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Determinants of Interest Rate Spreads in Nepalese Commercial Banks

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Abstract

This study has examined determinants of interest rate spreads of commercial banks in Nepal using the panel data of 7 commercial banks over the period of 6 years (2010-2015). This study has employed the pooled OLS model, fixed effect model and random effect model to investigate the bank-specific variables affecting interest rate spread. The estimated regression models reveal that default risk, profitability and bank size have significant and positive impact on interest rate spreads. Cash reserve requirement has negligible effect on interest rate spreads. Thus, this study concludes that the major determinants of commercial banks' interest rate spreads are default risk, profitability and bank size in Nepal.

Keywords: Interest rate spreads, commercial banks, Nepal, default risk, profitability, cash reserve requirement
JEL Code: C23, C33, C87, E43, G21

I. Introduction

Banking sector's ability to channel savings into productive uses is judged through its level of deposit-lending rate spreads. In fact, a commercial bank achieves the main benefit from the difference between interest paid on deposits and interest received from facilities and loans. The gap between the lending rates and the deposit rates is termed bank interest rate spread. Bank interest rate spread is the interest rate charged by banks on loans to customers minus the interest rate paid by banks for demand, time or savings deposits. When borrowing rates are high, it encourages deposit and provides needed funds for the bank to lend out. However, for a given lending rate, an increase in borrowing rate will lead to a decline in the interest rate spreads which could affect bank profitability. Likely, for a given borrowing rate, a lower lending rate will tend to reduce the bank interest rate spreads which could also affect bank profitability. However, when lending rates are low, they tend to induce investment in an economy leading to growth and development.

A high interest rate spread acts as an impediment to the expansion of financial intermediation necessary for growth and development of an economy. It is often argued that the higher the

interest rate spread, the higher would be the cost of credit to the borrowers for any given deposit rate. Alternatively, a high interest rate spread could mean unusually low deposit rates discouraging savings and limiting resources available to finance bank credit. In this perspective, Chand (2002) has found the several reasons for high interest rate spreads such as: lack of adequate competition, scale diseconomies due to small size of markets, high fixed and operating costs, high transportation costs of funds due to expensive telecommunications, existence of regulatory controls and perceived market risks.

Moreover, Demirguc-Kunt and Huizinga (1998), Moore and Craigwell (2000), Brock and Rojas-Suarez (2000), Gelos (2006), Sologoub (2006), and Crowley (2007) assert that the specific characteristics of commercial banks that can have an impact on their spreads include the size of the bank, ownership pattern, the quality of the loan portfolio, capital adequacy, overhead costs, operating expenses, and shares of liquid and fixed assets. However, past empirical literatures provide an extensive list of variables that affect the spreads and categorize these determinants into five main groups such as: bank-specific variables, system-wide measures of market structure, regulatory environment, legal and institutional environment and macro-economic variables.

In a country like Nepal, a high interest rate spread raises the cost of credit and restricting the access of potential borrowers to credit markets thus, reducing investments and limiting growth potential of the economy. Moreover, problems become more acute for small businesses, household enterprises and rural industries which are vital to promoting equitable growth and reducing poverty in low income countries. The spread between lending rate and deposit rate in Nepal has been widening over the years. It is noted that this situation accounts for the slow growth rate of the economy, as private businesses are unable to borrow at the current interest rate to expand their businesses so as to create employment to absorb the unemployed masses. There is a general perception that while lending rates are too high to induce any meaningful investment and are at the core of low private sector investment in Nepal, however, borrowing rates are too low for savings mobilization.

In Nepal, the banking sector plays a dominant role in the financial sector, particularly with respect to mobilization of savings and provision of credit. In Nepal, banks and financial institutions were now given full autonomy to determine their interest rates on deposits and lending. However, commercial banks in Nepal discourage potential savers due to low returns on deposits and thus, limits financing for potential borrowers, this is due to banks tendency of maximizing profits and widening the interest rate spreads. High interest rate spreads from Nepalese commercial banks attracted a lot of debate in both public and policy forums. Therefore, an analysis of bank interest rate spreads has become central to explore its determinants. There is lack of the empirical studies with respect to the analysis of interest rate spreads at the commercial bank level in Nepal. Thus, the aim of this study is to empirically investigate factors that determine interest rate spreads in

Nepal.

The rest of the study is organized as follows: section 2 reviews the literature on determinants of interest spreads while the research methodology is outlined in section 3. Section 4 provides findings and discussions followed by conclusion in section 5. Section 6 incorporates policy recommendations.

II. Literature Review

The major studies related to determinants of interest spreads have been reviewed as follows:
Demirgüç-Kunt and Huizinga (1999) examine interest spreads in a cross-country set up using data covering commercial banks from 80 countries across the world. The authors find that differences in interest margins and bank profitability are explained by several factors such as bank characteristics, macroeconomic variables, explicit and implicit bank taxation and deposit insurance regulation. After controlling for factors such as differences in bank activity, the extent to which banks are leveraged, and the macroeconomic environment, they claim that lower interest margins and lower profits are associated with larger banks asset to GDP ratio and a lower market concentration ratio. Additionally, they assert that foreign banks are associated with higher interest margins and higher profits compared to local banks in developing countries while the opposite is true for developed countries.

Ngugi (2001) has analyzed the interest rates spread in Kenya from 1970 to 1999 and found that interest rate spread increased because of yet-to-be gained efficiency and high intermediation costs. Increase in spread in the post-liberalization period was attributed to the failure to meet the prerequisites for successful financial reforms, the lag in adopting indirect monetary policy tools and reforming the legal system and banks' efforts to maintain threatened profit margins from increasing credit risk as the proportion of non-performing assets. She attributed the high non-performing assets to poor business environment and distress borrowing, owing to the lack of alternative sourcing for credit when banks increased the lending rate, and the weak legal system in enforcement of financial contracts. According to her findings, fiscal policy actions saw an increase in treasury bill rates and high inflationary pressure that called for tightening of monetary policy.

Grenade (2007) has examined the determinants of commercial banks interest rate spreads in the Eastern Caribbean Currency Union using annual panel data of commercial banks. The author claims that spread is found to increase with an increase in market power, the regulated savings deposit rate, real GDP growth, reserve requirements, provision for loan losses and operating costs.

Afzal (2011) has investigated the determinants of interest rate spreads and margins in Pakistan's commercial banking sector in the post transition period from 2004 to 2009. The author employed an exhaustive set of firm level and macro variables in the model for analysis. The findings of the study reveal that bank size, operational efficiency, asset quality, liquidity risk, absorption capacity and GDP growth were important determinants of banking spreads.

Aikaeli, Mugizi and Ndanshau (2011) have examined the determinants of interest rate spreads in Tanzania and argued that factors that determine interest rate spread can be clustered as bank specific factors, including size, capital structure, management efficiency, ownership pattern, quality of loan portfolio, overhead costs, profit maximization motive, and shares of liquid and fixed assets.

Akinlo (2012) has investigated the determinants of interest rate spreads in Nigeria using a panel of 12 commercial banks for the period 1986-2007.The results suggest that cash reserve requirements, average loans to average total deposits, remuneration to total assets and GDP have positive effect on interest rate spreads. However, non-interest income to average total assets, treasury certificate and development stocks have negative relationship with interest rate spreads.

Mannasoo (2012) has examined the role of recent global financial crisis on interest spreads in Estonia. The pure spread is explained by the degree of bank risk aversion and the market structure of the banking sector. The volatility of money market interest rates is found to have a long-run impact on the spreads. Other factors that drive the interest margins are the regulatory variables, efficiency of banks and bank portfolio effects. Credit risk was found to play a minimal role while higher bank liquidity was associated with lower interest margin.

Afroze (2013) has analyzed the interest rate spread (IRS) of the commercial banks in Bangladesh perspective. Based on the empirical analysis of data for the period 1974-2011 drawn from various publications of Bangladesh bank and other sources, the author concludes that there is statistically significant correlation between interest rate spread and deposit rate but no correlation with the lending rate. The data series for interest rate spread, deposit rate, and lending rate contained a unit root and were integrated of order one. However, the Granger causality test failed to indicate any bilateral causal relationship between IRS and deposit rate, IRS and lending rate, and also to deposit rate and lending rate. The author also found that IRS prevailing in the Bangladeshi banking sector was high compared to that in its neighboring countries.

Nampewo (2013) has examined the determinants of the interest rate spreads of the banking sector in Uganda using time series data for the period 1995-2010. The author applied the Engle and Granger two-step procedure to test for co-integration between the bank rate, treasury bill rate,

exchange rate volatilities, the ratio of money supply to gross domestic product (M2/ GDP) and the proportion of non-performing loans to total private sector credit. The author concludes that the interest rate spread in Uganda is positively affected by the bank rate, the Treasury bill rate and non performing loans. However, the findings of the study show that M2/GDP ratio and real GDP have a negative influence on the spread.

Were and Wambua (2013) have investigated the determinants of interest rate spreads in Kenya's banking sector based on panel data analysis. The empirical results show that bank-specific factors play a significant role in the determination of interest rate spreads. These include bank size based on bank assets, credit risk as measured by non-performing loans to total loans ratio, liquidity risk, return on average assets and operating costs. The impact of macroeconomic factors such as real economic growth and inflation is not significant.

Njeri, Ombui, and Kagiri (2015) have investigated the determinants of interest rate spreads in commercial banks of Kenya based on data analysis and quantified the impact of those factors on interest rate spreads. The research involved collecting secondary data from commercial banks in Kenya, CBK, financial journals and newspapers as well as primary data Questionnaires were used to collect primary data where drop and pick method was used. Based on the results from the inferential statistics the authors conclude that inflation rate, credit risk, liquidity ratio and returns on average assets significantly influence interest rates spreads in commercial banks of Kenya.

The relevant literature reviewed indicates the existence of several studies in developed and emerging economies while there was paucity of studies in Nepal. Therefore, this study has sought to fill the gap of investigating determinants of interest rate spreads in Nepalese context.

III. Research Methodology

The sample

The study has analyzed data obtained from 7 commercial banks. The study has employed descriptive and causal comparative research design. The banks, as sample, were selected based on the availability of the relevant data on the various variables used in the study. Thus, convenience sampling method was used in choosing the banks for the study. Moreover, in selecting the 7 banks for the study, due care is given to include banks such as: joint venture, domestic, best performer, average performer and comparatively week performer in the sample. The banks selected for the study are: Nepal Investment Bank Ltd, Everest Bank Ltd, Nepal Bangladesh Bank Ltd, Machahapurche Bank Ltd, Siddarth Bank Ltd., Sunrise Bank Ltd. and Sanima Bank Ltd. The population of this study is the "A class" commercial banks listed in the NEPSE. This study assumes that the selected samples fairly represent the study population.

The data

Data were collected from the annual reports of the banks in the sample over the period of 6 years (2010-2015). The data include time-series and cross-sectional data, i.e. panel data set. In this study three panel models such as: pooled OLS model, fixed effect model and random effect model have been employed for analyzing the data. Pooled OLS model is one where the data on different units are pooled together with no assumption on individual difference. The adoption of pooled OLS model is based on the assumption that there is no group or individual effects among the banks in the sample. Dumicic, Zmuk and Mihajlovic (2016) have asserted that the selection of an appropriate panel model (pooled OLS, fixed effect, and random effect) is made using the *F*-test for the fixed effect model, the Breusch-Pagan Lagrange Multiplier (LM) test and the Hausman test. Moreover, Baltagi, Bresson and Pirotte (2003) have asserted that the choice between the random effect and fixed effect estimators can be based upon the standard Hausman test. If this standard Hausman test rejects the null hypothesis that the conditional mean of the disturbances given the regressors is zero, the applied researcher reports the fixed effect estimator. Otherwise, the researcher reports the random effect estimator. In this study, data analysis was done using the Gretl 1.1 version.

The model

This study has employed three econometric models for analyzing the data. Initially the pooled OLS model specification is represented by the following equation:

$IRS_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$

Where, IRS_{it} is defined as interest rate spreads for bank i and time t, X_{it} is a vector of bank-specific variables for bank i and time t; and ε_{it} is error term for bank i and time t. In this model, the assumption is that the error term is distributed independently and identically in a manner that the variance is equal to zero. Based on the prescribed econometric model, the determinants of interest rate spreads of Nepalese commercial banks have been estimated with the following regression equation:

$IRS_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 CRR_{it} + \beta_3 PROF_{it} + \beta_4 SIZE_{it} + e_{it}$

Where:

IRS_{it} = Interest rate spreads of i^{th} bank in year t

DR_{it} = Default risk, which is calculated as non-performing loans to total loans of i^{th} bank in year t

CRR_{it} = Cash reserve ratio of i^{th} bank in year t

$PROF_{it}$ = Profitability, which is calculated as net income divided by total assets of i^{th} bank in year t

$SIZE_{it}$ =Natural logarithm of total assets of i^{th} bank in year t

β_0 = Intercept of the regression line

$\beta_1, \beta_2, \beta_3, \beta_4$ = The slope which represents the degree with which interest rates spreads changes as the independent variable changes by one unit. The priori expectation is that coefficients $\beta_1, \beta_2, \beta_3$ and $\beta_4 > 0$.

e_{it} = error component

In addition to pooled OLS model, this study has employed fixed effect approach. Fixed effect approach allows for the unobservable bank heterogeneity. This approach allows for different constants for each bank in the sample. In this instance, Greene (2002) suggested following fixed effect model:

$Y_{it} = X_{it}\beta + \alpha_i + \varepsilon_{it}$

Where, $\alpha_i = z_i \alpha$, embodies all the observable effects and specifies an estimable conditional mean. Greene (2002) has asserted that fixed effect approach takes α_i to be a group-specific constant term in the regression model. However, the use of a fixed effects model will eliminate the time-invariant hidden bank features that affect interest rate spread, and will make fixed effects estimations less efficient than the random effect estimation counterpart.

Additionally, random effect model has also been used in the study. In the random effect model constants for each bank are taken as random parameters, hence, incorporated in the error term. Greene (2002) pointed out that if the unobserved individual heterogeneity, however, formulated, can be assumed to be uncorrelated with the included variables, then the model may be formulated in random effect form. The model suggested by Greene (2002) can be written as:

$Y_{it} = X_{it}\beta + \alpha + u_i + \varepsilon_{it}$

This random effects approach specifies that u_i is a group specific random element, similar to ε_{it} except that for each group, there is but a single draw that enters the regression identically in each period.

In this study, these three regression models have been used in order to investigate the determinants of interest rate spreads in Nepal.

Study variables and hypothesis

In this study, the choice of variables was mostly affected by the approach in other empirical studies, as well as by determinants of interest rate spreads suggested by the literature. The factors affecting interest rate spreads were examined by defining a set of variables. The selected dependent and independent variables are specified as follows:

Dependent variable

In view of goal of this study, the study has used the interest rate spreads as dependent variables. This refers to the difference between bank's lending and deposit rate. It was calculated as average bank lending rate minus average bank deposit rate. Interest rate spread of commercial bank is hypothesized to be a function of selected bank specific factors.

Independent variables

Default risk (DR)

Non-performing loans to total loans ratio is used as an indicator of default risk or quality of loans. This is equal to the average of the past due receivables, overdue and doubtful to total loans. An increase in provision for loan losses implies a higher cost of bad debt write offs. Given the risk-averse behavior, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads. Likely, Chirwa and Mlachila (2004) and Sidiqqui (2012) found a positive impact of default risk (DR) on interest spreads of commercial banks for Malawi and Pakistan, respectively. In the same manner, Were and Wambua (2013) have also found that credit risk (default risk) has positive and significant effect on interest rate spreads. Therefore, a significant positive relationship is expected between interest rate spreads and default risk.

H_1: Default risk has a significant and positive effect on interest rate spreads

Cash reserve requirement (CRR)

This is the prescribed percentage of commercial banks' total deposits that must be kept with the monetary authority as a caution. The cash reserve requirements are viewed as the implicit taxes that increase interest rate spreads because banks tend to shift them to customers by either increasing the lending rate or reducing the deposit rate. Akinlo and Owoyemi (2012) conclude that cash reserve ratio is significantly positively related to interest rate spreads. Akinlo (2012) also asserts that cash reserve requirements have positive effect on interest rate spreads. In line with past empirical evidence, it is hypothesized that cash reserve requirement is positively related to interest rate spreads.

H_2: Cash reserve requirement has a significant and positive effect on interest rate spreads

Profitability (PROF)

In this study, profitability is represented by return on assets. Return on assets explains the overall profitability of a bank emanating from its asset portfolio. It is an effective measure for evaluating the performance of a bank's management. A bank with higher profitability can otherwise afford to charge lower spreads (Norris & Floerkemeier, 2007). However, banks with a higher return on assets can have higher spreads while their interest-sensitive assets perform better. This is generally considered as a good indicator to evaluate the profitability of the assets of a bank in comparison to other banks firms in the same industry. Siddiqui (2012) finds a positive effect of return on assets on interest spreads. Afzal and Mirza (2010) conclude that profitability (ROA) is significant and positive; indicating higher spreads for banks with an efficient use of assets. Were and Wambua (2013) have found that profitability has positive and significant effect on interest rate spreads. Thus, a positive relationship is expected between profitability and interest rate spreads.

H_3: Profitability has a significant and positive effect on interest rate spreads

Bank size (SIZE)

In this study, bank size is measured by natural logarithm of total assets of selected banks. Bank size is used to gauge the possibility of economies of scale in banking. Banks that enjoy economies of scale incur a lower cost of gathering and processing information, resulting in greater financial flexibility and, ultimately, higher spread. A stronger asset base is expected to positively impact interest rate spreads (Maudos & Solis, 2009). Ideally one would expect bigger banks to be associated with lower interest rate spreads, arguably because of large economies of scale and ability to invest in technology that would enhance efficiency. However, to the extent that bank size connotes control of the market in the deposit and loan markets, a positive relationship between interest rate spreads and bank size should not be surprising. Afzal and Mirza (2010) have found significant positive effect of bank size on interest rate spreads. Were and Wambua (2013) have found that bank size has positive and significant effect on interest rate spreads meaning that big banks have comparatively higher spreads than small banks. In line with past empirical studies, a positive relationship is expected between bank size and interest rate spreads.

H_4: Bank size has a significant and positive effect on interest rate spreads

IV Findings and Discussions

Descriptive statistics

Table 1 presents the descriptive statistics of the variables used in this study. The minimum and maximum interest rate spreads of Nepalese commercial banks during the sample period are 2.27% and 5.69% respectively. The average interest rate spread is about 4.43%. The result indicates that Nepalese commercial banks produce 4.43% average annual interest rate spreads.

The results of the default risk, which is calculated as non-performing loans to total loans percentage ranged from minimum 0.004% to maximum 17.99%. The average credit risk is 2.16% and the standard deviation of the same variable is 2.93%. The result shows that Nepalese commercial banks do not have high default risk but it varies drastically. The average cash reserve requirement is about 17.79%, meaning that in average Nepalese commercial banks have kept cash about 17.79% of banks' total deposits with the monetary authority as a caution. The standard deviation of cash reserve requirements percentage shows that CRR varies significantly during sample period.

Table 1

Descriptive statistics of variables (n=42)

Variable	Scale	Mean	Std. Deviation	Minimum	Maximum	CV	Skewness	Ex. kurtosis
IRS	Percent	4.434	0.713	2.270	5.690	0.161	-0.451	0.538
DR	Percent	2.164	2.926	0.004	17.990	1.352	3.940	18.614
CRR	Percent	17.789	8.580	5.610	34.030	0.482	0.341	-1.049
PROF	Percent	1.680	1.331	0.000	8.150	0.792	2.817	11.541
SIZE	Ln	24.191	0.628	22.703	25..371	0.026	-0.166	-0.432

The average profitability (ROA) is 1.68%, which shows the weak profitability position of Nepalese commercial banks. The standard deviation of the profitability (ROA) is about 1.33% which indicates the substantial variation of profitability during sample period. The standard deviation of the bank size (lnassets) indicates the minimal variation among the banks about their size during study period.

Correlation analysis

Table 2 shows the degree of association among the variables used in the study. The results indicate that interest rate spreads is positively correlated with profitability and bank size. The results imply that the interest rate spreads tend to move in the same direction with profitability and bank size. Moreover, the relationship of interest rate spreads with default risk seems positive but the relationships look weak. However, interest rate spread is negatively correlated with cash reserve requirements. The result implies that the relationship is not strong.

Table 2

Pearson correlations coefficients (n=42)

IRS	DR	CRR	PROF	SIZE	Variables
1.0000	0.1683	-0.0057	0.5113	0.3445	IRS
	1.0000	-0.0241	-0.0466	-0.2735	DR
		1.0000	-0.0268	-0.3045	CRR
			1.0000	0.0736	PROF
				1.0000	SIZE

Moreover, the correlation matrix of the variables presented Table 2 reveals that all correlations coefficients among the independent variables are less than 0.40, implying the absence of multicollinearity. Thus, there is no evidence of presence of multicollinearity among the independent variables and thus, the variables chosen seem appropriate for the regression model.

Regression results

In this study, data analysis techniques employed are panel data regression models. Thus, model diagnostic test statistics were used in order to choose the appropriate panel data model for the study. Testing and determination of appropriate panel data model were done by using the 'Joint significance of differing group means', Breusch-Pagan test statistic, and the Hausman test. The joint significance of differing group means statistic is F(6, 31) = 1.9442 with p-value 0.1048. The p-value is 0.1048 which is higher than 0.05 indicates that pooled OLS model is adequate as compared to fixed effect model. Likely, Breusch-Pagan test statistic has been used to compare pooled OLS model with random effect model. Breusch-Pagan test statistic shows that LM = 1.6634 with p-value = prob(chi-square(1) > 1.6634) = 0.1972. The p-value is 0.1972, which is higher than 0.05, and thus, pooled OLS model is preferred over random effect model. Moreover, Hausman test statistic has been used to compare random effect model and fixed effect model. Hausman test statistic is H = 1.0847 with p-value = prob(chi-square(4) > 1.0847) = 0.8967. The p-value is 0.8967, which is higher than 0.05, thus the random effects model is preferred as compared to fixed effect model. In view of model diagnostics statistics, the pooled OLS and random effects model stood superior among three models considered for the study. However, the results of these three models have been presented and discussed to ensure precise estimation of the determinants of interest rate spreads in the current study.

The test for normality of residual has been conducted in the current study using Gretl and the test statistics have been presented in Table 3. In pooled OLS model, the result of the test for null hypothesis of normal distribution: Chi-square (2) = 1.434 with p-value 0.4883 shows that null hypothesis is accepted. Thus, panel data set used in pooled OLS model is normally distributed.

Table 3

Test statistics for normality

Statistics		Pooled OLS Model	Fixed Effect Model	Random Effect Model
Test Statistics for normality	Chi-square (2)	1.4340	0.4396	1.1124
	p-value	0.4883	0.8027	0.5734

Results are drawn from Gretl-Statistical Software

In fixed effect model, the test for normality of residual was performed. The null hypothesis was that error is normally distributed. The result of the test statistics is Chi-square(2) = 0.4396 with p-value 0.8027. The insignificant p-value of Chi-square indicates that the null hypothesis is accepted that error is normally distributed. The test for normality of residual has also been conducted for random-effects model. The null hypothesis was that error is normally distributed. The result of test statistic is Chi-square (2) = 1.1124 with p-value 0.5734. The insignificant p-value

of Chi-square (2) test statistic indicates that the null hypothesis is accepted. The result proves that error is normally distributed. Thus, the panel data used in the analysis seems appropriate for the regression models.

The results of the determinants of interest rate spreads using pooled OLS are presented in table 4. The value of R^2 and adjusted R^2 are 0.4580 and 0.3994 respectively. The overall explanatory power of the regression model looks good with R^2 of 0.4580. The result implies that about 45.80% change in interest rate spreads is explained by the variations in explanatory variables, denoting that the regression model has good fit and is reliable. The overall explanatory power of the regression model also looks good with R^2 of 0. 6062 in the fixed effect model.

The p-value ($F_{Sig.}$) of F statistics in the pooled OLS model represent that the model is fairly fitted well statistically. Because, the F-statistic, a measure of the overall significance of the regression, shows that the explanatory variables employed are significant at the 1% level. The overall significance of the fixed effect regression model is proved with the p-value ($F_{Sig.}$) of F statistics which is also found significant the 1% level.

Table 4

Regression coefficients (n=42)

Variables	Pooled OLS Model				Fixed Effect Model			Random Effect Model		
	Coefficients	t	Sig.	VIF	Coefficients	t	Sig.	Coefficients	t	Sig.
Constant	-8.4719	-2.2646	0.0295		-8.6733	-2.4526	0.0200	-8.6259	-2.5580	0.0148
DR	0.0768	2.4874	0.0175	1.097	0.0791	2.4988	0.0180	0.0785	2.6604	0.0115
CRR	0.0124	1.1646	0.2517	1.118	0.0138	1.3676	0.1813	0.0134	1.4014	0.1694
PROF	0.2664	4.0985	0.0002	1.006	0.2813	4.4136	0.0001	0.2775	4.6131	0.0001
SIZE	0.4990	3.2992	0.0022	1.211	0.5051	3.5336	0.0013	0.5037	3.6981	0.0007
	R^2 =, 0.4580, Adj. R^2 = 0.3994, F.= 7.8163, P-value(F)= 0.0001, Durbin-Watson statistic = 1.4643, P-value (DW) = 0.2097 Test for differing group intercepts: F(5,26)=, 1.9442, p-value = 0.1048				R^2 = 0.6062 Adj.R^2 = 0.4791, F(9,26)=, 4.7717, P-value(F)=, 0.0004, Durbin-Watson= 2.0061, P-value (DW) = 0.4867			Breusch-Pagan test: Chi-square(1) = 1.6634, P-value = 0.1972, Hausman test: Chi-square(4) = 1.0847, P-value = 0.8967		

****Significant at the 0.01 level (2-tailed) ,** Significant at the 0.05 level (2-tailed), * Significant at the 0.1 level (2- tailed). Results are drawn from Gretl-Statistical Software*

As a test of the presence of multicollinearity among independent variables in the pooled OLS model, variance inflation factors (VIF) have been computed. The variance inflation factors (VIF) show a value less than 1.3 for each variable. The larger the value of VIF, the more troublesome or collinear the variables and as a rule of thumb a VIF greater than 10 is unacceptable (Gujarati, 2004). The VIF less than 1.3 for each variable indicates the non-presence of multicollinearity. Thus, the independent variables chosen for the models are not suffered from multicollinearity problem.

The empirical findings show that default risk is positively related to interest rate spreads in three models estimated. The coefficient is statistically significant at 5 percent level of significance. The results show that increases in default risk will increase interest rate spreads in Nepalese perspective. This result supports the findings of Chirwa and Mlachila (2004), Sidiqqui (2012), and Were and Wambua (2013), where they found a positive impact of default risk (DR) on interest rate spreads.

Profitability (ROA) is found significantly positively associated with interest rate spreads in all three models estimated. The result is found significant at 1% level of significance in these three models used. The result indicates that profitable commercial banks do increase interest rate spreads in Nepalese context. This result is consistent to the priori expectation and supports the findings of Afzal and Mirza (2010), Siddiqui (2012) and Were and Wambua (2013), where they found a positive impact of profitability on interest rate spreads, indicating higher spreads for banks with an efficient use of assets.

Bank size is also found significantly positively associated with interest rate spreads in these three models employed, meaning that big Nepalese banks have comparatively higher spreads than small banks. The result is found significant at 1% level of significance in these three models estimated. The result is consistent to the priori expectation and also supports the findings of Maudos and Solis (2009), Afzal and Mirza (2010) and Were and Wambua (2013), where they have found positive and significant effect of bank size on interest rate spreads.

The result reveals that the cash reserve requirements is found statistically insignificant in these three models estimated for explaining interest rate spreads. Meaning that the strength of its effect on interest rate spreads is considerably less than what was expected. Moreover, the low coefficients of the cash reserve requirements in these three models estimated could also reflect the fact that it doesn't appear as the influencing variable for interest rate spreads in Nepalese context.

V. Conclusion

This study has investigated the determinants of interest rate spreads of commercial banks listed in the Nepal Stock Exchange. Data were collected from the annual reports of 7 commercial banks in the sample over the period of 6 years (2010-2015). The data were analyzed using pooled OLS model, fixed effects model and random effects model. The dependent variable chosen in the study is interest rate spreads and whereas default risk, cash reserve requirement, profitability, bank size are considered as independent variables. The estimated regression models reveal that default risk, profitability and bank size have positive association with interest rate spreads. However, cash reserve requirement has immaterial impact on interest rate spreads. Thus, this study concludes that the major determinants of commercial banks' interest rate spreads are default risk, profitability and bank size in Nepalese context.

VI. Policy Recommendations

This study offers the following recommendations based on the findings from the empirical analysis.

Interest rate is inevitable in the financial sector since it is the only way of rewarding depositors and meeting the costs in commercial banks. The difference between lending and deposit rate can, however, be controlled. Nepalese commercial banks have excessive levels of interest rate spreads which can pose a significant threat to lending activities and deposit collection. Banks should try as much as possible to strike a balance which will help them to cover cost associated with lending and at the same time, maintain good banking relationship with their borrowers and depositors. Moreover, bank management should ensure that appropriate policies procedures, management information systems and internal controls system should be followed to maintain interest rate spreads at prudent levels with consistency and continuity.

Commercial banks should increase the range of alternative investments available to institutional investors which would improve their flexibility in managing both long term and short term investments since high-concentration deposits from large depositors are able to distort higher level spreads based on their leverage with the individual bank.

There is need to strengthen bank interest rate spreads policy through effective and efficient regulation and supervisory framework. Commercial banks should develop credit procedures, policies and improve analytical capabilities of loans by which overall credit management could be effective to reduce non-performing loans and enhance their profitability. Moreover, commercial banks should avoid giving out loans that will lead to bad debt. This sort of effort can reduce interest rate spreads.

In an effort to open up the financial sector, policy makers should device measures to promote the growth of medium sized banks in a bid to enhance their ability to penetrate the market so as to break market dominance by a few banks and also enhance competition. This kind of strategy will increase competition among banks and hence, can reduce interest rate spreads.

There is a need for the government to provide essential infra-structural support to both lenders and borrowers. The findings of this study also point to the view that the banks should improve their management practices particularly in the light of the practices in other developed and developing countries.

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