Firm-specific Variables and Net Interest Margin in Nepalese Banks[9]

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Abstract

This paper examines the impact of firm-specific variables on net interest margin in Nepalese commercial banks for the period 2005/06-2018/19. Secondary source data were collected through NRB and data have been analyzed using descriptive and causal comparative research design. In this paper, net interest margin is used as dependent variable and bank-specific variables such as size of assets, deposit ratio, loan ratio, and capital ratio are considered as explanatory variables. The estimated correlation results of the paper reveal that equity capital, bank loans and deposits are positively related with net interest margin of Nepalese commercial banks. Moreover, the regression results of this paper indicate that equity capital, bank lending and deposits have significant impact on net interest margin of banks. Finally, this paper concludes that bank loans and deposit have strong explanatory power to explain net interest margin as profitability in Nepalese commercial banks. Policy makers are suggested to formulate sound bank policies and to adopt effective strategies to increase the size of bank deposits as well as bank lending to maximize the profitability (net interest margin) in Nepalese commercial banks.

Keywords: net interest margin, bank deposits, bank loans, equity capital and size of assets

Introduction

The economic growth of nation depends on development of financial market and financial institutions. The role of financial institutions is to facilitate the flow of funds from unproductive sector to productive sector which helps to accelerate economic development of the nation. For this purpose, banking sector plays major role in generating and rendering required financial resources and services towards business firms. The financial intermediation provided by the banking sector supports economic acceleration by transforming deposits into productive investments (Levine et al., 2000). During the last four decades, advancement in technology and globalized business

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activities has allowed the banking sector to take advantages for the improvement in its performance and profitability both for bank-oriented and market-oriented countries. Athanasoglou et al. (2006) and Ramlall (2009) stated both internal and external determinants have affected the performance and earnings of the banks.

In general, profitability of bank is measured in terms of net interest margin, return on assets, return on equity, return on capital employed etc. Net interest margin is the percentage of net interest on total assets. It is a measure of difference between interest income generated by banks from lending and amount of interest paid out to their deposits in relative to the amount of total assets. It is defined as net interest income divided by total assets of banks. Determinants of banks' net interest margin are usually assorted into internal and external factors. The internal factors are bank-specific variables which are under the control of banks and external factors are macroeconomic variables which affect net interest margin but they are beyond controlling power of banks' management. In this context, this paper focuses to address the issues of why net interest margin of Nepalese banks is low? and what are the firm-fundamental variables which have more impact on net interest margin in Nepalese commercial banks?

Literature shows different theories of bank profitability. Market Power hypothesis argued performance is influenced by industry's market structure. Structure Conduct Performance (SCP) and Relative Market Power (RMP) hypotheses are important approaches of Market Power (MP) theory. SCP approach argues level of bank market concentration raises potential market power of banks which increases their performances. SCP presupposes that higher concentration permits collusion of banks to set higher prices and consequently gain substantial profitability (Mason, 1939; Heggested, 1977; Tregenna, 2009; Baye, 2010). Profits of banks in highly concentrated industries have significantly higher than banks operating with lower concentration banks.

Market power (MP) hypothesis proposes that bank performance is affected by market share. MP hypothesis assumes large banks with differentiated products influence prices and increase bank performance. Berger (1995) revealed MP hypothesis and suggested that firms with large market shares with product differentiation are able to exercise MP and are capable to make more noncompetitive profits. Increase of firms in banking market increases market

competition and focuses on higher concentration which makes higher profits and long-run relationship exists between market structure and performance (Chirwa, 2003).

Efficiency Structure (ES) theory argues higher performances of banks are not reasons of behavior but is the causes of higher and more efficiency leads to larger market shares that banks possess (Demsetz, 1974). This hypothesis assumes market share as a proxy to efficiency and there is no association between market concentration and bank performance while there is significant relationship between bank performance and market share (Smirlock, 1985). There are two hypotheses of ES: X-efficiency hypothesis, and Scale-efficiency hypothesis. X-efficiency hypothesis argues more efficient banks are more profitable due to lower costs and larger share of market (Athanasoglou et al. 2006). Scale-efficiency hypothesis suggests economies of scale are better rather than differences in management or production technology. Bank performance is determined not only by market concentration but by bank efficiency (Grygorenko, 2009).

Short (1979) revealed that assets size affects capital adequacy of banks. Relatively large banks tend to raise less expensive capital which makes more profitability. Berger et al. (1987) suggested little cost saving can be achieved by increasing size of banks and large banks faces scale inefficiencies. Higher assets may not necessarily lead to higher profits because of diseconomies of scale and higher loans of banks contribute towards more profitability (Javaid et al., 2011). Bourke (1989) revealed a positive relation between liquidity and bank profitability whereas Molyneux and Thorton (1992), and Kosmidou et al. (2005) argued that liquidity and profitability are inversely related.

Neely and Wheelock (1997) suggested per capita income exerts strong positive effect on bank earnings. Demirguc-Kunt and Huizinga (1999) found economic growth boost bank profitability for most of countries. Demirguc-Kun, and Huizinga (2000); and Bikker and Hu (2002) observed cyclical movements and bank profits are correlated with business cycle. The association between inflation and bank profitability may be a positive or negative which are depending on whether it is anticipated or unanticipated (Perry, 1992).

Naceur (2003) examined the impact of bank characteristics on net interest margin and return on assets using bank level data for the period 1980-2000. Fixed effect and random effect models were applied to analyze bank fundamentals and net interest margin.

Results of the study suggests higher net interest margin and return on assets tend to be associated with banks that hold a relatively large amount of capital with more overheads. Moreover, findings of study reported that bank loan had a positive and significant impact on net interest margin. Finally, Naceur concluded size of bank had a negative and statistically significant impact on net interest margin which reflects the scale inefficiencies of banks.

In examination of impact of bank characteristics, financial market structure and macro-economic conditions on net interest margin and return on assets in banking industry, Kasmidou et al. (2005) used time series data for the study period of 1998-2001 and applied regression models. Estimated results revealed cost to income ratio had negative and significant effect on net interest margin of banks. Furthermore, results suggested that liquidity had negatively related with net interest margin but positively related with return on average assets. Finally, finding of the study concluded loan loss reserve was positively and significantly related with net interest margin.

Kosmidou et al. (2006) analyzed profitability of banks in terms of net interest margin and return on average assets using 58 operating banks in UK for the period 1998-2001. In this study, Kosmidou et al. applied multivariate analysis framework. The estimated results of study suggested bank size had a significant and positive impact on net interest margin. Moreover, Kosmidou et al. revealed capital strength was the most significant factor positively affects net interest margin of banks. Finally, findings of the study concluded that liquidity had a negative effect on NIM. Sufian and Habibullah (2009) argued size of assets had a positive and significant impact on return on assets and net interest margin of banks but its impact on return on equity was negative.

In examination of impact of assets, loans, equity, deposits, economic growth, inflation and market capitalization on net interest margin of banks, Gul et al. (2011) used data for the period 2005-2009. In this study, authors employed regression models to analyze data and observed size had significant and negative impact on net interest margin. Furthermore, estimated results of the study reported capital had significant and negative impact on net interest margin. Moreover, findings of the study suggested loan had positive and significant impact on net interest margin. Finally, Gul et al. concluded growth rate had negative and significant impact on net interest margin.

San and Heng (2013) examined the impact of bank-specific variables and macroeconomic factors on net interest margin for the study period 2003-2009. The study applied regression models to analyze factors affecting net interest margin of banks and showed that loan loss reserve to gross loan ratio, liquidity, size of assets, gross domestic growth rate and consumer price index of banks had positive relation with net interest margin but only size of assets had significant impact. Moreover, estimated result suggested equity to total assets and cost to income ratio were inversely related with net interest margin but, only cost to income ratio had significant effect on net interest margin of banks.

Jara-Bertin et al. (2014) examined the impact of bank-specific, industrial and macroeconomic determinants on bank performance in Latin America using generalized method of moments (GMM) for the period 1995-2010. Estimated results revealed capital ratio, assts size, specialization degree, service diversification, bank concentration, inflation and economic growth had significant impact on bank profitability. Moreover, findings of the study suggested inverse effect of operational efficiency, liquidity risk and credit risk on bank performance in Latin America.

In examination of macroeconomic and bank-specific factors on net interest margin of commercial banks, Zeb and Bashir (2016) used data of 15 commercial banks for the period 2009-2012. In this study, least square and fixed effect models were applied to analyze factors affecting net interest margin of banks. Estimated result reported capitalization, management quality, liquidity default risk had mixed effect on net interest margin of banks. However, economic growth and inflation had no significant effect on net interest margin. Moreover, results of the study concluded that bank size and bank ownership had significant role in explaining net interest margin of banks in Pakistan.

Barik and Raje (2019) analyzed various factors (bank-specific, macroeconomic and system level variables) affecting net interest margin of Indian banks using bank level data for the period 2011-2017. In this study dynamic panel model of GMM framework was applied. The estimated results of the study showed that size of loan, current and fixed deposits to total deposits, capital to risk weighted assets ratio, operating costs, repo rate and economic growth were significant determinants of net interest margin in Indian banks.

Literature shows that commercial banks have a dominant position in the financial system of Nepal. Total twenty-seven commercial banks are providing various banking services to Nepalese business and non-business sectors. At present dynamism and globalization age, Nepalese banks are facing numerous challenges for their survival, profitability and development. The preponderance of prior theoretical and empirical studies on factors affecting net interest margin of banks carried out in the developed and developing countries but a very few studies have been made in developing countries. There is lacking in-depth studies in under-developing countries like Nepal. Thus, this paper is an attempt to analyze the firm-specific variables affecting net interest margin of Nepalese commercial banks.

The basic objective of this paper is to examine the impact of firm-specific variables on net interest margin of Nepalese banks. Section two covers research methodology. Section three of this paper deals with the results and discussion of the study. Finally, section four of this paper summarizes conclusion and suggestions for future research.

Research Methodology

Research Design

This paper has used descriptive research design to explain the net interest margin of 15 banks consisting 210 observations during the fiscal year 2005/06 through 2018/19 with respect to size, capital, deposits and loans. The causal comparative research design is applied to examine the impact of firm-specific variables such as size of assets, capital ratio, deposit ratio, and loan ratio on net interest margin of Nepalese commercial banks. This paper has used Pearson's correlation analysis to ascertain, understand and analyze the directions and relationship of explanatory variables with net interest margin. Furthermore, this study has employed univariate, and multi-variate regression models to examine the impact of explanatory (firm-specific) variables on net interest margin of Nepalese commercial banks.

Nature and Source of Data

This paper has used secondary sources of data. For the secondary data set, the necessary information was collected from periodical reports and statements of banks

published by Nepal Rastra Bank (NRB) database and financial statements of respective banks covering the period of fourteen years i.e., from the fiscal year 2005/06 to 2018/19.

Population and Sample

In this paper, all the A class commercial banks licensed by NRB till mid-July 2019 are considered as population. Out of total 27 commercial banks by the end of FY 2018/19, fifteen commercial banks have been selected as sample. Fourteen observations from each of sample banks and total two hundred ten observations have been considered to analyze the factors affecting net interest margin of banks.

Analysis Tools

This paper has applied SPSS (version 20) program to process and analyze the collected data. The study has used correlation analysis and regression analysis along with statistical test of significance such as t-test, F-test, Adjusted R^2, Durbin-Watson (DW) test of auto-correlation and Variance Inflationary Factor (VIF) test of multicollinearity. The ordinary least square regression models have been applied to examine the impact of firm-specific factors that influence net interest margin of Nepalese commercial banks.

Variables

Net interest margin: In this paper, net interest margin ratio as bank profitability is considered as independent variable. The net interest margin is percentage of net interest on total assets of banks. It is a measure of the difference between the interest incomes generated from loans or lending and amount of interest paid out to their deposits in relation to total assets. Net interest margin is determined using equation 1.

$$Net\ interest\ margin = \frac{Net\ interest\ income}{Total\ assets} \qquad (1)$$

The prior theoretical and empirical studies have observed several factors that affect net interest margin of banks. In this study, assets size, capital ratio, loan ratio, and deposit ratio are used as independent (explanatory) variables to examine their impact on net interest margin of banks.

Assets size: Assets size is the sum of total assets. In the most of finance and economics literature, total assets of banks are used as the proxy for bank size. In this study, assets size is used by natural logarithm of total assets as a proxy of bank size. It is applied to capture the fact that larger banks are better placed than smaller banks in

harnessing economies of scale in transactions to explain the effect that they will tend to enjoy a higher level of profits. Consequently, a positive relationship is expected between the size of assets and profitability of the banks. Assts size of bank is computed using equation 2.

$$Assets\ size = Natural\ logarithm\ of\ total\ assets \qquad (2)$$

Capital ratio: Capital ratio is the ratio of equity capital to total assets of banks. It is used to measure capital strength. It is expected that higher the ratio, lower the need for external funding and higher the profitability of banks. It shows the ability of a bank to absorb losses and handle risk exposure with shareholders' equity. Capital ratio is expected to have positive relation with performance that well-capitalized banks face lower costs of funding and risks (Berger, 1995; Bourke, 1989). In this paper, capital ratio is the ratio of total shareholders' equity to total assets which is considered as an explanatory variable to measure the net interest margin. Capital ratio is computed using equation 3.

$$Capital\ ratio = \frac{Total\ shareholder's\ equity}{Total\ assets} \qquad (3)$$

Loan ratio: Loan ratio is the ratio of total loans to total assets of banks. It is a measure of income source of banks and is expected to affect net interest margin positively unless bank takes on unacceptable level of risk. Other things remain constant, more deposits are transformed into loans which results the higher net interest margin. Miller, and Noulas (1997) suggested that greater the exposure of financial institutions to high-risk loans, higher would be the accumulation of unpaid loans and profitability would be lower. Large size of low-risk loans has produced higher returns. Therefore, large size of low-risk bank loan has positive effect on net interest margin whereas high-risk loan has negative effect on net interest margin of banks. In this paper, loan ratio is determined using equation 4.

$$Loan\ ratio = \frac{Total\ loans}{Total\ assets} \qquad (4)$$

Deposit ratio: Total deposit ratio is the ratio of total deposits to total assets of banks. The deposit measures liquidity position of a bank. It is also considered to measure as a liability of bank toward its depositors. Deposits are the principal source of bank funding. The more deposits are transformed into more bank loans at the higher interest margin which helps to increase bank profitability. The deposit is considered as

an explanatory variable to measure net interest margin and deposits are expected to have positive impact on net interest margin. In this paper, deposit ratio is estimated using equation 5.

$$Loan\ ratio = \frac{Total\ deposits}{Total\ assets} \qquad (5)$$

Model Specification

In the finance and economics literature, causal comparative research design and ordinary least square regression models have been commonly applied for explaining net interest margin of banks. In this paper, univariate and multivariate regression models under casual comparative research design are used to examine the impact of firm-specific variables on net interest margin of banks. In this study, assets size, capital ratio, loan ratio, and deposit ratio are considered as explanatory variables of net interest margin of Nepalese commercial banks. The linear regression model which is applied in this paper to analyze the factors affecting net interest margin of banks is presented in equation 6.

$$Y=\beta_0+\beta_1\ ln\ X_1+\beta_2\ X_2+\beta_3\ X_3+\beta_4\ X_4+e_t \qquad (6)$$

Y is net interest margin of banks, X_1 represents size of assets of banks, X_2 indicates capital ratio of banks, X_3 stands for loan ratio of banks, X_4 *symbolizes* deposit ratio of banks, β_0 represents coefficients of constant or intercept value, $\beta_1, \beta_2, \beta_3, \beta_4$ are coefficients of explanatory variables and e_t is error term.

Results and Discussion

This section of the paper attempts to analyze the data associated with factors affecting net interest margin of banks. This study deals with firm-specific variables and their effect on net interest margin to observe and analyze the relationship among these variables. The correlation analysis is used to analyze the association among variables and regression analysis under causal comparative research design has been applied to examine the effect of various firm-specific factors on net interest margin of Nepalese commercial banks.

Analysis of Relationship among Variables

This paper has used various bank related factors such as assets size, capital ratio, loan ratio, and deposit ratio to analyze net interest margin of banks. In this study,

Pearson's correlation coefficient is used as measure of linear association in explaining direction and magnitude of relationship among different pairs of factors and net interest margin of banks. Table 1 presents correlation coefficient of variables to explain the relationship between net interest margin and its explanatory variables during the study period.

Table 1

Correlation Coefficients of Net Interest Margin and Explanatory Variables

Variables	Y	lnX_1	X_2	X_3	X_4
Y	1	-	-	-	-
lnX_1	-0.219	1	-	-	-
X_2	0.297*	-0.509**	1	-	-
X_3	0.516**	-0.498**	0.489**	1	-
X_4	0.495**	-0.354	0.463**	0.539**	1

Source: Author's own calculation based on data from NRB2005/06-2018/19

Note: '' indicates that correlations is significant at 5 percent level and '**' indicates that correlation is significant at 1 percent level (2-tailed).*

Table 1 shows the value of Pearson's correlation coefficient between different pairs of firm-specific variables and net interest margin (Y). The result has exhibited in Table 1 indicates that net interest margin is positively related with capital ratio (X_2), loan ration (X_3), and deposit ratio (X_4). The net interest margin is significantly and positively related with loan ratio, and deposit ratio at 1 percent level of significance and capital ratio at 5 percent level of significant. On the other hand, net interest margin is negatively related with assets size of banks (LnX_1), and it is statistically insignificant. This result implies that among given set of explanatory variables, loan and deposit ratios have strong positive association with net interest margin of Nepalese commercial banks.

Impact of Firm-specific Variables on Net Interest Margin

In this paper, regression analysis models have been used to examine impact of firm-specific variables on net interest margin. Table 2 presents regression results of univariate, and multivariate regression models under previous specified equations to analyze the various explanatory variables and their impact on net interest margin of commercial banks in Nepal.

Table 2

Impact of Explanatory Variables on Net Interest Margin

Models	Constant	$\ln X_1$	X_2	X_3	X_4	DW	Adj.R^2	F
1	0.151* (3.196)	-0.126 (-2.537)	-	-	-	1.924	0.114	26.763*
2	0.239** (4.796)	-	0.215* (2.349)	-	-	1.905	0.213	56.295**
3	0.227** (4.143)	-	-	0.314** (4.752)	-	1.893	0.247	68.228**
4	0.119* (2.891)	-	-	-	0.351** (5.928)	1.907	0.251	69.704**
5	0.437 (3.541)	-0.125 (-2.148)	0.207* (2.841)	0.308** (4.193)	0.390** (5.147)	1.931	0.476	46.556**

Source: Author's own calculation based on data from NRB 2005/06-2018/19

Model: $Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_t$

Note: The figures in the parentheses are t-value and asterisk sign indicate that result is significant level. '*' indicates statistical significance at 5 percent level and '**' indicates statistical significance at 1 percent level. Also reported are the F-statistics, Durbin Watson (DW) statistics and Adjusted R^2.

The first regression model in Table 2 shows the negative relationship between net interest margin (Y) and size of assets ($\ln X_1$) of the commercial banks. The estimated regression result shows that the relationship between size of assets and net interest margin of banks seems weak negative and statistically insignificant. This result supports to the findings of Gul et al. (2011) but contradicts with result of San and Heng (2013). The result of this paper indicates that assets size has no explanatory power to predict net interest margin in Nepalese commercial banks.

Similarly, the second regression model exhibited in Table 2 depicts the relationship between net interest margin and capital ratio of the banks. The regression result shows positive effect of capital ratio on net interest margin of banks. In Nepalese context, regression result indicates that capital ratio has statistically significant impact on net interest margin of banks. The result of the study supports to the findings of prior study of Naceur (2003), but contradict with the findings of Gul et al. (2011), and San and Heng (2013). The result of this paper implies that net interest margin increases with increment in equity capital of commercial banks in Nepal.

Furthermore, regression analysis of the third model shown in Table 2 demonstrates that loan ratio is positively and significantly related with net interest margin at 1 percent level of significance. The result of this paper is in the line of findings of Naceur (2003) and Gul et al. (2011) but contradicts with the findings of Alper and Anbar (2011). The adjusted R^2 of 0.247 which implies that loan has 24.7 percent explaining power of variation of net interest margin by bank loans. Hence, loan has explanatory power to predict net interest margin in Nepalese commercial banks.

In addition, fourth model of Table 2 shows the relationship between deposit ratio and net interest margin. The estimated regression result indicates that deposit ratio has a positive and statistically significant impact on net interest margin at 1 percent level of significance. The result implies that bank deposit has strong explanatory power to explain and predict net interest margin in Nepalese commercial banks. The result of this paper supports to the findings of the prior findings of Gul et al. (2011) and contradicts with the findings of Alper, and Anbar (2011). Therefore, finding of this paper concludes that large deposits of the banks are perceived as strong liquidity position and positively influence to the net interest margin of banks. The adjusted R^2 of 0.251 implies that deposit ratio has 45.1 percent explaining power of net interest margin of Nepalese commercial banks.

Moreover, Table 2 presents multivariate regression models that show the combined impact of all firm-specific explanatory variables on net interest margin of Nepalese commercial banks. The estimated regression results of multiple regression models five with the consideration all the explanatory variables show that capital, loans and deposits have explanatory power of net interest margin. Result of the study concludes that loans and deposits of banks have the strong explanatory power of net interest margin and it is statistically significant at 1 percent level of significance. The coefficient of determinants (Adj. R^2) of multivariate regression model five is 0.476. This result implies that firm-specific variables assets size, equity capital, loans and deposits jointly explain the variation of 47.6 percent to predict and explain net interest margin of commercial banks in Nepal.

Finally, F-values of the models one through five are statistically significant which indicates that all the regression models except model one are statistically significant at 1 percent level but model 1 is significant at 5 percent level. The computed values of DW

for the entire models' specifications of net interest margin fall in between d_U and $4-d_U$. Therefore, there is no evidence of serious problem of autocorrelation. With regards to multicollinearity, variance inflation factor (VIF) of explanatory variables across all the model specifications of net interest margin are significantly lower than ten (estimated VIF of all models lies between 1.281 and 1.919). Thus, there is no evidence of multicollinearity problem in the regression models to estimate and explain net interest margin of Nepalese commercial banks.

Conclusion

In the modern competitive and globalized business age, role of banks in economic activities is growing up. The success of banks depends on their performance and profitability. Net interest margin is one of the key measures of bank profitability. Net interest margin of banks are difference between interest income and interest expenses. Net interest margin of banks are affected by firm-specific, and macroeconomic variables. This paper has been attempted to examine the impact of firm-specific variables on net interest margin of Nepalese commercial banks using descriptive-cum causal comparative research design for the period 2005/06-2018/19. The estimated results of this paper have revealed that equity capital, bank loans and bank deposits significantly explain net interest margin of banks and assets size has no significant explaining power. Result of this paper concludes that loans and deposits of banks have strong explaining power of net interest margin as the profitability of Nepalese banks. This result suggests that policy makers should focus to increase bank lending (loans) and deposits to increase net interest margin as profitability in Nepalese commercial banks.

This study has used annual observation of banks to estimate net interest margin of commercial banks. The results may differ if net interest margin is determined based on monthly or quarterly information. Therefore, future studies should be directed to compute net interest margin based on monthly or quarterly observations. This paper has considered only size, capital, deposits and loans as explanatory variables to examine their impact on net interest margin of banks. Hence, further study should be inclusion of credit risk, liquidity, operating expenses, exchange rate, money supply, inflation rate, gross domestic product etc. This paper covers only commercial banks and there is a need of future research to cover other financial institutions such as development banks, finance

companies, micro finance, cooperatives etc. to analyze net interest margin of Nepalese financial institutions.

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