interest rate, capital adequacy, asset quality ratio, cash reserve ratio, and other studies argue that bank size, liquidity, interest rate, asset quality ratio, and capital adequacy may not affect lending behavior of commercial banks. And this is particularly relevant in the current economic environment, as the COVID-19 pandemic has had a significant impact on the financial sector and may have changed the way banks make lending decisions. This research has provided insights into the factors that influence commercial bank lending behavior and how these factors may change over time.

Theoretical framework

Theoretical review

Market Power Model was developed by Gorton and Winton (2000). The theory posits that, since capital acts as a loss-absorbing buffer, banks with high capital ratios should be less vulnerable to runs (from both deposits and short-term wholesale funding). This lower run risk allows highly capitalized banks to offer more loans.

The idea of quality uncertainty in financial works was introduced by (Leland & Peyle, 2012) and (Ramakrishnan & Takor, 1984) [53]. According to their representations, they give evidence that quality uncertainty also occurs on financial markets and has effect on the market Makers. There exists information asymmetry where the participants are unsure regarding the quality of the services or product being offered. A model of the neo-classical credit market postulates that the terms of credits clear the market. If collateral and other restrictions (covenants) remain constant, the interest rate is the only price mechanism. With an increasing demand for credit and a given customer supply, the interest rate rises, and vice-versa. Thus, it is believed that the higher the failure risks of the borrower, the higher the interest premium (Ewert *et al*, 2000) [16].

Under Creation theory credit money is created by a loan extension such loan needs to be backed by CBN Money but it is created from the promise (Credit) embodied in the loan,

not from the lending or relending of central bank money. When the loan is repaid, with interest the credit money of the loan is destroyed but reserves (equal to the interest) are created the profit from the loan (Olumuyiwa *et al*, 2012) [52].
The signaling argument states that good companies should provide more collateral so that they can signal to the banks that they are less risky type borrowers and then they are charge lower interest rates. Meanwhile, the reverse signaling argument states that banks only require collateral and or covenants for relatively risky firms that also pay higher interest rates (Chodechai, 2004; Ewert& Schenk, 1998) [15].

Empirical evidences

Jonas *et al*. (2013) [22] concluded that bank size, capital structure was statistically significant with a positive relationship with bank lending. Again the macroeconomic indicators like central bank lending and exchange rate were negative and statistically significant. however only two variables were insignificant that is real GDP and bank spread-which measures the volatility among borrowers and that determines levels of loans banks can issue to individuals and firms basing on ability to pay back.
Malede (2014) [50] found that there is a significant relationship between commercial bank lending and the size of the bank, the credit risk of the borrower, the gross domestic product of the country, and the liquidity ratio of the bank. However, the study found that deposit levels, investment levels, cash required reserve levels, and interest rates do not have an impact on commercial bank lending. The study suggests that commercial banks should pay particular attention to credit risk and liquidity ratio when making lending decisions, as these factors can impact the bank's ability to lend and its financial stability.
Bhattarai (2016) [8] argued that Nepalese banks are more willing to extend credit as they expand in terms of their total assets. However, the study argues that cash reserve requirement ratio, liquidity and investment portfolio decrease the banks' intention and penchant to extend further credit to customers. This was as a result of the significant negative result noticed in the regression analysis. In the case of deposit to capital ratio, the study reveals a significant positive effect on lending behavior.
Bajracharya (2018) revealed that bank size and deposit of the banks had significant positive impact on loan and advance of commercial banks in Nepal whereas cash reserve ratio of the banks had negative impact on loan and advance of the banks. Similarly, inflation rate and lending volume of the banks had negative relation which indicates that higher inflation rate leads to decrease lending of the banks.
Bhattarai (2019) [10] asserted the positive effect of exchange rate infers that commercial banks have sufficient insights into the international market and trade and that they are prepared to meet short-term and long-term commitments. Inflation maintained by the central economic policy has a positive and significant influence on lending volumes among commercial banks in Nepal. Likewise, the findings showed interest rate spread negatively and significantly on total loans advanced to individual and institutions.
Bhattarai (2020), revealed the factors such as investment portfolio, cash reserve ratio, and bank size had a positive and significant impact on loan and advance, while liquidity had a negative and statistically significant effect. Additionally, the macroeconomic variables of gross domestic product growth rate and inflation rate did not have a significant impact on loan and advance. The study recommends that loan administrators at banks should consider these variables when deciding whether to approve loans and advances.
Goet (2021) [17] investigated the effect of bank-specific and macroeconomic variables on the loan and advances of joint venture banks. The results of the study showed that there was a significant and positive correlation between loan and advances and total deposits, and a significant and negative correlation between loan and advances and inflation rate. The studyalso found that total deposits and inflation rate had a significant impact on loan and advances, while cash reserve ratio and interest spread rate did not have a significant influence on loan and advances.
Makanile and Pastory (2022) [49] conducted a study to investigate the factors that influence the lending decisions of six commercial banks from 2015 to 2019. The researchers concluded that commercial banks should focus on maintaining sufficient liquidity to meet their short-term financial obligations, having sufficient capital relative to their assets to ensure financial stability, and being efficiently managed in order to make informed lending decisions. These factors can help commercial banks to provide more credit and support economic growth.

Research methodology

This study is based on the secondary data of ten sample commercial banks of ten-year period from 2011/12 to 2020/21 AD. There is used data of two forms i.e. bank-specific variables and macroeconomic variables. The information about the commercial banks are obtained from their annual reports, while the macroeconomic data collected from the NRB and Economic Survey, Mo F/N..
At present, 26 commercial banks are operating in Nepal. All 26 commercial banks have been considered as the total population of the study. Out of them this study is concerned with Ten commercial banks as a sample by adopting convenience sampling method.

The model and definition of variables

Regression equation showing the relation between all independent and dependent variable.

$$Y1 = a+b1X_1 +b2X_2+ b3X_3 +b4X_4 +b5X_5+b6X_6+e$$

Where,
Y1= Loan and advance,
a = Constant term,
b=Beta (parameters of model)
X_1= Bank size
X_2= Cash reserve ratio
X_3= Interest Rate spread
X_4= GDP growth rate
X_5= Inflation rate,
X_6= Exchange rate,
e= Error term

Dependent variable

A dependent variable is a variable that is affected or influenced by the independent variable.

Loans and Advances

Loans and advances are explained in terms of the commercial banks' lending part of their deposits in the form of a number of credit schemes. In addition, the amount lent by the lender to the borrower for a specific purpose like the construction of the building, capital requirements, and purchase of machinery and so on, for a particular period of time is known as Loan (Bhattarai, 2019) [10].

Independent variables
An independent variable is a variable that is manipulated or controlled by the researcher in an experiment.

Bank specific variables
Interest rate spread
Interest rate spread is measured as the difference between interest charged on loans advanced and interest charged on deposits. In this respect, Timsina (2016) [58] has found significant negative relationship between interest rate spread and total bank lending in the study. Likewise, Bhattarai (2018) [9] also indicated that interest rate spread has significant negative relationship.

H1: Interest rate spread has a significant and negative impact on loans and advances.

Cash reserve ratio
Cash Reserve Ratio (CRR) is a percentage of deposits that commercial banks are required to hold in reserve, as mandated by the central bank. It is a key instrument of monetary policy and is used to regulate the money supply in an economy. The results have negative and statistically significant found with lending were Timsina (2016) [58], Bhattarai (2016) [8] and Balago, Ayuba and Dagwon (2018) [7].

H2: The cash reserve ratio has a significant and negative impact on loans and advances.

Bank size
The size of a bank, in this context, refers to the total assets of the bank as reported in the end-of-year balance sheet. The past studies in the same line were Djiogap and Ngomsi (2012), Bhattarai (2016) [8], Adzis, Sheng and Bakar (2018), Isa, Latif, Zaharum, Nasrul, & Noh (2019), Alkhazaleh (2017) [2], Djiogap and Ngomsi (2012), and Isa, Latif, Zaharum, Nasrul and Noh (2019).

H_3: The bank size has significant and positive impact on loans and advances.

Exchange rate
An exchange rate is a metric by which the value of one currency is compared to another. It can be thought of as a measure of how much of the second currency can be "bought" with an amount of the first currency. The past studies in the same line were Timsina (2016) [58] and Bhattarai (2019) [] which found that exchange rate have positive impact on lending behavior which is theoretically correct.

H_4: Exchange rate has significant and positive impact on loans and advances.

GDP growth rate
This is the value of goods and services product in an economy within a one-year period. It measures the total income in the economy. The priori studies in the same line were Olumuyiwa, Oluwatosin and Chukwuemeka (2012) [52], Djiogap and Ngomsi (2012) and Alkhazaleh (2017) [2]. The study found negative relation was Mukhanyi (2016). In this-regards, the study has expected positive relation with loan and advance.

H5: The gross domestic products growth has significant and positive impact on loans and advances**.**

Inflation Rate
Inflation is a quantitative measure of the rate at which the average price level of a basket of selected goods and services in an economy increases over a period of time.If the rise in inflation lending institutions feel the pressure of higher lending. The past studies in the same line were Alkhazaleh (2017) [2] and Bhattarai (2019) [10]. The hypothesis of the study is as follows.

H6: The Inflation rate has significant and positive impact on loans and advances.

Result and conclusion
Descriptive Statistics
The descriptive statistics of the variables are given in the table 1 for the-each variables shows minimum, maximum, mean and standard deviation of ten commercial banks in Nepal. On an average of loan and advanced is 4.812932% with a minimum of 4.081743%and a maximum of 5.420055%and standard deviation is 0.280916%.

Table 1: Descriptive Statistics

	LNLOAN	LNER	LNBS	IRS	IR__	GDP_	CRR
Mean	11.08219	4.648969	11.54016	4.385600	7.151000	4.293000	19.05850
Maximum	12.48014	4.775002	12.75462	7.170000	9.460000	8.980000	37.52000
Minimum	9.398561	4.447377	9.825256	2.700000	3.630000	-2.370000	3.220000
Std. Dev.	0.646832	0.098939	0.602023	0.876762	2.133525	3.217540	9.771561
Skewness	-0.188921	-0.563705	-0.305151	1.087368	-0.491903	-0.598656	0.067312
Kurtosis	2.595478	2.484875	2.974224	4.820210	1.615731	2.703468	1.718677
Jarque-Bera	1.276674	6.401690	1.554717	33.51101	12.01699	6.339523	6.916305
Probability	0.528170	0.040728	0.459619	0.000000	0.002458	0.042014	0.031488
Observations	100	100	100	100	100	100	100

Note: Result are drawn from E-views 12

Here, skewness value of loan and advance, bank size, GDP growth, Exchange rate is less than 0, this shows that the distribution is negatively skwed or left skwed. And Skewness of Interest rate spread and Cash reserve ratio is greater than 0, this shows that the distribution is positively skwed or right skwed. kurtosis value of loan and advance, exchange rate, bank size, GDP growth rate and cash reserve ratio have less than 3, this shows that the distribution is platykurtic. And other hand, interest rate spread kurtosis value is greater than 3, this shows that the distribution is leptokurtic.
Jarque-Bera statistic measure the difference of the skewness and kurtosis of the series with those from the normal distribution.

Correlation Analysis

Correlation is a way to index the degree to which two or more variables are associated with or related to each other. The correlation analysis is generally used to describe the degree to which one variable is related to another. It helps to determine whether a positive or a negative relationship exists.

Table 2: Pearson correlation coefficient

0	LNLOAN	LNER	LNBS	IRS	IR	GDP	CRR
LNLOAN	1.000000						
LNER	0.830928	1.000000					
LNBS	0.976487	0.803001	1.000000				
IRS	-0.082657	-0.174302	-0.080208	1.000000			
IR__	-0.705464	-0.765422	-0.665071	0.144515	1.000000		
GDP_	-0.056024	0.031377	-0.066258	0.192075	-0.388383	1.000000	
CRR	-0.100598	-0.148578	-0.167434	0.201953	0.165591	-0.008835	1.000000

Note: Result are drawn from E-views 12

AS presented in table 2, the cash reserve ratio and loan and advance have insignificance and lower degree of negative correlation. Similarly, there is no significant relationship between the interest rate spread and the loan and advance, with the correlation between these two variables being lower degree of negative. However, the bank size and loan and advance have significance and strong degree of positive correlation. The GDP growth rate and loan and advance have insignificance and lower degree of negative correlation. On the other hand the inflation rate and loan and advance have significance and moderate degree of negative correlation. Finally, the exchange rate and the loan and advance have a strong and positive relationship, with a significant correlation.

Breusch and Pagan lagrangian Multiplier Test

The Breusch-Pagan Lagrange Multiplier Test is used to determine pooled OLS or random effects which are significant in panel data models. Breusch-Pagan Lagrange Multiplier test is applied after estimating the panel least square equation.

Table 3: Breusch and Pagan Lagrangian Multiplier Test

	Cross section	Test Hypothesis Time	Both
Breusch-Pagan	155.0340 (0.0000)	2.765362 (0.096a3)	157.7994 (0.0000)

Note: Result are drawn from E-views 12

The above table shows Breusch- Pagan value is 0.000 so, we reject the null hypothesis because the p-value is less than 0.05. We can conclude that Pooled OLS model is not appropriate for the data. So, we are using Hausman specification test to determine most appropriate model between random effect and fixed effect.

Hausman specification test

To determine which model best fits the data or is the most appropriate for the estimation, we performed the traditional Hausman test (hausman, 1978) which is identical asymptotically to the Wooldridge (2002) test. Under the Hausman test, the researcher used alternative and null hypotheses to test which model is appropriate to use between random effect and fixed effect.

Table 4: Hausman Test

Correlated Random Effects - Hausman Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	6	1.0000

Note: Result are drawn from E-views 12

On conducting the test, it was shown that P- value is greater than 0.05 level of significance, which implies that the individual level effects are best modeled using the random effects method.

Regression Analysis

Regression analysis has been conducted in order to examine the lending behavior of commercial banks. Bank size, Cash reserve ratio, interest rate spread, GDP growth rate, inflation rate and exchange rate are used as independent variable and loan and advance is used as dependent variable.

Table 5: Estimation of Random Effect Model

Variable	Coefficient	t-Statistic	Prob
IRS	0.040434	4.132605	0.0001
IR	-0.040970	-6.812905	0.0000
GDP	-0.014536	-5.508650	0.0000
LNER	0.777270	5.397054	0.0000
CRR	-0.002296	-1.529246	0.1296
LN BANK SIZE	0.823239	29.87072	0.0000
C	-2.008470	-10.33443	0.0000
R-squard	0.989240	Prob (F- statistic)	0.00000
Adjusted R- sqaurd	0.988546	Durbin-Watson stat	1.591945
F- statistic	1424.983		

Note: Result are drawn from E-views 12

From the regression result, identified several factors that seem to be associated with commercial banks' lending behavior. It seems that the interest rate spread, bank size, exchange rate, gross domestic product (GDP) and inflation rate all have significant relationships with lending, while cash reserve ratio have no significant relationship.

The F-statistic results show a critical value of 1424.983 and a p-value of 0.0000, which indicates that the level of significance is lower than 5%, therefore null hypothesis is rejected. It means that, we could say that the model is fit or the variables fit in the model. Further, the R-squared of 0.98924 indicates that 98.924% variation in total loans and advances is explained by the variations in BS, IRS, CRR, GDP, IR, ER whereas the remaining 1.076% of variation in total loans and advances is explained by other variables or factors, which are not included in this study.

In the study, Adjusted R2 is 0.988546 which show that 98.8546% of variations in total loans and advances is explained by the variations in BS, IRS, CRR, GDP, IR, ER after adjusting by degree of freedom. The durbin – Watson stat is 1.591945 which is approximately 2. Therefore, we can say that there is no autocorrelation problem.

Multi- Collinearity Test

Multicollinearity occurs when two or more independent variables are highly correlated with one another in a regression model. Multicollinearity can be detected via various methods. In this study we are focus on the most common one – VIF (Variable Inflation Factors) *Inflation Factors (VIF).*

Table 6:Variable Inflation Factors

	Coefficient	Un centered	Centered
Variable	Variance	VIF	VIF
LNER	0.061521	9151.139	4.101485
LNBS	0.001318	1210.799	3.253428
IRS	0.000227	31.18956	1.187127
IR__	0.000129	49.53453	4.011682
GDP_	2.49E-05	4.913502	1.755950
CRR	1.65E-06	5.199946	1.073813
C	1.153366	7934.298	NA

Note: Result are drawn from E-views 12

VIF determines the strength of the correlation between the independent variables. It is predicted by taking a variable and regressing it against every other variable. The VIF of independent variables are less than 10. It shows that there is no multi-collinearity problem to run this model.

Discussion

The study observed a relationship between bank lending behavior and a set of macroeconomic indicators and bank level characteristics. There is positive and significant relationship between bank size and loan and advance. This result is consistent with existing studies such as Imran and Nishat (2013), Olusany *et al*. (2012),, Zulfiqar *et al*. (2016), Mukhanyi (2016), Ayieyo (2016) [3]. This finding is not consistent with Dibri (2020). Interest rate spread has positive and significant impact on loan and advance of commercial banks. This result also consistent with Irungu (2013). And inconsistent with the result of Bhattarai (2020) and Goet (2021) [17]. Cash reserve requirement ratio has negative and insignificant effect on total loans and advances. The finding is similar with Olokoyo (2011) [51], Malede (2014) [50], Bhattarai (2016) [8], Timsina (2016) [58]. Additionally it is inconsistent with Olusanya *et al*. (2012), Bhattarai (2020). Gross domestic product has a negative coefficient and significant relationship with loan and advance. This result is consistent with Mukhanyi (2016). The result of finding has inconsistent with the priori studies were Tomak (2013) and Ladime *et al*. (2013) [23]. There is negative and significant relationship between inflation rate and loan and advance. This result is consistent with Goet (2021) [17]. The result of finding has inconsistent with the priori studies were Bhattarai (2016) [8], Alkhazaleh (2017) [2] and Bhattarai (2019) [10]. Exchange rate has positive and significant effect on commercial banks' lending. This result is consistent with Timsina (2016) [58] and Bhattarai (2019) [10] which found that exchange rate have positive impact on lending behavior which is theoretically correct.

Conclusion and implication

The study found several factors that seem to be related to commercial banks' lending behavior in Nepal. Increased interest rate spread and bank size were found to be associated with increased lending, while higher GDP, inflation were associated with decreased lending. Exchange rate had a positive relationship with lending behavior. The cash reserve ratio was found to have a relatively insignificant impact on lending behavior. Based on these findings, the study recommends that commercial banks in Nepal consider interest rate spread, bank size, exchange rate, and risk profile when making lending decisions and adopt innovation in lending. It also suggests the use of capital growth strategies to increase capital conservation buffers and maintaining balance in loan pricing to cover costs and maintain good relations with borrowers.

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