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The Mediating Role of NIM on Market Structure and Bank Performance: Empirical Confirmation from Listed Nepalese Commercial Banks

Prem Bahadur Budhathoki

Corresponding Author: Tribhuvan University, Finance Department, Mahendra Multiple Campus, Dharan, Nepal

ORCID ID: 0000-0002-1249-7005

Chandra Kumar Rai

Tribhuvan University, Accountancy Department, Mahendra Multiple Campus, Dharan, Nepal

ORCID ID: 0000-0002-0111-6609

Abstract

This paper examined the mediating role of net interest margin (NIM) on the nexus between market structure and banks' profitability. Two ordinary least-squares models with a path analysis model were applied to analyze the data. The first regression model measured the indirect effects of market structure, total assets, geographic expansion, and specialization on ROA through NIM and revealed that the higher market share of loans positively effects on bank's performance and statistically insignificant. Similarly, the geographic expansion was observed to hurt the bank's ROA, but statistically insignificant. On the other hand, the indirect effect of total asset size and specialization was negative, but the first one was statistically significant, and the second was statistically insignificant. The result of the second regression model measured the direct effect of antecedent variables on the ROA and revealed that the market structure, geographic expansion, and specialization were negatively related to performance measure ROA. However, the direct effect of total assets size was positively associated with ROA and statistically significant. The results of the two regression models based on total effects revealed that a higher bank size appeared favorable to Nepalese CBs and was found to have positive effects on ROA but the geographic expansion was an inverse effect on ROA. The results of the study might be helpful to Nepalese bankers, regulatory authorities, and other concerned stakeholders to take an effective decision about the direct, indirect, and total effects of chosen antecedent variables on consequent variables through the mediating role of NIM.

Keywords: Market structure; Total asset size; Geographic expansion; Specialization; Path model

JEL Classifications: G0; G2; M0

Introduction

The nexus between market structure (MS), net interest margin (NIM), and banks' performance is a disputed issue in the literature on financial economics. The traditional market structure hypothesis (ESH) states that banks in a low competitive market can impose higher lending rates and offer lower deposit rates through their collusive power and generate high NIM, which leads to higher profitability. In contrast, an efficient market hypothesis (EMH) argues that competent banks get larger returns and can grab higher market share through their expert knowledge and skills (Park & Weber, 2006). However, the difference between lending rates and deposit rates (spread) can be limited by regulatory authorities. For example, Nepalese commercial banks (CBs) cannot charge a net interest margin by more than five percent. Also, all Nepalese CBs should grant at least five percent of total loans and advances (LA), to the deprived sectors at a one percent concessional interest rate, which reduced NIM and banks' profitability (NRB Unified Directives, 2017). Similarly, there are several disputed arguments about the connection between the total firm's size, NIM, and the bank's profitability. The first line of arguments states that large banks might produce a large volume of service products at relatively low-cost and might produce more income by diversification of assets, which finally reduces bank's risk and increases the overall banks' profitability (Sinha & Shrama, 2015; Tan, 2017). The second line of arguments states that large banks might have a serious information gap about the borrowers, which eventually increases non-performing assets, monitoring costs, administrative costs, and other size-related costs and reduce banks' overall profitability (Tan, 2017; Dietrich & Wanzenried, 2014). Therefore, the aforementioned association between these variables needs to be investigated empirically.

The nexus between bank branching (geographic diversification), NIM, and banks' performance has still a controversial issue. In recent years, the regulatory authority (Nepal Rastra Bank [NRB]) has increasingly focused on the expansion of bank branches in rural areas. Therefore, all CBs should take permission while opening new branches in urban areas, but not required to take permission in the rural area. Additionally, NRB grants interest-free loans up to Rs 10 million to the new branches that are established in rural and prescribed prefecture areas (NRB Unified Directives, 2017).

The NIM of CBs also depends on the specialization of business. Banks with higher LA indicate that banks are still engaged in traditional banking activities. There are two effects on banks' NIM through traditional business activities. On the one hand, a higher volume of LA, relative to deposits (or total assets) leads to a higher net interest spread and vice versa. On the other hand, a higher volume of loans-to-deposit ratio brings a higher unsystematic risk because banks unable to generate more income from non-interest income (Trinugroho, Risfandy, & Ariefiano, 2018). The traditional risk-return hypothesis states that a higher risk might increase deposit interest rates, but banks compel to lower lending interest rates to attract borrowers in the competitive world.

As mentioned above, there are many inclusive facts about the connection between MS, total firm's size, geographic expansion, diversification, and profitability through the mediating role of NIM. Many investigators endeavor to present the nexus between these antecedents, mediating, and consequent variables, notably in the context of the developed world. But in the Nepalese context, very few studies have been found; therefore, it is still a greatly searchable fact. Therefore, this study attempts to depict a cause and consequence nexus among the aforementioned variables.

This study offers several inputs: First, this study endeavors to build the direct, indirect, and total effects of MS, total firm's size, geographic expansion, and specialization on profitability measure ROA. Second, this study helps bankers and regulatory bodies to take effective steps for the stability and growth of the Nepalese banking sector. Lastly, our empirical findings address the documentation gaps about the study drivers.

The other part of the paper is organized in this way: Section 2 summarizes the existing literature concerning the antecedent, mediating, and consequent variables and develops the initial hypothesis; Section 3 is associated with the operationalization of variables and overall research strategy; Section 4 presents and

describes the empirical findings; and Section 5 over with the conclusion, policy implications, and shortcomings of the study.

Literature Review

The nexus between MS and profitability through the mediating role of *NIM* in the Nepalese banking sector has been insignificantly verified by previous studies. However, this connection has been extensively studied in developed and our neighboring countries like India and China. Park and Weber (2006) evaluated the profitability of Korean banks by testing MS versus efficient structure using a structural model. The results indicated that efficiency has a substantial effect on bank performance and supports the ESH. Their findings suggested that efficient banks can increase market share, *NIM*, and reduced operating costs, which ultimately increase the banks' performance. By using a two-stage semi-parametric data envelopment analysis model, Hou et al. (2014) examined the relationship between MS, risk-taking, and efficiency of Chinese CBs. They used 44 CBs as a sample throughout 2007-2011. In this study, they found that intense market competition with the financial system compelled banks to strengthen technical and managerial skills to handle their business properly. They further added that technical efficiency has been positively associated with risk-taking. The traditional risk-return hypothesis stated that higher risk-taking behavior brings a higher return to firms. Furthermore, Islam and Nishiyama (2016) study found that a more competitive market in South Asian countries and *NIM* has negatively related and found statistically significant. This result also disproved the presumption of MSH—a lower market competition creates opportunities for imposing extra interest rates to the customers. On the basis of the literature review, the following alternative hypotheses were tested:

H_{1 (A)}: The indirect effect of MS is positively (or negatively) related to the profitability measure.

H_{1 (B)}: The direct effect of MS is positively (or negatively) related to the profitability measure.

H_{1 (C)}: The total effect of MS is positively (or negatively) related to the profitability measure.

The nexus between total assets (TA) and profitability through the mediating role of *NIM* in the Nepalese banking sector has been insignificantly tested by empirical studies. Brighi and Venturelli (2016) examined the link among geographic diversification and the profitability of banks over the period 2006-2012 under the general panel model with fixed effects. Their results showed that bank size has a positive impact on bank profitability. The findings of these studies further suggested that Greek banks identified the importance of automation in the banking sector because the delivery of better service quality and low operating costs could be achieved through the automation and efficient use of resources. In contrast, Islam and Nishiyama (2016) study found an inverse and significant association among bank size and *NIM*. Their finding further suggested that larger banks in terms of asset size impose smaller net interest spread and vice versa. On the basis of the literature review, the following alternative hypotheses were tested:

H_{2 (A)}: The indirect effect of TA is positively (or negatively) related to the profitability measure.

H_{2 (B)}: The direct effect of TA is positively (or negatively) related to the profitability measure.

H_{2 (C)}: The total effect of TA is positively (or negatively) related to the profitability measure.

The nexus between geographic expansion and profitability through the mediating role of *NIM* in the Nepalese banking sector has been insignificantly verified by research works. Goetz et al. (2016) examined the effect of the geographic expansion of banks on risk under a two-stage least square (2SLS) analysis. The results showed that geographic diversification has not been affected by loan quality. Their findings further suggested that an increase in geographic diversity have not an impact on loan loss provisions, non-performing loans, or loan charge-offs, and thus, increased *NIM* and *ROA*. Using a sample of Canadian CBs over the period 1889-1926, Chu (2010) investigated the impact of mergers and branch networks on economic growth. Their findings indicated that a larger network size of banks reduced the financial intermediation cost and encourage

savers to save more. This ultimately increased the NIM and profitability of banks by increasing their deposits and lending volume. Cai et al. (2016) have used a two-stage least square (2SLS) method by taking a sample of Chinese CBs throughout 2006-2012 and found that geographical expansion increased the market shares of banks. This study also concluded that banks benefited a higher net interest spread after geographic expansion and should bear additional operating costs as the level of diversification increased. Moreover, this study stated that geographical diversification has a positive but minimal effect on ROA. Temesvary (2015) analyzed the relationship between dynamic branching and interest rate competition of Hungarian CBs over the period 2004-2007, using a dynamic structural model. The findings of this study indicated that banks charged an additional interest rate for relative branch network dominance. In other words, firms with a larger scale of networks grant market power to impose a premium in the lending rates, which leads to an increase in NIM and ROA. More recently, Hossain et al. (2020) conducted research entitled "Optimal branching strategy, local financial development, and SMEs performance" by taking a sample of 1084 SMEs. Their findings indicated that the optimal number of bank branches could reduce excess liquidity of a particular bank and could use excess funds to deficient bank's branches and increased SMEs access to bank credit. This also reduced the asymmetry information about borrowers and monitoring costs, leading to lower default losses. Similarly, Giokas (2008) analyzed the relationship between cost efficiency and bank branch characteristics and location by taking a sample of 171 retail bank branches. He used the DEA model to analyze the sampled data. His studies concluded that larger bank branches have higher operating efficiency. Also, his studies concluded that holding profitability and branch size constant, rural bank branches have more cost-efficient than urban branches. On the basis of the literature review, the following alternative hypotheses were tested:

H_{3(A)}: The indirect effect of geographic diversification is positively (or negatively) related to profitability.

H_{3(B)}: The direct effect of geographic diversification is positively (or negatively) related to profitability.

H_{3(C)}: The total effect of geographic diversification is positively (or negatively) related to profitability.

The nexus between specialization and profitability through the mediating role of NIM in the Nepalese banking sector also has been insignificantly checked by previous studies. Nguyen (2018) conducted a study about the link between diversification and the efficiency of banks over the period 2007-2014, using the SFA. The findings of the study indicated that more income-diversified banks have lower cost efficiency. While more funding-diversified banks enjoyed higher profit efficiency and more asset-diversified banks enjoyed only higher persistent profit efficiency. In this connection, Lin et al. (2012) findings further suggested that income-diversified banks could reduce the shocks of declining NIM arising from idiosyncratic risk. Islam and Nishiyama (2016) examined the determinants of net interest margins of South Asian countries by taking a sample of 230 banks throughout 1997--2012 under the general panel model with fixed effects. Their study results found that the total loan-to-deposit ratio has positively and statistically significantly related to the NIMs of banks in India, Nepal, and Pakistan, but LA (log of LA) played a significant and positive role in the banking markets of Bangladesh and Nepal. This empirical evidence was inconsistent with the argument of Hawthey and Liang (2008)—the larger the size of the transaction brings huge potential loss and larger groups of customers benefited from narrower interest margins. A study conducted by Sakonova (2010) entitled "the role of net interest margin in improving bank's assets structure and accessing the stability and efficiency of their operations" and found that there was a favorable link between the volatility of the NIM and ROA. He further argued that NIM could decline due to greater competition for financial or technological innovations that increased productivity. On the basis of the literature review, the following alternative hypotheses were tested:

H_{4(A)}: The indirect effect of specialization is positively (or negatively) related to the profitability measure.

H_{4(B)}: The direct effect of specialization is positively (or negatively) related to the profitability measure.

H_{4(C)}: The total effect of specialization is positively (or negatively) related to the profitability measure.

Based on the review of the literature, we develop the following theoretical diagram.

Figure 1: Theoretical diagram

Methodology

This study intended to examine the role of the mediating variable on the connection between antecedent and consequent variables. This study considered four antecedent variables, one mediating variable, and one consequent variable. To measure banks' performance, we used *ROA* as an antecedent variable, which was assessed by dividing net income after taxes by TA. Most of the researchers found this method to measure the bank's performance. We used *NIM* as a mediating variable, which was measured by dividing net interest income by total firm's size; Most of the researchers found this method to measure the mediating role on the relationship between the antecedent and consequent variables.

In this study, we used four consequent variables. The first was the MS estimated by dividing total LA by total consolidated LA of CBs—a commonly used tool to assess market share. A larger outcome of the market share indicates higher market coverage and vice versa. The next consequent driver was the firm's size calculated by taking the natural logarithm of TA—another tool widely used to measure the firm's size and the effect of the firm's size on the bank's performance. The third antecedent variable was the geographic expansion estimated by taking the natural logarithm of bank branches. In the end, the fourth consequent driver was specialization assessed by dividing total LA by total deposits. A larger outcome of the loan-to-deposit ratio reveals that banks were more engaged in traditional loan businesses and less specialization.

At present, Twenty-seven CBs are running in Nepal. These twenty-seven CBs were considered a target population size. The twenty-three CBs took as a sampled and were made 115 observations during the study period from 2014 to 2018. This study was based on time-series balanced panel data collected from the review of the Bank Supervision Report of 2016 and 2018, which were disseminated by the central bank of Nepal (i.e., Nepal Rastra Bank). The gathered time-series data were assessed using basic descriptive statistics, Pearson product-moment correlation coefficient, and Ordinary least square with path models. Therefore, this study incorporated descriptive as well as the cause-and-effect research design. The basic descriptive statistics were used to outline the basic features of the selected research variables. This matrix was used to check out the connection between consequent, mediating, and antecedent variables. The correlation matrix helped to recognize the multicollinearity problem. Lind, Marchal, and Wathen (2006) explained that the correlations among the consequent, mediating, and antecedent variables between -0.7 to 0.7 have not brought problems. Also, the multicollinearity problem was identify based on *VIF*—"a problem that arises if *VIF* is greater than five" (Titko, Skvarciany, & Jureviciene, 2015). To identify whether autocorrelation was present in a time-series regression analysis, the Durbin-Watson test was conducted (Black, 2017). In the end, the assembled data were assessed systematically using the process procedure for SPSS version 3.4.1, which was developed by Andrew F. Hayes. To identify the cause-and-effects nexus among the antecedent variable, mediating variable, and consequent variables, the following two multiple regression models were tested:

$$\text{Model 1: } NIM = i_M + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + e_M$$

$$\text{Model 2: } ROA = i_Y + c'_1 X_1 + c'_2 X_2 + c'_3 X_3 + c'_4 X_4 + bM + e_Y$$

(Where, NIM = net Interest Margin, X_1 = market share of LA of particular sample bank, X_2 = proxy of TA, X_3 = natural logarithm of the number of bank branches, X_4 = specialization, ROA = return on assets, and e = error term)

This study measured the indirect, direct, and total effects of antecedent variables on the consequent variable through the mediating variable. According to Hayes (2018), the regression coefficients α_1b , α_2b , α_3b , and α_4b measured the indirect effect of antecedent variables on the consequent variable (i.e., $X \rightarrow M \rightarrow Y$). Similarly, the direct effects of antecedent variables on the consequent variable were measured by the regression coefficients of c'_1 , c'_2 , c'_3 , and c'_4 (i.e., $X \rightarrow Y$). The total effect was measured by the sum of α_jb and c'_j (i.e., total effect = $\alpha_jb + c'_j$).

Findings and Discussion

Table 1 presents a summary of the descriptive statistics of one consequent variable— ROA , one mediating variable— NIM , and four antecedent variables— MS, TA, geographic expansion, and specialization. The outcomes revealed that the average NIM of Nepalese CBs became much higher than that of return on assets, implying that Nepalese banks were found to be involved in traditional loan business and to earn a very low amount from asset diversification. The SD of specialization indicated that it was much more volatile than that of other antecedent variables. Similarly, the standard deviation of NIM also indicated that it was much more changeable than the consequent variable.

Table 1: Basic statistics of the antecedent, mediator, and consequent variables

Variables	N	Minimum	Maximum	Mean	SD
ROA	115	.548	3.706	1.756	.532
NIM	115	.653	5.595	3.218	.752
Market share of loan (X_1)	115	1.640	6.739	3.799	1.358
Ln total assets (X_2)	115	9.932	12.193	11.192	.496
Ln number of branches (X_3)	115	2.639	5.521	4.109	.644
Specialization (X_4)	115	33.673	97.220	79.490	11.233

Table 2 depicts the correlation coefficients of the consequent, mediating, and predictor variables. The ROA was positively correlated with NIM , X_1 , and X_3 and statistically significant at the 5%, 1%, and 5% levels, respectively. Similarly, ROA was positively correlated with X_2 and negatively correlated with X_4 and statistically insignificant. Similarly, NIM was positively correlated with X_1 , X_2 , X_3 , and X_4 but X_1 and X_3 were statistically significant at the 1% level, but X_2 and X_4 were statistically insignificant. The relationship between other variables is presented in Table 2.

Table 2: Correlation matrix of the antecedent, mediator, and consequent variables

Variables	ROA	NIM	X_1	X_2	X_3	X_4
ROA	1	.360** (.000)	.211* (.024)	.293** (.001)	.085 (.368)	-.046 (.628)
NIM	.360** (.000)	1	.295** (.001)	.149 (.113)	.305** (.001)	.004 (.967)
X_1	.211* (.024)	.295** (.001)	1	.770** (.000)	.593** (.000)	-.111 (.238)
X_2	.293** (.001)	.149 (.113)	.770** (.000)	1	.668** (.000)	.238 (.980)
X_3	.085 (.368)	.305** (.001)	.593** (.000)	.668** (.000)	1	.358** (.000)
X_4	-.046 (.628)	.004 (.967)	-.111 (.238)	.238 (.980)	.358** (.000)	1

Note: ** and * indicates that correlation is significant at the 1% and 5% level.

The above correlation matrix showed that almost all the correlation coefficients among the antecedent, mediating, and consequent variables were less than 0.7, (except between X_1 and X_2) implying no evidence of multicollinearity problem among antecedent variables.

This study especially emphasized on regression outcomes. Tables 3, 4, 5, and figure 2 showed the regression results. Table 3 reports the direct effects of the MS, firm size, geographic expansion, and specialization on bank ROA. The value of R^2 (.262) showed that the “overall explanatory power of the regression model was fair with” (Budhathoki, et al., 2020) 26.2% of the variation in the consequent variable by the variation in the antecedent variables. The F -statistics and its p -value revealed that this regression model was a good fit. Additionally, the variance inflation factor (VIF) of all the study drivers which were less than 5 (Titko, Skvarciany, & Jureviciene, 2015), revealed that the multicollinearity problem was absent. Approximately, the same result was found in the above correlation matrix table. In Table 3, the slope of the market structure ($c'_1 = -.051$, $p > .01$) indicated that a higher/or lower market share of LA did not result in the higher/or lower ROA for Nepalese CBs. This result has contradicted the findings of some previous researchers (for example, Nishiyama, 2010; Weber, 2006).

Figure 2: Regression Results

This result failed to support our initial hypothesis that a higher market share of LA and ROA of the banks were positively related. The result of this regression coefficient showed that relatively high/low levels of the market share of the LA have not produced positive ROA because it produced a higher volume of loan loss provision, non-performing loans, and operating costs to the CBs. The regression coefficient of firm size ($c'_2 = .634$, $p < .01$) indicated that a higher firm size results in higher ROA to the banks. This result was consistent

with the findings of some previous research works (Venturelli, 2016; Islam & Nishiyama, 2010). This outcome proved our initial hypothesis that a higher firm's size and *ROA* were positively related. The outcomes of the study were supported by the fact that a larger volume of investment in modern technology enhances the delivery of better service quality, alleviates the operating cost, and able to compete more effectively by lowering the interest rate. The banks also benefited from economies of scale and economies of scope (Budhathoki & Rai, 2020). The regression coefficient of geographic expansion ($c_3 = -.326$, $p < .01$) indicated that a higher number of bank branches resulted in lower *ROA* to the banks. This result is in contrast with the findings of previous scholars (for example, Chu, 2010; Temesvary, 2015; Goetz, Laven, & Laven, 2016; Cai, 2016). The result of the study was supported by this evidence that a higher number of bank branches may increase the operating cost of banks and reduce overall net income after taxes, which leads to a decrease in *ROA*.

Table 3: Ordinary least square equation of *ROA* on mediating and antecedent variables

Variables	Coefficient	S_e	t -statistics	p -value	$LLCI$	$ULCI$	VIF
Constant	-5.089*	1.568	1.568	.002	-8.197	- 1.980	---
X_1	-.051	.055	.055	.362	-.159	.058	2.893
X_2	.634*	.156	.156	.000	.323	.944	3.158
X_3	-.326*	.112	.112	.005	-.549	- .103	2.747
X_4	.004	.005	.005	.412	-.005	.013	1.436
<i>NIM (M)</i>	.304*	.064	.064	.000	.178	.430	1.194
F -statistics	7.808	$R = .514$	$R^2 = .264$	$D-W$ test = 1.786			---
P -value	.000	---	---	---	---	---	---

Note: ** and * indicates that correlation is significant at the 1% and 5% level.

The regression coefficient of specialization ($c_4 = .004$, $p > .01$) indicated that a higher/or lower level of loan to deposit ratio did not affect the *ROA* of Nepalese CBs. This result was in contrast with the findings of other studies (for example, Lin et al., 2010; Islam & Nisiyama, 2016). The result of the study was supported by the fact that a higher level of loan to deposit ratio increases loan loss provision, non-performing loans, transaction and monitoring costs of the banks. Further, it could not save banks from the shock of declining *NIM* arising from idiosyncratic risk (Lin et al., 2012).

Table 4 especially reports the indirect impacts of the MS, firm size, geographic expansion, and specialization on mediating variable *NIM*. The value of R^2 (.163) revealed that the portion of the variance accounted by the antecedent variables, which is approximately 16.3 % of the variance in the regression equation. The F -statistics and its p -value reveal that this regression model was a good fit. Furthermore, the variance inflation factor (VIF) of all study variables was less than 5 indicated that the multicollinearity problem was absent. Approximately, the same result was found in the above correlation matrix table. In Table 4, the regression coefficient of the market share of LA ($\alpha_1 = .189$, $p < .05$) indicated that a higher/or lower market share of LA results in the higher/or lower *NIM* to the Nepalese CBs. The result of this regression coefficient indicated that relatively high/low levels of the market share of the LA produced positive/negative *NIM* because LA was the main source of income of traditional banks. The regression coefficient of firm size ($\alpha_2 = .564$, $p < .05$) indicated that a larger firm size ratio produced a higher *NIM* for the banks. The outcome of the study was backed by this proof that a larger bank size enhanced the bank's creditworthiness, which might be beneficial to impose an additional premium on lending interest rates and render lower deposit rates. Further, it might be beneficial to geographical diversification and the development of new service products. The banks also benefited from economies of scale and economies of scope. The regression coefficient of geographic expansion ($\alpha_3 = .451$, $p < .01$) indicated that a larger number of bank branches produced a higher *NIM* to the banks—the result was similar with the outcomes of previous research works (Chu, 2010; Goetz et al., 2016; Cai, 2016; Hossain, et al., 2020; Gokas, 2008). The outcome of the study was supported by this fact that the larger number of bank branches might increase both LA and deposit volume of CBs and increase net interest income, which leads to an increase in *NIM*. The regression coefficient of specialization ($\alpha_4 = -$

.007, $p > .01$) indicated that a higher/or lower level of loan-to-deposit ratio does not result in the higher/or lower *NIM* to the Nepalese CBs. The finding of the study was supported by the fact that a higher volume of loan to deposit ratio increases interest income and interest expenses simultaneously, which eventually balances the net interest income and *NIM*.

Table 4: Ordinary least square equation of the *NIM* (Mediating variable) on antecedent variables

Variables	Coefficient	S_e	t -statistics	p -value	$LLCI$	$ULCI$	VIF
Constant	7.475*	2.244	3.331	.001	3.027	11.923	---
X_1	.189**	.080	2.360	.020	.030	.3481	2.753
X_2	-.564**	.229	-2.467	.015	-1.017	-.111	2.992
X_3	.451*	.163	2.759	.007	.127	.774	2.569
X_4	-.007	.007	-.933	.353	-.020	.0007	1.424
F -statistics	5.340	$R = .403$	$R^2 = .163$	---	---	---	---
P -value	.001	---	---	---	---	---	---

Note: ** and * indicates that correlation is significant at the 1% and 5% level.

Table 5 reports the indirect effects, direct effects, and total effects of antecedent variables on the consequent variable. The indirect effect of α_1b is .0575, which indicates that MS (the market share of LA) has an indeterminate effect on *ROA*. Similarly, the total effect of X_1 is .007, which revealed that the market share of LA did not affect *ROA*. The indirect effect of α_2b is -.171, which indicated that the total firm's size has a determinate effect on *ROA*. Similarly, the total effect of X_2 was .463, which revealed that the total number of bank branches has a positive effect on *ROA*. The indirect effect of α_3b is .0575, which indicates that geographic expansion (total number of bank branches) has a determinate effect on *ROA*. Similarly, the total effect of X_3 was -.189, which revealed that the total number of bank branches hurt *ROA*. The indirect effect of α_4b is -.002, which indicated that the specialization of bank business has an indeterminate effect on *ROA*. Similarly, the total effect of X_4 is -.002, which revealed that specialization did not hurt *ROA*.

Table 5: Summary of indirect, direct, and total effects

Variables	Direct effect ($X \rightarrow Y$)	Indirect effect ($X \rightarrow M \rightarrow Y$)	Total effect
X_1	-.501	.0575	.007 (Insignificance)
X_2	.634*	-.171	.463 (Significance)
X_3	-.326*	.137	-.189 (Significance)
X_4	-.004	-.002	-.002 (Insignificance)

Note: ** and * indicates that correlation is significant at the 1% and 5% Level.

Conclusion

This study scrutinizes the mediating role of *NIM* on the connection between antecedent variables (share of LA, total firm's size, bank's branches, and specialization) and the consequent variable (*ROA*). In this field, most of the studies are performed in the developed world, and as per our knowledge; some studies are conducted in the undeveloped world like Nepal. Therefore, the main purpose of this study is to examine the effect of the aforementioned antecedent variables on the consequent variable through the mediating role of *NIM*. This study uses two ordinary least squares regression models with path analysis to measure the indirect, direct, and total causal nexus between the antecedent and consequent variables. The first regression model, which uses *NIM* as the mediating variable, is statistically significant. It suggests that the regression model is best fitted. This regression model exhibits that a larger market share of LA and the

opening of new bank branches positively affect the bank's NIM is statistically significant. Nonetheless, the slope of the total firm's size suggests that a higher volume of TA inversely affects the bank's NIM. Likewise, the slope of specialization shows that a larger loans-to-deposits ratio inversely affects the bank's NIM but is not statistically significant. The second equation, which incorporates ROA as the consequent variable, is statistically significant and this suggests that the second equation is best fitted. This regression equation reveals that the direct effect of the antecedent variables market share of loan and expansion of bank branches is negative, but the coefficient of the market share of the loan is statistically insignificant. However, the two antecedent variables of a firm's size and specialization are positively associated with the bank's ROA, specialization is statistically insignificant. Finally, the result of the total effects reveals that a higher bank size seems to be favorable to Nepalese CBs and is found to have positive effects on profitability measure ROA, but geographic diversification is a negative effect on ROA and statistically significant.

The outcomes of this study render substantial policy implications to reform the Nepalese banking sector. The above-noted outcomes conclude that the Nepalese commercial banking sector has a higher TA rises the bank's ROA and the expansion of bank scope decreases the ROA. Therefore, Nepalese CBs should increase both their TA and bank branches to increase ROA.

This study is not free from some shortcomings. It includes only four antecedent variables—market structure, total firm's size, geographic expansion, and specialization—to exhibit the effect on the bank's performance measure ROA by employing the mediating variable NIM. Furthermore, the value of R² is very low. Therefore, further research needs to be done by employing other more antecedent, mediating, moderate, and consequent variables in the Nepalese banking context.

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