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Determinants of Interest Rate Spread of Nepalese Commercial Banks

Purna Man Shrestha[1]
Graduate School of Management
Mid-West University, Surkhet, Nepal

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Abstract

This paper has analysed the determinants of interest rate spread (IRS) of Nepalese commercial banks. The panel data of 25 commercial banks from 2013/14 to 2020/21 was used for the analysis. The study used return on assets (ROA), management efficiency (ME), capital adequacy ratio (CAR), assets quality (AQ), and credit risk (CR, and operational efficiency (OE) as the bank specific determinants and inflation (INF) and growth rate of gross domestic product (GDP) as the macroeconomic determinants. Using the random effect model, the paper finds ROA, CR, ME, and OE as the major bank specific determinants and INF and GDP as the major macroeconomic determinants of interest rate spread. Similarly, the role of ROA, CR, INF and GDP was found to be positive while that of ME and OE was discovered as a negative role in determining IRS of Nepalese commercial banks. The findings of this study can be useful in formulating policies on the spread rate of interest.

INTRODOUCTION AND STUDY OBJECTIVES

Bank charges interest on its loan granted to the borrower and pays interest on the deposit received from the depositor. The interest rate charged on its borrower is known as lending rate and the interest rate paid to its depositor as deposit rate. Net interest income, which is the difference between the interest received from bank loans and the interest paid on the bank's deposits, is the main source of income for the institution. Interest rate spread (IRS) refers to the difference between lending rates and deposit rates (Sheriff

[1] Dr. Shrestha is Associate Professor of Graduate School of Management, Mid-West University (MWU). He is a member of Research Committee, Graduate School of Management of the MWU. He has presented several research papers in national and international conferences and published them in journals. His email ID is: *purnaman.skt@gmail.com*

& Amoako, 2014; Ghasemi & Rostami, 2015). Macroeconomic variables, bank and industry related factors all have an impact on IRS (Mujeri & Younus, 2009; Tennant & Folawewo, 2009; Achille, 2016; Khan & Jalil, 2020). The IRS of commercial banks rises along with operating costs, liquidity risk, credit risk, reserve requirements, concentration, interest rate volatility, gross domestic product, and exchange rates, whereas the interest rate spread declines as return on assets, financial development indicators, and non-interest income rise (Hailu, 2016). The significant role of bank-specific factors for explaining IRS is also documented by Muhammad (2012). On the other hand, Claeys and Vander (2008) found capital adequacy ratio as the important determinants of IRS.

Previous empirical studies documented that high IRS are the result of high operating cost, lack of competition, dominant market power of few banks, high deposit rate, and high-risk factors (Mujeri & Younus, 2009; Muhammad, 2012). Likewise, higher IRS is also the result of an unfavourable macroeconomic environment (Aboagye et al., 2008; Owusu-Antwi & Antwi, 2013). On the other hand, macroeconomic factors are also found as the strongest factor for determining IRS (Afanasieff et al., 2002). Furthermore, macroeconomic variables, bank related factors and industry related factors are also found to be the strongest determinants of IRS (Khan & Khan, 2010; Hailu, 2016; Anjom, 2021).

To investigate how bank specific factors affect the IRS, Muhammad (2012) employed the annual data of 14 Pakistani commercial banks from 2000 to 2008. Using the regression analysis, the author concluded that these factors play an important role for explaining the IRS of commercial banks. The author further observed the significant positive influence of administrative cost, nonperforming loan and return on assets and significant negative influence of net interest income.

Likewise, Mujeri and Younus (2009) analysed the impression of macroeconomic variables, bank related and industry specific variables on the IRS Bangladeshi Banks. The author used the annual data of 48 banks from 2004 to 2008. Using the OLS and fixed effect regression model, the study established a substantial positive impression of deposit rate (DR), non interest income (NII), Statutory reserve requirement (SRR), certificate rate (NSD), and significant negative impact of market share of deposit (MS) and classified loan (CL) on IRS.

The impact of macroeconomic variables, bank related and industry related factors on IRS was analysed by Khan and Khan (2010). The authors used the data of 28 Pakistani commercial banks from 1997 to 2009. Applying the fixed effect panel regression, the authors found a significant influence of all these factors on IRS. Further, Khan and Khan (2010) found a significant positive impact of administrative expenses to total expenses, share of non-remunerative deposit, Herfindhal Index, GDP and interest rate and negative impact of share of non-interest in total income on IRS.

Additionally, Sheriff and Amoako (2014) determined the association between macroeconomic factors and interest rate using the autoregressive distributed lag (ARDL) cointegration technique. Using the monthly data from 1999 to 2010, the study revealed that macroeconomic variables are the key determinant of IRS of Ghana and there is negative impact of T-bill rate and public sector domestic borrowing and positive impact of inflation and total deposit on IRS in long-run.

Likewise, the macroeconomic and industry-specific determinant of IRS of commercial bank of Ghana was analysed by Churchill, Kwaning and Ababio (2014). The authors found that macroeconomic factors such as prime rate, GDP, T-bill rate, exchange rate, and industry-specific variables such as profit margin, overhead cost, liquidity and loan loss provision are the major determinants of IRS.

Furthermore, the factor affecting the IRS of commercial banks was analysed by Ghasemi and Rostami (2015). The authors considered the 19 months data of Iranian banks for the period of September 2014 to March 2015. The study's regression analysis revealed that the IRS was significantly impacted by both internal and external indicators. Likewise, the author observed the significant positive influence of demand deposit on total deposit ratio, return on assets, and significant negative influence of non-performing loan ratio, non-interest income ratio, interest to total assets ratio,capital adequacy ratio, inflation and exchange rate on IRS.

In another study, Al Shubiri and Jamil (2017) analysed the impact of market, legal, financial and economic indicators on IRS of commercial banks of Oman from 2008 to 2014. The study found the significant relation of all macroeconomic variables except GDP and legal indicator no significant relation of financial indicator with IRS. Similarly, the authors discovered that various financial factors had a considerable impact (return on assets, risk aversion and liquidity risk). Likewise, some economic indicators (debt service ratio, principal repayment, and unemployment rate) and some legal indicators (sound money and regulation), and market indicators (Herfindahl-Hirschman Index) also showed a significant impact on the IRS.

Anjom (2021) evaluated the impact of macroeconomic variables, bank related and industry related factors on IRS of Bangladeshi commercial banks from 2011 to 2019. Applying the pooled OLS and random effect models, the author revealed that operational costs, credit risk, and liquidity risk had a substantial positive influence on IRS, whereas capital adequacy, net interest income, market share, and return on assets had a negative impact.

In the context of Nepal, very few studies (e.g., Bhattarai, 2017; Kathayat, 2021) have been conducted in this issue. Bhattarai (2017) investigated the factors that affect Nepal's commercial banks' IRS. Using the annual data of seven commercial banks from 2010 to 2015, the author found that bank related factors are the key predictors of IRS. The study further revealed that the IRS is positively affected by the bank size, default risk and profitability. Similarly, Kathayat (2021) examined the data from six commercial banks between 2014–15 and 2019–20 to determine the factors that influence the IRS of Nepalese commercial banks. Based on the regression analysis, the author found credit risk and liquidity risk as the major determinants of IRS. Further the study observed the significant positive role of these two variables for determining the IRS of Nepalese commercial banks.

Above mentioned studies clarify that various bank specific variables and macroeconomic variables play extensive role for explaining the IRS but the results are inconclusive [such as Muhammad (2012) found bank specific factors (administrative cost, nonperforming loan, return on assets and net interest income as the major determinants of IRS; Sheriff and Amoako (2014) found macroeconomic variables (T-bill rate, public sector domestic borrowing, inflation and total deposit) as the major determinants of IRS; Anjom (2021) found bank related variables (liquidity risk, credit risk, operating cost, capital adequacy, net interest income, market share and return on assets) as the major determinants of IRS]. Therefore, it is necessary to identify the variables that are crucial in determining IRS in Nepalese context.

Objective of the Study

This study aims to determine the factors that affect Nepalese commercial banks' IRS. For this purpose, selected bank-specific and macroeconomic indicators were used as the determinants of IRS. In addition, this paper also aims to evaluare the relationship among the variables under the study, and analyse the role played by these factors in determining the IRS.

RESEARCH METHODS

This paper follows the descriptive and causal comparative research design. The descriptive research design has been applied for this study to identify the type and facts of the variables under consideration. Similarly, the determinants of IRS have been identified by using causal comparative research design. For this multivariate regression analysis has been used based on the annual data of 25 commercial banks (out of 26 commercial banks listed in Nepal Stock Exchange till mid-July 2021) of Nepal from 2013/14 to 2020/21. The required bank specific data for this paper is obtained by using the annual report of selected sample banks. The information on macroeconomic factors is also taken from the publication of Nepal Rastra Bank's quaterly economic bulletin. Finally, the collected data has been analysed using Stata 12 software.

The Model

In order to identify the factors that affect the IRS of Nepalese commercial banks, the following econometric model has been estimated in this study.

$$IRS_{it} = \alpha_0 + \alpha_1 ROA_{it} + \alpha_2 CAR_{it} + \alpha_3 ME_{it} + \alpha_4 AQ_{it} + \alpha_5 OE_{it} + \alpha_6 CR_{it} + \alpha_7 INF_{it} + \alpha_8 GDP_{it} + \varepsilon_{it}$$

IRS_{it} *is* the weighted average interest rate spread of bank *i* for year *t*, which is the difference of weighted average interest rate of loan and advance and weighted average interest rate of deposit. 〈*i* is the slope coefficient of the independent variable to be estimated. CAR, ME, AQ, OE, and CR are the bank specific independent variables and INF and GDP are the macroeconomiZdc independent variables. CAR_{it} is the capital adequacy ratio of bank *i* for year *t*, which is obtained by dividing total equity by total assets. ME_{it} is the management efficiency of bank *i* for year *t*, which is obtained by dividing net profit by total revenue. AQ_{it} is the assets quality, i.e., the ratio of nonperforming loan to total loan of bank *i* for year *t*. Similarly, OE_{it} is the operational efficiency which is the ratio of total interest income to total operating expenses of bank *i* for year *t*. CR_{it} is the credit risk, i.e., the ratio of loan loss provision to total loan of bank *i* for year *t*. Likewise, INF_{it} is the rate of inflation for year *t*, which is obtained by calculating the percentage change in consumer price index (CPI) and GDP_{it} is the growth rate of gross domestic product for year *t*, which is obtained by calculating the percentage change in real GDP. ε_t *is* the residual error term.

DATA ANALYSIS AND DISCUSSIONS

The following paragraphs will present the results of data analysis and discuss them.

Table 1 shows the result of descriptive statistics. The result indicates that there is a wide spread in the difference between the weighted average interest rate charged by the bank in loans and advances and the weighted average interest rate given by the bank on its deposit, i.e., IRS. It ranges from minimum value of 2.52 per cent to maximum value of 7.15 per cent. The average value of return on assets (ROA) 1.51 per cent with minimum value of -1.44 per cent and maximum value of 3.12 per cent is observed. This average value of ROA shows that Nepalese commercial banks have very low financial performance in terms of return of assets. Likewise, capital adequacy ratio (CAR), management efficiency (ME), assets quality (AQ), operational

Table 1
Result of Descriptive Statistics

	Mean	Std. Deviation	Minimum	Maximum
IRS	4.1774	0.7624	2.52	7.15
ROA	1.5114	0.5853	-1.44	3.12
CAR	13.6158	2.6680	4.55	30.32
ME	23.7407	11.1989	-33.23	53.79
AQ	1.7532	2.1394	0.01	24.29
OE	4.4649	1.0886	1.61	8.78
CR	0.6677	0.9162	-2.21	9.14
INF	6.2638	2.1235	4.15	9.94
GDP	4.4500	3.4950	-2.09	8.98

Note. Calculation based on data collected by the author from the annual report of the sample banks and quarterly economic bulletin published by NRB.

Table 2
Correlation Results

	IRS	ROA	CAR	ME	AQ	OE	CR	INF	GDP
IRS	1.0000								
ROA	0.4272	1.0000							
CAR	-0.0334	0.1209	1.0000						
ME	0.0574	0.5739	0.0295	1.0000					
AQ	0.1545	-0.3172	-0.1638	-0.2853	1.0000				
OE	-0.3449	-0.0204	-0.0535	-0.0743	-0.2683	1.0000			
CR	0.1553	-0.3578	-0.2008	-0.2751	0.7358	-0.1840	1.0000		
INF	0.1855	-0.0344	-0.3620	0.0401	0.1736	-0.1562	0.3406	1.0000	
GDP	0.0914	0.1734	0.0938	0.1002	0.0224	0.0563	-0.0972	-0.4712	1.0000

Note. Calculation based on data collected by the author from the annual report of the sample banks and quarterly economic bulletin published by NRB.

efficiency (OE), CR (credit risk) have average value of 13.61 per cent, 23.40 per cent, 1.74 per cent, 4.46 per cent, and 0.67 per cent respectively. Finally, the result depicted in Table 1 shows the average value of inflation 6.23 per cent with minimum and maximum value of 4.15 per cent and 9.94 per cent respectively and average value of growth rate of gross domestic product (GDP) shows the average value of 4.45 per cent with minimum value of -2.09 and maximum value of 8.98 per cent.

Correlation Analysis

Pearson correla-tion has been computed to assess the relationship between the IRS and other independent variables. The result is presented in Table 2. The result illustrates that there is a positive relationship of IRS with ROA, ME, AQ, CR, INF and GDP and negative relationship of IRS with CAR and OE. The result further shows that ROA has positive relationships with CAR, ME and GDP and negative relationships with AQ, OE, CR and INF. Likewise, CAR shows the positive relationship with ME and GDP and negative relationship with AQ, OE, CR and INF. On the other hand, ME demonstrates the positive relationship with INF and GDP and negative relationship with AQ, OE and OE. Likewise, AQ shows the positive relationship with CR, INF and GDP and negative relationship with OE. CR shows the positive relationship with INF and negative relationship with GDP and INF shows the negative relationship with INF.

Estimation of the Model

This study is based on the panel data of 25 commercial banks from 2014 to 2021. It would be appropriate to choose the best model from the pooled, random effect, and fixed effect models when estimating the model using panel data. The Breusch and Pagan (LM) test and Hausman Test were employed in the study to determine which of these three models was the best. The result of Breusch and Pagan (LM) test (Table 3) shows the Chibar^2 value of 15.58 (p value

Table 3

Result of Breusch and Pagan (LM) test for random effects

	Var	sd = sqrt(Var)
IRS	0.5812	0.7624
E	0.2680	0.5177
U	0.0672	0.2593
Test: Var(u) = 0	$chibar^2(01)$ = 15.58	Prob > $chibar^2$ = 0.0000

Note. *Calculation based on data collected by the author from the annual report of the sample banks and quarterly economic bulletin published by NRB.*

Table 4

Result of Hausman Test

	(b)Fixed Effect	(B)Random Effect	(b-B) Difference	sqrt(diag(V_b-V_B))
ROA	0.7739	0.8368	-0.0629	0.0754
CAR	-0.0524	-0.0297	-0.0227	0.0102
ME	-0.0249	-0.0226	-0.0023	0.0043
AQ	-0.0548	-0.0155	-0.0394	0.0202
OE	-0.0336	-0.1691	0.1355	0.0508
CR	0.1886	0.1685	0.0201	0.0218
INF	0.0598	0.0513	0.0085	0.0072
GDP	0.0325	0.0272	0.0053	0.0022
χ^2 (8) = 12.43		Prob> χ^2 = 0.1331		

Note. *Calculation based on data collected by the author from the annual report of the sample banks and quarterly economic bulletin published by NRB.*

0.0000<0.01) which indicates that the given set of panel data is not appropriate for the estimation of the model using pooled regression model. The result of the Hausman Test (Table 4) presents the χ^2 value of 12.43 (p value 0.1331<0.01) which indicates that the given set of data is suitable for the estimation of the model using a random effect model. Thus, this paper has estimated the model using random effects and the result is presented in Table 5.

The result of multivariate regression using a random effect model presented in Table 5 shows that bank specific and macroeconomic variables play vital roles for determining the weighted average interest rate spread (IRS) of commercial banks of Nepal. The result shows that bank-specific factors like return on assets (ROA) and management effectiveness (ME), operational efficiency (OE) and credit risk (CR) and macroeconomic variables of the study, i.e., inflation rate (INF) and gross domestic product (GDP) also plays significant role for determining the IRS. Further, this study reveals that capital adequacy ratio (CAR) and assets quality (AQ) have no significant role for determining the IRS.

Table 5

Regression Result based on Random-effects Model

Variable	Coefficient	Std. Error	t-statistics	p-value
ROA	0.8378	0.1064	7.87	0.000
CAR	-0.0297	0.01853	-1.60	0.109
ME	-0.0226	0.0055	-4.08	0.000
AQ	-0.0155	0.0332	-0.47	0.641
OE	-0.1691	0.0506	-3.34	0.001
CR	0.1685	0.0704	2.39	0.017
INF	0.0530	0.0244	2.10	0.035
GDP	0.0272	0.0130	2.10	0.036
Cons	4.0816	0.4560	8.95	0.000

R^2: within = 0.3000, between = 0.6055, overall = 0.4265 Wald χ^2 (8) = 106.44 Prob > χ^2 = 0.0000

Note. Calculation based on data collected by the author from the annual report of the sample banks and quarterly economic bulletin published by NRB.

The result presented in Table 5 depicts the significant positive coefficient for ROA, CR, INF and GDP and significant negative coefficient for ME and OE. This indicates ROA has a positive influence on IRS and the banks with higher financial performance have higher IRS. The positive influence of ROA aligned with the findings of Ghasemi and Rostami (2015) and contradicts with the findings Muhammad (2012) and Anjom (2021). Similarly, the significant positive coefficient of CR indicates that it also has a positive influence on IRS which depicts that the bank with higher credit risk has higher IRS. The positive influence of CR corroborates the findings of Muhammad (2012) and Anjom (2021) and disagrees with the findings of Ghasemi and Rostami (2015). Likewise, the significant negative coefficient of ME and OE shows that they have a negative influence on IRS which reveals that the bank with sound management and operating activities can reduce their IRS.

Furthermore, the significant positive coefficient of two macroeconomic variables of the study, i.e., INF and GDP shows that they have positive influence on IRS. The positive influence of INF indicates that as the inflation in the economy increases the IRS of Nepalese commercial banks also increases. Finally, the positive influence of GDP shows that banks can increase their IRS when there is economic growth in the country. The positive influence of INF and GDP supports the findings of Claeys and Vander (2008); Sheriff and Amoako (2014); Damane (2020) and Anjom (2021). On the other hand, this finding is opposed with the findings of Ghasemi and Rostami (2015) and Tarus and Manyala (2018).

Likewise, the value of R^2 (overall) 0.4265 reveals that the independent variable included in this study can determine IRS of Nepalese commercial bank by 42.65 per cent and the estimated model is the best suited model, according to the Wald χ^2 value of 106.44 (p value 0.0000<01).

CONCLUSION AND IMPLICATIONS

This study has been carried out to identify the determinants of the IRS of Nepalese commercial banks. This paper concludes that both macroeconomic factors and bank-specific factors influence the IRS of Nepalese commercial banks. The major conclusion of this study is that bank specific factors such as return on assets, credit risk, management efficiency and operational efficiency have a significant influence on IRS. Similarly, this study also concludes that macroeconomic variables such as inflation and growth rate of gross domestic product have significant influence on IRS. However, this study reveals no evidence of a significant relationship between the capital adequacy ratio and assets quality and the IRS of Nepalese commercial banks.

The findings of this study can be useful to the authorities in formulating policies on the spread rate of interest. Evidence of this paper clearly indicates that among the bank specific factors ROA, CR, ME and OE and inflation and gross domestic product (macroeconomic variables) are the major determinants of IRS of Nepalese commercial banks. Thus, the concerned authority should consider these bank specific as well as macroeconomic variables while formulating policy of interest rates. The result of this paper shows the positive influence of credit risk and negative influence of management efficiency and operational efficiency. Thus, the bank management should control the credit risk and improve their efficiency for maintaining the IRS at a lower level. Furthermore, the analysis also shows that higher inflation rate and higher growth rate of gross domestic product also contributes to the higher IRS of Nepalese commercial banks. It is, therefore, concerned that authorities should lower the level of inflation for maintaining the lower level IRS.

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Conflict of interest

The author claims to have no conflict of interests in the study.

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