INCOME DIVERSIFICATION AND BANK RISK-RETURN TRADE-OFF IN THE NEPALESE COMMERCIAL BANKS

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ABSTRACT

This study examines an impact of income diversification on the risk return trade off in the Nepalese commercial banks. Risk adjusted performance variables in terms of risk adjusted return on assets and risk adjusted return on equity are the dependent variables of the study. The study employs the secondary data gathered for twenty Nepalese commercial banks from 2009 to 2015. The secondary panel data are collected from Banking and Financial Statistics and annual reports of the selected commercial banks. The regression models are estimated to test the significance and importance of income diversification variables on the risk adjusted performance of Nepalese commercial banks. The results show that non-interest income, foreign ownership and bank size are positively correlated to risk adjusted returns. It indicates that higher the non-interest income, foreign ownership and bigger the bank size, higher would be the risk adjusted returns. However, the study also reveals that equity to total assets ratio and loan to total assets ratio have negative relationship with the risk adjusted return on assets and risk adjusted return on equity. The regression results conclude that the beta coefficients are positive for non-interest income, Herfindahl-Hirschman Index–HHI, and foreign ownership which indicate the positive impact on risk adjusted performance. The results further reveal that equity to total assets ratio and loan to total assets ratio have negative effect on the risk adjusted performance of Nepalese commercial banks. The study concludes that income diversification-HHI followed noninterest income, equity to total assets ratio and foreign ownership are the most dominant factors that affect the risk return trade off in the context of Nepalese commercial banks.

Contribution/ Originality: This study contributes in the existing literature in the context of developing countries. This study uses standard deviation of the returns to measure bank risk which makes it one of very few studies which have investigated the relationship between income diversification and risk adjusted performance of commercial banks.

1. INTRODUCTION

The banking business around the world plays a major role in the business of financial intermediation and has grown over the years, resulting in the diversity and complexity of its operations. Markowitz's portfolio theory supported the theoretical case for the income diversification and the conventional wisdom of seeking not to put all eggs in the same basket. According Markowitz (1952) diversification is the idea that investors allocate money to different types of investment alternatives. An income diversification refers to the relative proportions of non-

279

interest income and interest income in the operating income of the banks. According to Huang and Chen (2006) non-interest income is an important source of income diversification for the banks.

The financial crisis of 2008 made all the market players learn and realize vital lesson that diversification of income sources and less reliance on traditional lending activities are important for the financial stability. Mercieca *et al.* (2007) classified the diversification in banking sector in three major dimensions: (a) financial products and services diversification, (b) geographic diversification, and (c) combination of business line and geographic diversification. An implication of income diversification of bank's on its risk and return exposure has been addressed by various studies, predominantly in developed economies (Lepetit *et al.*, 2008; DeYoung and Torna, 2013; Meslier *et al.*, 2014).

Teimet *et al.* (2011) found that banks tend to diversify by trading in real estate, stocks, bonds and private equity to raise their fee revenue, trading revenue and other types of non-interest income. Bank's income composition, in recent times, has considered the fee income as importantly relevant aspect for the nontraditional components in estimating their performance (Lozano-Vivas and Pasiouras, 2010).

Drucker and Puri (2009) showed that diversified banks can gain economies of scope through spreading fixed costs over multiple products. Fees, commission and discount income, other operating income and the foreign exchange incomes are not correlated with the net interest income of the banks. Therefore, diversification on such income source makes the total operating income of the banks (Gurbuz *et al.*, 2013). Banks diversify their portfolios, operating in competitive environment, in order to be more stable, enhance performance and risk adjusted returns for the banks (Amidu and Wolfe, 2013).

According to Stiroh (2004) diversification, shifting into non-interest income, improves bank's returns and reduces volatility in returns thereof. Ekanayake and Wanamalie (2017) revealed that non-interest income activities have positive impact on the risk adjusted return on equity. It implies that marginal increase in non-interest income activities improves the shareholder's risk-return trade off. Chiorazzo *et al.* (2008) found that diversification of income improves risk adjusted returns and this relationship is stronger for larger banks. This study is the first of its nature to conduct in commercial banking industry of Nepal.

It is evident that Nepalese banks are also involving more in noninterest income generating activities since the transition of economic centralization to economic liberalization and reformation. Rajbahak *et al.* (2016) found that there is no relationship between foreign ownership and z-index, financial stability, indicating that foreign ownership does not have any impact of z-index. However, there is positive relationship between Herfindahl-Hirschman Index (HHI) loan and z-index indicating that higher the HHI loan, higher would be the financial stability. Hence, this study attempts to analyze the relationship between income diversification and risk adjusted performance of Nepalese commercial banks.

The major purpose of this study is to examine the impact of income diversification on risk return trade off in Nepalese commercial banks. Specifically, it examines the effect of noninterest income, HHI-income diversification, equity to total assets, loan to total assets, foreign ownership and bank size on risk adjusted performance of Nepalese commercial banks.

Further, this study is organized as follows: section two describes the review of the literature, section three describes sample, data and methodology, section four explains the variable description, section five presents the empirical results and the final section draw conclusions and discuss the implications of the study findings.

2. LITERATURE REVIEW

Banks and financial institutions, in all over the world, are transcending and diversifying their traditional and normal line of operations in response to the reformation of economic and financial sectors. The modern banking practices have a lot to do with non-traditional banking activities. Therefore, an income diversification, in banking, refers to increasing share of fees, net trading profits and other non-interest incomes within net operating income of

a bank. In banking, diversification is done functionally by combining conglomerate activities such as, commercial banking, insurance, securities trading and other financial services (Baele *et al.*, 2007). Similarly, banks typically increased income diversification by moving into fee-based businesses, while other banks with already strong fee-based businesses extended their businesses into trading activities (Elsas *et al.*, 2010).

Goddard *et al.* (2008) found that diversification through increase in the income share of non-interest income in the operating income of the banks has the effect of volatility reduction. According to Ismail *et al.* (2014) there is a positive impact of income diversification on the performance of Pakistani banks. Pennathur *et al.* (2012) found that fee-based income significantly reduces risk for public sector banks. The study also revealed that diversification can be a source of enhancing revenue however, banks must consider risk and return trade off.

Carbo-Valverde and Fernandez (2007) showed that in European banking, market power tends to increase as banks diversify into non-traditional activities and the performance of banks improves thereof. However, Delpachitra and Lester (2013) found that non-interest income and revenue diversification have negative effect on the profitability of Australian banks. In addition, the study revealed that over-reliance on the non-interest incomes does not improve the bank's profitability and risk of default.

According to Mndene (2015) diversification is better for the performance measured by risk adjusted return on equity of the bank which focuses on non-interest income activities. However, small banks, domestic and public banks are highly affected especially in risk adjusted return on equity. Muneer *et al.* (2016) found that there is a positive effect of income diversification on the performance of commercial banks; however, there is no significant effect of income diversification on the performance of Islamic banks in Pakistan. Demsetz and Strahan (1997) revealed that there is positive relation between bank size and income diversification. The study also found that income diversification has negative impact on the risk reduction.

Banks expand more into non-traditional activities, income source diversification, if they experience higher credit losses in order to better match the risk return trade off (Nguyen *et al.*, 2012). Acharya *et al.* (2006) found empirical evidence that banks with less competition in industry are not able to ripe the benefits of income diversification but the returns of these banks have improved marginally as a result of diversification. Banks can get economic scope with higher profitability through diversification (Li, 2003). Reichert *et al.* (2008) revealed that there are potential gains and risk reduction when diversification into the non-bank commercial and industrial sector is permitted. Barth *et al.* (2004) revealed that non-traditional activities-income diversification is positively associated with bank stability.

Rogers and Sinkey (1999) found that US banks heavily engaging in nontraditional activities display less risk and concluded that they are using non-traditional activities to strengthen their franchise values. There is negative relationship between bank risk and non-interest income generating activities which implies that non-interest activities reduce bank risk via diversification of earnings. Hang *et al.* (2017) found that deposit ratio, loan ratio and size have negative impact on the risk adjusted performance. The study further concluded that the diversification of income is not beneficial for commercial banks in Vietnam.

In the context of Nepal, Kattel (2014) evaluated the financial soundness of joint venture banks and private sectors banks in Nepal. The study showed that private owned banks are more financially sound than joint venture banks. Foreign bank's entry enhances competition which forces banks to reduce cost, diversify products through innovation, and provide better services to customers to minimize risk and to retain them (Panta and Bedari, 2015).

Accroding to Gajurel and Pradhan (2012) market for interest based income is more competitive than the market of fee based income. The study also revealed that equity capital has negative effect on revenue generation in Nepalese banking insdustry. It means that banks with higher equity capital base are likely to generate lower revenue than banks with lower equity capital base. Barth *et al.* (2004) found that the financial health of the joint venture banks is better than other banks in Nepal.

The above discussion reveals that there is no consistency in the findings of various studies concerning the income diversification and risk adjusted performance of commercial banks. Therefore, the study attempts to fill the literature gap in Nepalese context.

3. METHODOLOGICAL ASPECTS

The study has employed descriptive and causal comparative research design. The study has estimated the relationship based on s secondary data. Twenty commercial banks have been considered in data collection for the period of 7 years, leading to a total of 140 observations, from 2009 to 2015 AD. The study considered only those banks for the sample which have been established and operated before 2010 AD. The data sources of the study consist of Banking and Financial Statistics published by the central bank of Nepal, Nepal Rastra Bank, and annual reports of the selected commercial banks.

3.1. The Model

The model estimated in this study assumes that the risk adjusted performance of banks depends on income diversification variables. The empirical investigation employs two Ordinary Least Square (OLS) models in order to give in depth analysis of impact of income diversification on the risk adjusted performance in the Nepalese commercial banks. Noninterest income (NONII), Herfindahl-Hirschman Index–HHI, equity to total assets ratio (EQUITY), loan to total assets ratio (LOAN), foreign ownership (FORGN) and total assets (SIZE) are independent variables. From the conceptual framework the function of dependent variables (i.e. risk adjusted performance) takes the following form:

Risk adjusted performance = f (NONII, HHI, EQUITY, LOAN, FORGN, and SIZE)

More specifically, the given model has been segmented into following models:

Model 1

$$RAROA_{it} = \alpha_{it} + \beta_1 NONII_{it} + \beta_2 HHI_{it} + \beta_3 EQUITY_{it} + \beta_4 LOAN_{it} + \beta_5 FORGN_{it} + \beta_6 SIZE_{it} + e_{it}$$

Model 2

$$RAROE_{it} = \alpha_{it} + \beta_1 NONII_{it} + \beta_2 HHI_{it} + \beta_3 EQUITY_{it} + \beta_4 LOAN_{it} + \beta_5 FORGN_{it} + \beta_6 SIZE_{it} + e_{it}$$

Where,

RAROA = Risk-adjusted return on assets defined as the ratio of return on assets (ROA) of bank i for the given period and standard deviation of return on assets (ROA) for the sample period.

RAROE = Risk-adjusted return on equity defined as the ratio of return on equity (ROE) of bank i for the given period and standard deviation ofreturn on equity (ROE) for the sample period.

NONII = Non-interest income defined as the sum of sum of fee, commission and discount income, other income and exchange income

HHI = Herfindahl Hirschman index for income diversification defined as sum square of net interest income share and non-interest income share over net operating income

EQUITY = Equity multiplier defined as ratio of total equity to total assets

LOAN = Loan ratio defined as ratio of total loans to total assets

FORGN = Foreign ownership defined as dummy variable; 1 for foreign banks, 0 otherwise

SIZE = Total assets of the firm

e = Error term

β_0 is the constant term and β_1, β_2, β_3, β_4, β_5 and β_6 are the beta coefficients of variables.

4. VARIABLES DESCRIPTION

4.1. Dependent Variables

Risk Adjusted-Return on Assets (RAROA)

Risk adjusted-return on assets (RAROA) is the ratio of ROA to the standard deviation of ROA for sample period. Chiorazzo *et al.* (2008) used RAROA as a tool to measure the risk-adjusted profitability of banks. Gurbuz *et al.* (2013) found the positive relationship between income diversification and risk-adjusted return on assets in Turkish banking sector. RAROA has led to the widespread use of measures of revenue volatility and risk adjusted return as dependent variables (Stiroh and Rumble, 2006; Mercieca *et al.*, 2007; Goddard *et al.*, 2008). RAROA in this study has been calculated by using following formula.

$$RAROA = \frac{ROA_{it}}{\sigma ROA_i}$$

Risk Adjusted-Return on Equity (RAROE)

Risk adjusted-return on equity (RAROE) is the ratio of ROE to standard deviation of ROE over the sample period. Hang *et al.* (2017) found that the current bank risk is positively affected by the bank risk in the previous period with the presentation of standard deviation of ROE. Gurbuz *et al.* (2013) found the positive relationship between income diversification and risk-adjusted return on equity in Turkish banking sector. RAROE in this study has been calculated by using following formula.

$$RAROE = \frac{ROE_{it}}{\sigma ROE_i}$$

4.2. Independent Variables

Noninterest Income

Non-interest income is the income generated by banks other than loan creation. It is the sum of fee, commission and discount, exchange income and other incomes of the banks. Pennathur *et al.* (2012) found that the fee-based income significantly reduces risk for public sector banks. However, DeYoung and Rice (2004b) found that an increased focus on non-interest income is associated with a decline in risk-adjusted performance. Meslier *et al.* (2014) found that increase in noninterest activities increases bank's risk-adjusted profits. Based on above discussion, following hypothesis has been developed:

H₁: There is positive relationship between non-interest income and risk adjusted performance.

Herfindahl-Hirschman Index (HHI)

The measuring tool of income diversification is Herfindahl-Hirschman Index–HHI which measures the level of revenue diversification in the composition of net operating income. HHI is calculated by using following formula:

$$HHI = \left(\frac{NETII}{NOI}\right)^2 + \left(\frac{NONII}{NOI}\right)^2$$

Net operating income (NOI) captures the total value of NETII and NONII. HHI varies between 0.50 and 1.00. HHI value of 0.50 indicates complete income diversification in a bank, while HHI value of 1.00 represents the lowest level of income diversification. Estes (2014) revealed that HHI, for assets diversification, has positive impact on the risk adjusted performance. Gurbuz *et al.* (2013) showed that income diversification, measured through Herfindahl–Hirschman Index (HHI), improves the risk-adjusted performance of banks. Based on above discussion, following hypothesis has been developed:

H₂: There is positive relationship between income diversification, HHI, and risk adjusted performance.

Equity

Equity, in the study, is the ratio of equity to total assets which measures the financial leverage of bank. According to Daud *et al.* (2009) leverage has positive relationship with the market adjusted return. However, Delpachitra and Lester (2013) found that the equity to assets ratio has negative impact on the risk-adjusted return on equity (RAROE). Hafidiyah and Trinugroho (2016) found that equity to total assets is positively associated with the Z-Score i.e. proxy for risk adjusted return. Based on above discussion, following hypothesis has been developed:

H₃: There is positive relationship between equity ratio and risk adjusted performance.

Loan

Loan, in the study, is the ratio of total loans to total assets which measures the liquidity of banks. Hafidiyah and Trinugroho (2016) found that loan to total assets is positively associated with the Z-Score i.e. proxy for risk adjusted return. Likewise, Al-Tarawneh *et al.* (2017) revealed that bank loans have positive relationship with the bank profitability. Ismail *et al.* (2014) revealed that loan ratio has positive and significant relationship with the the performacnce of banks in Pakistan. Based on above discussion, following hypothesis has been developed:

H₄: There is positive relationship between loan ratio and risk adjusted performance.

Foreign Ownership

Foreign ownership refers to the significant stake of foreign bank and investors on the capital structure of the bank. In this study, it is used as a dummy variable where dummy variable 1 is for foreign banks, 0 otherwise. Nguyen *et al.* (2012) found that there is larger proportion of non-interest income in foreign owned banks than that of others. However, Vinh and Mai (2016) revealed that the income diversification is not beneficial to commercial banks. Hafidiyah and Trinugroho (2016) showed that joint venture banks are riskier than other banks when they engage in non-interest income activities. Based on above discussion, following hypothesis has been developed:

H₅: There is negative relationship between foreign ownership and risk adjusted performance.

Size

Total asset is used as proxy of bank size. Vinh and Mai (2016) found that bank size has positive relationship with the risk adjusted returns. Lepetit *et al.* (2008) showed a positive relationship between risk and income diversification for small banks. It means that bigger the banks with more diversification, higher would be the bank's risk. According to Sanya and Wolfe (2011) larger banks have better risk management and diversification opportunities. Based on above discussion, following hypothesis has been developed:

H₆: There is positive relationship between bank size and risk adjusted performance.

5. RESULTS AND DISCUSSION

5.1. Descriptive Statistics

Table 1 presents the descriptive statistics of selected dependent and independent variables during the period 2009/10 to 2015/16.

Table-1. Descriptive statistics for selected Nepalese commercial banks

Variables	Minimum	Maximum	Mean	Standard Deviation
RAROA	0.00	12.17	4.28	2.54
RAROE	-0.38	9.16	3.96	2.25
NONII	0.11	1.48	0.51	0.33
HHI	0.52	0.83	0.64	0.06
EQUITY	5.51	21.64	9.96	2.77
LOAN	28.01	82.84	65.48	8.28
FORGN	0.00	1.00	0.35	0.48
SIZE	12.53	129.78	46.38	26.18

Table 1 shows the descriptive statistics of dependent and independent variables for the selected Nepalese commercial banks. Clearly, risk adjusted return of assets ranges from a minimum of 0 to a maximum of 12.17 leading to an average of 4.28. Similarly, the risk adjusted return on equity ranges from a minimum of -0.38 to a maximum of 9.16 leading to an average of 3.96.

Noninterest income varies from a minimum of Rs. 0.11 billion to a maximum of Rs. 1.48 billion leading to an average of 0.51 billion. The standard deviation of Rs. 0.33 billion indicates that noninterest income can deviate by Rs. 0.33 billion on an average. Similarly, HHI ranges from a minimum of 0.52 to a maximum of 0.83 leading to an average of 0.64. It indicates that, on an average, majority of the banks are approaching to 0.50 which is an indicator of the income diversification. Equity ranges from a minimum of 5.51 percent to a maximum of 21.64 percent leading to an average of 9.96 percent. The average loan ratio is 65.48 percent ranging from minimum of 28.02 percent to a maximum of 82.84 percent. The study has employed both foreign owned banks and domestic owned banks, however there are more domestic owned banks in sample as an average of foreign ownership is 0.35 which is close to zero. Likewise, the size of bank varies from the minimum of Rs.12.53 billion to a maximum of Rs. 129.78 billion leading to an average of Rs. 46.38 billion.

5.2. Correlation Analysis

Having indicated the descriptive statistics, Pearson's correlation coefficients are computed and the results are presented in Table 2. More specifically, it shows the correlation coefficients of dependent and independent variables for Nepalese commercial banks.

Table-2. Pearson's correlation coefficients matrix

Variables	RAROA	RAROE	NONII	HHI	EQUITY	LOAN	FORGN	SIZE
RAROA	1							
RAROE	0.70**	1						
NONII	0.36**	0.44**	1					
HHI	-0.03	-0.04	0.33**	1				
EQUITY	-0.41**	-0.38**	-0.05	0.33**	1			
LOAN	-0.20*	-0.32**	-0.37**	0.34**	0.01	1		
FORGN	0.29**	0.41**	0.42**	-0.40**	-0.13	-0.53**	1	
SIZE	0.32*	0.40*	0.89*	-0.05	-0.05	-0.26*	0.24*	1

Notes: The asterisk signs (**) and (*) indicate that the results are significant at 1 percent and 5 percent level respectively

Table 2 shows that non-interest income is positively correlated to risk adjusted return on assets. It indicates that increase in noninterest income leads to increase in risk adjusted return on assets. The result is significant at the 1 percent level of significance. Likewise, foreign ownership and bank size have positive relationship with risk adjusted return on assets. However, the results show that equity ratio and loan ratio are negatively correlated to risk adjusted return on assets. It indicates that lower the equity ratio and loan ratio, higher would be the risk adjusted return on assets. Herfindahl-Hirschman Index-HHI, proxy for income diversification, has weak and negative relationship with the risk adjusted return on assets.

Similarly, the result shows that there exists positive relationship of noninterest income, foreign ownership and bank size with the risk adjusted return on equity. It reveals that higher the noninterest income, foreign ownership and bank size higher would be the risk adjusted return on equity. However, there is weak negative relationship between Herfindahl-Hirschman Index-HHI and risk adjusted return on equity. However, equity ratio and loan ratio have negative relationship with the risk adjusted return on equity indicating that decrease in equity ratio and loan ratio, leads to increase in the risk adjusted return on equity.

5.3 Regression Analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been performed and the results are presented in Table 3. More specifically, the Table 3 shows the regression results of noninterest income, Herfindahl–Hirschman Index-income diversification, equity to total assets, loan to total assets, dummy variable for foreign ownership and total assets-bank size on risk adjusted return on assets of Nepalese commercial banks.

Table-3. Estimated regression of NONII, HHI, EQUITY, LOAN, FORGN and SIZE on RAROA

Dependent Variable: RAROA
Method: Least squares
Sample: 140
Included observations: 140

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	–2.758	2.882	–0.957	0.340
NONII	5.404	1.514	3.569	0.001**
HHI	18.868	4.150	4.546	0.000**
EQUITY	–0.469	0.067	–6.945	0.000**
LOAN	–0.026	0.025	–1.020	0.310
FORGN	0.819	0.459	1.783	0.077
SIZE	–0.036	0.018	–2.033	0.044*
R-squared	0.395	**F-statistic**		14.488
Adjusted R-squared	0.368	**Prob. (F-statistic)**		0.000**

Notes: The asterisk signs (**) and (*) indicate that the results are significant at 1 percent and 5 percent level respectively.

Table 3 shows that beta coefficient is positive for non-interest income, HHI, and foreign ownership. It reveals that positive impact of non-interest income on the risk adjusted return on assets indicating that higher the non-interest income, higher would be the risk adjusted return on assets. This finding is consistent with the findings of Sawada (2013). Similarly, the beta coefficient is positive for HHI, proxy for the income diversification. The means that HHI has positive effect on the risk adjusted return on assets. The result is significant at the 1 percent level of significance. This finding is similar to the findings of Gurbuz *et al.* (2013) and Estes (2014). However, the beta coefficients are negative for equity ratio and loan ratio indicating that the equity ratio and loan ratio have negative influence on the risk adjusted return on assets. It also shows that higher the equity ratio and loan ratio lower would be the risk adjusted return on assets.

Additionally, the beta coefficient is positive for foreign ownership in banks. It means that increase in foreign ownership increases risk adjusted return on assets. It shows the positive impact of foreign ownership on the risk adjusted return on assets. However, the beta coefficient is negative for bank size which is the size of total assets. The result shows that bigger the bank's size, lower would be risk adjusted return on assets. This finding is consistent with the findings of Goddard *et al.* (2008).

The regression model displays F-value of 14.488 with a probability value of 0.000 and it is statistically significant at 1 percent level of significance. According to the R^2 value the 39.50 percent of total variation in the risk adjusted return on assets is explained by the six independent variables. This implies the other 60.50 percent remained as unexplained independent variables.

Table 4 shows the regression results of noninterest income, Herfindahl-Hirschman Index- income diversification, equity to total assets, loan to total assets, dummy variable for foreign ownership and total assets-bank size on risk adjusted return on equity of Nepalese commercial banks.

Table-4. Estimated regression of NONII, HHI, EQUITY, LOAN, FORGN and SIZE on RAROE

Dependent Variable: RAROE
Method: Least squares
Sample: 140
Included observations: 140

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.517	2.331	-1.080	0.282
NONII	4.511	1.225	3.682	0.000**
HHI	18.361	3.358	5.469	0.000**
EQUITY	-0.383	0.055	-7.025	0.000**
LOAN	-0.045	0.020	-2.198	0.030*
FORGN	1.181	0.371	3.178	0.002**
SIZE	-0.025	0.014	-1.764	0.080
R-squared	0.495	**F-statistic**		21.728
Adjusted R-squared	0.472	**Prob. (F-statistic)**		0.000**

Notes: The asterisk signs (**) and (*) indicate that the results are significant at 1 percent and 5 percent level respectively.

The Table 4, multiple regression analysis presents F-value of 21.728 with probability value of 0.000. It is statistically significant at 1 percent level of significance as the probability value is less than 0.01. This implies that all the independent variables have a significant impact on the risk adjusted return on equity. The coefficient of determination or R^2 is 49.50 percent which shows that 49.50 percent of the variation in the risk adjusted return on equity is explained by the independent variables of the study while remaining 51.50 percent is explained by other factors.

The result shows that beta coefficient is positive for non-interest income, HHI, and foreign ownership. The positive coefficient of non-interest income indicates that marginal increase in non-interest income significantly improves the risk adjusted return on equity. It shows the positive effect of non-interest income on the risk adjusted return on equity. This finding is consistent with the findings of Sanya and Wolfe (2011). The results also show that the shareholders risk return trade-off has significant impact from HHI index or income diversification. The result is significant at the 1 percent level of significance. This finding is similar to the findings of Lee *et al.* (2014). Additionally, the beta coefficient is positive for foreign ownership in banks. It reveals that the foreign ownership has positive effect on the risk adjusted return on equity.

On the other hand, the beta coefficient is negative for equity ratio. It reveals that increase in equity ratio leads to decrease in the risk adjusted return on equity as there is a negative influence of equity ratio on the risk adjusted return on equity. This finding is similar to the findings of Delpachitra and Lester (2013). The beta coefficient is also negative for loan ratio. It indicates that higher the loan in total assets of the bank, lower would be the risk adjusted return on equity. The study further shows the negative impact of bank size on the risk adjusted return on equity which shows that bigger the size of the banks, lower would be the risk adjusted return on equity. This finding is consistent with the findings of Stiroh (2004).

6. SUMMARY AND CONCLUSION

Income diversification is creating pool of modern banking revenue sources along with the traditional banking activities for sound financial performance of the banks. Income diversification in banking sector refers to increasing share of fees, net trading profits, exchange incomes, commission and charges, and other non-interest income within net operating income of a bank. An important source of diversification for the banks is considered as non-interest incomes.

This study attempts to examine the relationship between income diversification and risk return trade off in Nepalese commercial banks. The study is based on the secondary data which are gathered for twenty commercial banks in Nepal for the period of 7 years from 2009 to 2015.

The major conclusion of the study is that non-interest income, income diversification, equity ratio and foreign ownership are the major determinants of risk return trade off in Nepalese commercial banks. The positive and significant impact of noninterest income on the risk adjusted performance ratios indicates that the Nepalese commercial banks have to focus on generating noninterest income through modern banking activities so as to achieve tradeoff between the risk and return in their performance. The income diversification measurement proxy HHI shows that Nepalese commercial banks are in the process of diversification in their income sources. There is positive impact of diversification on the risk adjusted performance of the Nepalese commercial banks. The banks focused on modern and innovative banking services are generating non-interest incomes and having better trade-off in their risk and return. The result also shows that the highly levered banks have better risk adjusted performance than other banks which encourages banks to use more of debt in financing assets. The result also finds that loan ratio has negative impact on the risk adjusted performance of the commercial banks. Foreign banks have better income diversification practices in comparison to domestically owned banks. Moreover, the income diversification has positive influence on the risk return trade off in the context of Nepalese commercial banks.

There are some policy level implications of the study. Banks should offer various fee, commission and service charge based banking services as increases the return in banks with the lesser earning volatility. However, the regulators need to have keen concern on the modern business practices of the banks that generate non-interest income more.

Further study can be conducted to test the segregated effect of non-interest income sources on the performance of banks. Data set for longer period, more sample of financial institutions and banks with non-linear regression models can also be tested to have improved and more comprehensive results.

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Appendix

Banks	Years	Raroa	Roroe	Netii	Nonii	Hhi	Equity	Loan	Forgn	Size
1. ADBL	2009/10	2.685	4.573	3.9569	0.421	0.826	20.117	62.712	0	54.020
	2010/11	3.061	4.984	4.1374	0.431	0.829	21.644	59.846	0	57.581
	2011/12	2.225	3.725	4.1209	0.659	0.762	18.898	57.435	0	68.646
	2012/13	2.279	4.227	4.7188	0.646	0.788	18.448	64.446	0	77.097
	2013/14	1.350	2.649	4.6222	0.841	0.739	17.032	64.603	0	88.520
	2014/15	0.714	5.689	5.6072	1.015	0.740	15.981	68.026	0	100.812
	2015/16	0.445	3.570	6.2613	1.162	0.736	16.216	71.109	0	111.786
2. EBL	2009/10	10.645	7.579	1.5297	0.398	0.672	6.667	66.589	1	41.383
	2010/11	10.696	7.520	2.5359	0.398	0.766	6.734	67.172	1	46.236
	2011/12	10.747	6.564	2.0867	0.523	0.679	7.484	64.341	1	55.813
	2012/13	12.173	7.661	2.7577	0.615	0.702	7.344	66.006	1	65.741
	2013/14	11.460	7.140	2.9188	0.631	0.708	7.747	67.531	1	70.445
	2014/15	9.423	5.745	2.8794	0.780	0.665	6.948	54.940	1	99.167
	2015/16	9.423	5.109	3.2286	0.909	0.657	7.476	59.670	1	113.885
3. HBL	2009/10	3.701	4.697	1.5951	0.563	0.614	8.051	65.502	1	42.717
	2010/11	5.940	7.097	1.9113	0.675	0.614	8.549	67.543	1	46.736
	2011/12	5.474	6.571	1.9084	1.003	0.548	8.520	64.317	1	54.364
	2012/13	4.789	5.654	2.5083	1.016	0.590	8.672	65.000	1	61.114
	2013/14	4.043	5.006	2.4942	1.249	0.555	8.267	61.585	1	73.590
	2014/15	4.167	5.075	2.6735	1.152	0.579	8.404	64.584	1	82.802
	2015/16	6.034	6.966	3.4499	1.308	0.601	8.836	67.839	1	99.863
4. NABIL	2009/10	6.112	7.494	2.0896	0.676	0.630	7.362	61.961	1	52.080

	2010/11	6.267	7.407	2.3116	0.750	0.630	7.864	65.417	1	58.141
	2011/12	7.221	7.845	2.9928	1.022	0.620	8.640	65.831	1	63.200
	2012/13	8.381	8.362	3.5348	1.117	0.635	9.161	63.311	1	73.241
	2013/14	6.834	7.657	3.7136	1.311	0.614	8.790	62.657	1	87.275
	2014/15	5.312	5.553	3.5444	1.285	0.609	8.207	56.474	1	115.987
	2015/16	5.983	6.113	4.3410	1.476	0.621	9.142	59.785	1	127.300
5. NIBL	2009/10	7.207	5.857	2.0997	0.635	0.643	8.002	70.357	0	57.305
	2010/11	6.581	4.838	2.1831	0.650	0.646	8.842	70.421	0	58.357
	2011/12	5.265	3.644	2.1682	0.742	0.620	9.201	63.320	0	65.756
	2012/13	8.556	5.786	3.0911	0.908	0.649	9.597	63.430	0	73.152
	2013/14	6.581	5.192	2.9958	1.150	0.599	9.197	60.366	0	86.174
	2014/15	6.252	4.244	2.9788	1.193	0.592	9.399	28.010	0	104.345
	2015/16	6.581	3.322	3.9211	1.443	0.607	12.550	65.849	0	129.783
6. NSBI	2009/10	2.746	7.198	0.8260	0.281	0.621	6.441	45.944	1	38.048
	2010/11	2.693	7.265	1.0039	0.402	0.592	6.247	46.358	1	46.088
	2011/12	2.213	6.761	0.9987	0.498	0.556	5.507	45.026	1	58.060
	2012/13	3.173	9.144	1.6235	0.573	0.614	5.863	44.429	1	64.796
	2013/14	4.026	9.162	1.7450	0.645	0.606	7.426	57.757	1	61.083
	2014/15	4.799	8.497	2.0475	0.768	0.603	9.525	67.444	1	59.277
	2015/16	4.533	8.666	2.4161	0.920	0.601	8.814	59.830	1	78.515
7. NMB	2009/10	2.899	1.704	0.3066	0.140	0.570	13.696	59.034	1	13.227
	2010/11	3.330	1.998	0.4453	0.147	0.626	13.918	70.281	1	15.948
	2011/12	0.671	0.483	0.4625	0.143	0.640	12.270	65.266	1	18.495
	2012/13	3.426	2.885	0.7650	0.181	0.690	9.657	65.633	1	25.126
	2013/14	3.259	2.959	0.8115	0.296	0.608	9.369	67.745	1	30.212
	2014/15	2.899	3.062	0.9889	0.380	0.599	8.087	66.015	1	41.337
	2015/16	3.570	3.251	2.0880	0.648	0.638	9.293	72.037	1	74.613
8. BOK	2009/10	2.798	3.051	0.9679	0.371	0.600	8.863	71.229	0	23.396
	2010/11	3.132	3.087	1.1680	0.370	0.634	9.836	70.556	0	24.758
	2011/12	2.695	2.795	1.1364	0.399	0.615	9.351	65.141	0	28.882
	2012/13	2.439	2.320	1.2307	0.400	0.630	11.442	78.097	0	28.882
	2013/14	0.834	0.891	1.2189	0.435	0.612	9.091	72.512	0	39.034
	2014/15	0.950	1.078	1.3813	0.493	0.612	8.570	70.923	0	44.970
	2015/16	1.027	1.047	1.5429	0.543	0.615	9.767	73.100	0	79.648
9. SCBL	2009/10	8.025	6.199	1.4664	0.831	0.538	8.380	39.681	1	40.213
	2010/11	7.579	5.854	1.7156	0.746	0.578	8.395	42.061	1	43.811
	2011/12	8.322	5.455	1.8638	0.775	0.585	9.891	46.971	1	41.677
	2012/13	7.936	5.074	1.9240	0.853	0.574	10.119	50.029	1	45.631
	2013/14	7.461	5.053	2.0077	0.906	0.572	9.542	48.715	1	53.324
	2014/15	5.915	4.137	1.9135	1.015	0.547	9.365	42.548	1	65.059
	2015/16	5.885	3.304	1.8499	1.035	0.540	11.543	48.021	1	65.186
10.SBL	2009/10	4.002	4.551	0.6118	0.106	0.749	7.032	73.035	0	22.802
	2010/11	4.832	4.746	0.7651	0.169	0.704	8.720	80.623	0	22.802
	2011/12	4.228	4.587	0.8574	0.318	0.605	8.946	82.839	0	24.406
	2012/13	5.399	5.835	1.1604	0.459	0.594	7.428	68.600	0	33.654
	2013/14	6.569	7.131	1.3482	0.514	0.600	7.451	67.499	0	40.278
	2014/15	5.701	6.268	1.4358	0.619	0.579	7.417	71.751	0	50.647
	2015/16	6.380	6.148	2.1301	0.713	0.624	8.417	74.393	0	74.403
11. NBBL	2009/10	3.245	2.999	0.6908	0.246	0.613	17.026	62.322	1	12.531
	2010/11	0.000	-0.384	0.6915	0.272	0.595	16.074	60.356	1	14.005
	2011/12	1.596	1.717	0.4912	0.316	0.524	14.646	51.216	1	20.170
	2012/13	1.421	1.365	0.6862	0.368	0.546	16.390	58.757	1	21.802
	2013/14	0.956	1.131	0.8525	0.542	0.525	13.313	60.377	1	30.874
	2014/15	0.820	1.042	1.0902	0.653	0.532	12.391	64.155	1	39.484
	2015/16	1.023	1.243	1.4624	0.810	0.541	12.937	68.492	1	46.684
12. SUBL	2009/10	2.591	2.237	0.5846	0.133	0.698	9.725	71.194	0	16.919
	2010/11	0.600	0.371	0.6970	0.131	0.734	13.539	75.140	0	15.850
	2011/12	1.113	0.931	0.5907	0.179	0.643	10.110	67.234	0	21.279
	2012/13	2.548	2.290	0.9889	0.270	0.663	9.381	67.858	0	26.129
	2013/14	1.777	1.647	1.0951	0.309	0.657	9.096	67.220	0	29.661
	2014/15	2.698	0.253	1.1063	0.387	0.616	8.954	70.556	0	37.389
	2015/16	3.469	2.788	1.5036	0.555	0.606	10.493	73.206	0	58.559
13. KBL	2009/10	5.880	5.751	0.6821	0.164	0.687	8.701	71.950	0	20.522
	2010/11	4.549	3.682	0.6852	0.190	0.660	10.804	71.375	0	20.492
	2011/12	4.068	3.760	0.8191	0.204	0.681	9.459	70.089	0	25.131

	2012/13	3.809	3.559	0.9780	0.237	0.686	9.413	68.631	0	28.223
	2013/14	4.068	3.737	0.8355	0.331	0.594	9.563	70.592	0	31.021
	2014/15	3.920	3.827	0.9258	0.298	0.632	8.956	70.224	0	37.375
	2015/16	6.250	5.760	1.1754	0.277	0.691	9.509	69.517	0	42.417
14. LXBL	2009/10	7.174	6.653	0.6521	0.154	0.690	9.127	69.492	0	20.952
	2010/11	7.606	6.933	0.7354	0.201	0.663	9.810	70.501	0	21.560
	2011/12	6.482	6.061	0.6536	0.315	0.561	8.854	63.318	0	26.029
	2012/13	6.482	6.003	0.9248	0.345	0.604	9.125	66.051	0	29.816
	2013/14	6.353	5.818	0.8223	0.419	0.553	9.093	65.076	0	34.919
	2014/15	4.494	4.018	1.0388	0.511	0.558	9.201	68.732	0	45.340
	2015/16	5.834	4.960	1.4612	0.594	0.589	10.474	73.346	0	54.663
15. MBL	2009/10	0.602	0.594	0.5438	0.153	0.657	8.576	69.104	0	20.679
	2010/11	0.086	0.072	0.5230	0.155	0.647	9.091	73.492	0	19.606
	2011/12	0.275	0.207	0.4254	0.165	0.598	10.872	64.058	0	24.357
	2012/13	0.843	0.763	0.9440	0.245	0.672	9.231	69.860	0	30.296
	2013/14	1.927	2.018	1.1160	0.293	0.670	7.945	71.342	0	40.724
	2014/15	2.168	2.218	1.3559	0.350	0.674	8.186	70.275	0	48.753
	2015/16	2.598	2.416	1.8573	0.436	0.692	8.982	73.393	0	59.455
16. CTZ	2009/10	2.690	1.483	0.4479	0.108	0.686	14.615	65.301	0	16.517
	2010/11	2.713	1.643	0.5589	0.111	0.724	13.273	72.975	0	16.816
	2011/12	4.576	1.822	0.5745	0.135	0.691	11.370	70.407	0	20.069
	2012/13	5.151	3.212	1.0351	0.242	0.693	9.160	67.599	0	25.980
	2013/14	4.668	3.346	1.0731	0.341	0.634	8.543	69.784	0	32.222
	2014/15	4.645	3.603	1.2684	0.342	0.665	8.920	68.710	0	41.451
	2015/16	4.484	3.766	1.6198	0.513	0.635	9.635	71.983	0	55.062
17.PRIME	2009/10	5.115	3.530	0.5568	0.177	0.634	7.609	68.978	0	20.219
	2010/11	5.178	2.420	0.6966	0.167	0.688	11.260	76.504	0	22.086
	2011/12	3.145	1.741	0.7164	0.191	0.668	9.522	69.602	0	27.158
	2012/13	4.670	2.704	1.0419	0.221	0.712	9.107	65.496	0	32.409
	2013/14	4.638	2.557	1.0600	0.349	0.627	9.511	71.269	0	38.031
	2014/15	5.178	2.875	1.3878	0.435	0.637	9.462	71.214	0	45.801
	2015/16	6.513	0.402	1.5885	0.582	0.607	9.933	74.031	0	54.399
18. NCC	2009/10	4.143	4.524	0.4621	0.130	0.657	11.932	62.649	0	12.761
	2010/11	2.078	2.059	0.4696	0.109	0.694	13.178	66.751	0	13.236
	2011/12	1.162	1.502	0.4689	0.140	0.645	10.339	66.918	0	18.595
	2012/13	1.768	2.547	0.8129	0.165	0.720	9.096	61.977	0	24.891
	2013/14	1.885	2.426	0.7835	0.177	0.699	10.414	68.453	0	25.224
	2014/15	1.471	1.912	0.8039	0.210	0.671	9.890	69.580	0	29.940
	2015/16	2.762	3.142	1.1894	0.303	0.676	10.286	70.391	0	35.361
19. GIME	2009/10	0.989	0.846	0.5030	0.165	0.627	8.842	69.532	0	17.201
	2010/11	3.014	2.323	0.6756	0.183	0.664	9.748	70.608	0	17.523
	2011/12	2.049	1.844	0.6396	0.276	0.579	8.273	66.190	0	30.664
	2012/13	2.708	2.452	1.3799	0.461	0.625	8.280	67.179	0	39.018
	2013/14	3.815	2.804	1.7584	0.614	0.616	10.120	69.013	0	60.536
	2014/15	3.273	2.313	2.2898	0.879	0.599	10.585	70.732	0	69.186
	2015/16	3.721	2.800	2.8896	1.056	0.608	9.927	67.524	0	87.701
20.NICA	2009/10	5.617	4.945	0.7457	0.216	0.651	8.690	62.690	0	20.309
	2010/11	5.714	4.813	0.8748	0.249	0.655	9.046	67.604	0	22.090
	2011/12	4.005	3.686	0.8097	0.246	0.643	8.062	67.407	0	25.580
	2012/13	4.347	2.839	1.2433	0.290	0.693	9.430	67.819	0	46.535
	2013/14	4.176	3.311	1.7982	0.441	0.684	9.462	70.533	0	51.500
	2014/15	2.955	2.400	1.5775	0.525	0.625	9.086	69.638	0	60.519
	2015/16	3.687	2.804	1.9577	0.656	0.624	9.176	72.650	0	80.457

Where,

ADBL = Agricultural development Bank Limited

EBL = Everest bank limited

HBL = Himalayan Bank Nepal Limited

NABIL = Nabil Bank Limited

NIBL = Nepal Investment Bank Limited

NSBI = Nepal State Bank of India

NMB = Nepal Merchant Bank

BOK = Bank of Kathmandu

SCBL = Standard Chartered Bank Nepal Limited

SBL = Siddhartha Bank Limited

NBBL = Nepal Bangladesh Bank Limited

SUBL = Sunrise Bank Limited

KBL = Kumari Bank Limited

LXBL = Laxmi Bank Limited

MBL = Machhapuchchhre Bank Limited

CTZ = Citizen International Bank Limited

PRIME = Prime Commercial Bank Limited

NCC = Nepal Credit and Commerce Bank Limited

GIME = Global IME Bank Limited

NICA = NIC Asia Bank Limited