Competition in Nepalese Commercial Banks

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Abstract

This study has made an attempt to assess the degree of competition (or market structure) in Nepalese commercial banking. For the purpose, both of structural (n-bank concentration ratio and Herfindahl-Hirschman Index) and non-structural measures (Panzar-Rosse H-statistics) have been used. Data of ten years have been abstracted from various sources for the analysis purpose. Study shows that the market structure of Nepalese commercial banks is characterized by the monopolistic competition. Further, it is observed that the banks other than government owned and joint-venture banks have been facing highest degree of competition where as joint-venture commercial banks face lowest degree of competition. Finally, the study suggested that the degree of competition among government owned, joint-venture and other Nepalese commercial banks slightly vary but overall market structure of all set of banks have the feature of monopolistic competition.

Key Words: Competition, Nepalese Commercial Banks, Market Structure, Bank Concentration, HHI index, Panzar-Rosse Approach

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I.   BACKGROUND

Banking sector provides a mechanism to channelize the funds from surplus to deficit sector in an economy. In every economy the banking sector is considered to be a vital source of financing economic activities (Bobakova, 2003). Competition in banking is important for the efficient production of financial services, the quality of financial products and the degree of financial innovation (Claessens & Laeven, 2004).

Competition is a key driver of social welfare, as it may push down prices (i.e. interest rates) and improves services for consumers and enterprises (Cetorelli, 2001). The literature has identified six reasons why competition in the financial sector is important: firstly, for firms and households to access financial services (Beck et al., 2010), secondly, for proper functioning of the financial sector (Claessens & Laeven, 2004), thirdly, for stability of the financial system (Boyd et al., 2009), fourthly, for efficient management of financial intermediaries (Berger & Hannan, 1993), fifthly, for improvement of monetary policy transmission through the inter-bank market rates (Van Leuvensteijn et al., 2008), and finally, for overall industrial and economic growth (Allen & Gale,2004). In a competitive market setting, there is allocative and productive efficiency as well as dynamic efficiency. As in other industries, competition in banking system is also needed for efficiency and maximization of social welfare. Banking system is also important since any instability in the banking system has the potential to lead to a financial instability and economic crisis. Hence, a well-functioning banking system is regarded as a cornerstone of a market economy. Policymakers try to ensure that banking system is stable besides ensuring that it is competitive and efficient (Kocabay, 2009).

Creating an efficient banking system is an important objective of banking regulating agencies. So, central bank as a regulator should always works for maintaining perfection in the banking industry. For the purpose, central bank formulates and implements various financial tools/policies to check-out the imperfection. The degree of competition in banking industry determines the effectiveness of policy measures. In this connection, detecting the degree to which the banking industry is competitive is a crucial issue for regulating agencies like Nepal Rastra Bank.

Basic objective of this study is to examine the degree of competition in Nepalese commercial banking. Beside this, study also makes an attempt to test whether the degree of competition differs across government owned, joint-venture and other commercial banks in Nepal.

II.   REVIEW OF LITERATURE

Competition is defined as a process of rivalry between firms seeking to win customers' business over time (Whish, 2005). The aim is to increase market share and get higher profits. Firms compete on prices or quality of the products in concern. According to the traditional industrial organization literature, in a perfectly competitive market, there are many producers having small market shares. The concentration in the market is low. Individual producers can not affect the price of the product, so they are price takers.

Products are homogenous. Moreover, there are no barriers to enter to or exit from the industry. Finally there is perfect information among producers and consumers.

The measures of competition can be divided into the traditional Industrial Organization (IO) and the new empirical IO approaches (Podpiera et al. 2008). The traditional IO approach proposes tests of market structure to assess banking competition based on the SCP model suggested by Bain (1951). According to this, competition can be measured by concentration indices such as the market share of the five largest banks, or by the Herfindahl index, which is defined as the sum of the squares of the market shares (Herfindahl, 1950). These tools were widely applied until the 1990s. The new empirical IO approach provides non-structural tests to circumvent the problems of the measures of competition provided by the traditional IO approach. These latter measures suffer from the fact that they infer the degree of competition from indirect proxies such as market structure or market shares. In comparison, non-structural measures do not infer the competitive conduct of banks through the analysis of market structure, but rather measure banks' conduct directly.

By using the Panzar-Rosse model, Shaffer (1982) observed competitive bank market even though banks in New York City exercise some market power during the period of 1979-1980. Similarly, Nathan and Neave (1989) rejected the hypothesis of pure collusion in Canadian context tested over three year period (1982-1984). Further, Shaffer (1993) observed the perfect competition in Canadian banking over the period of 1956 to 1989 by using the BL model. Through the construction of H-statistics for 50 countries, Claessens and Laeven (2004) observed that the imperfect competition describes each of the countries to varying degrees; some countries that have a large number of banks exhibit relatively low levels of competition (e.g., the United States). Claessens and Laeven (2004) relate competitiveness (the H-measure) to the indicators of countries' banking system structures and regulatory regimes and found no evidence that their competitiveness measure negatively relates to banking system concentration or the number of banks in the market. In the study of competition and stability in the Euro area, Staikouras and Wood (2000) compared banking system stability of Greece and Spain for 1990s and observed that the Spanish banking system is more competitive than the Greek banking system which has a larger public involvement.

Looking at the cross-country studies carried out in the EU banking markets, Molyneux et al. (1994) tested the Panzar–Rosse H-statistic on a sample of banks in France, Germany, Italy, Spain and the UK for the period 1986–89. Results of their study indicated monopolistic competition in all countries except Italy where the monopoly hypothesis could not be rejected. Similarly, Bikker and Groeneveld (2000) tested the competitive structure in the banking industry in the EU as a whole as well as in individual EU countries and provided evidence that European banking sectors operate under conditions of monopolistic competition, although to varying degrees. De Bandt and Davis (2000) also compared the behavior of large and small European Economic and Monetary Union banks (banks of the nations adopting euro as their national currency) with a US banking sample. This study found that the behavior of large banks is not fully competitive compared with the USA, while the level of competition appears to be even lower for small institutions especially in France and Germany. Bikker and Haaf (2001) examined

competitive conditions and market structure for 23 countries during 1990s and found monopolistic competition in all countries. Bikker and Haaf (2002) also observed that the competition is weaker among small banks operating mainly in local markets and stronger in inter-national markets where large banks usually operate. Competition is found to be stronger in Europe than in Canada or USA.

By assuming a single EU banking market, Casu and Girardone (2006) observed monopolistic market competition in the EU single market for the period of 1997-2003. But at country level, Finland seems near to perfect competition where as monopoly competition in Greece. The comparison of United Kingtom (UK) and German banking systems showed more competition and less stability in the UK and less competition but more stability in Germany (Hoggarth, Milne and Wood, 1998). An examination of the nature of competition and structure in South Asian banking markets indicated that bank revenues appear to be earned under conditions of monopolistic competition during the period 1995 to 2003. In Bangladesh and Pakistan competition is greater in the traditional interest-based product markets while Indian and Sri Lankan domestic commercial banks seem to face more competitive pressure in the fee-based product market from other financial intermediaries (Parera et al. 2006).

III.   RESEARCH METHODOLOGY

In this study descriptive type of research design has been employed for the detail study of the various issues and fact finding of various aspects of banking competition in Nepalese commercial banking. This study is entirely based on the accounting data of 18 commercial banks (established before 2005) for 10 years (2005-2014, including both years). The required data has been extracted from Nepal Rasta Bank (NRB) database, annual reports of SEBON, NEPSE and the annual reports of concerned banks. Further, additional information is extracted from official web site of World Bank and the publications of government authorities (CBS and MoF).

For the study purpose, two structural (n-bank concentration ratio and Herfindahl-Hirschman Index) and a non-structural (Panzar-Rosse H-statistics) measures of competition have been used.

n-Bank Concentration Ratio (CRn)

n-bank concentration ratio is the sum of market shares of n largest banks in the banking system. It is calculated by the following formula:

$$CR_I = \sum_{i=1}^{n} S_i$$

Where S_i is the market share of bank i and n is the number of banks in concern. Total assets are generally used to measure the bank size in calculation of market shares. Concentration ratios give equal emphasis to the n leading banks and neglect the effect of many small banks in the market. There is no general rule determining the optimal value of n. However, in the empirical analysis, n is generally determined to be 3, 4 or 5. The

ratio ranges between 0 and 1. It approaches zero if there is an infinite number of very small banks in the system and it equals 1 if there is one monopoly bank. The index provides information only about shifts in market shares between the top n banks and the remaining small banks, but does not capture changes in distribution within these two groups. Moreover, it ignores the structural changes in the part of the industry which is not included in concentration ratio and also neglects the competitive influence of small banks on the decisions of the large banks in the market (Bikker and Haaf, 2002; Alegria and Schaeck, 2006). In this study 5-bank and 3-bank concentration ratios have been used as the competition measures. 5-bank and 3-bank concentration ratios are the sum of market share of five and three largest banks respectively for each year. Total assets and total deposits of all commercial banks have been used to evaluate the market share of the banks.

Herfindahl-Hirschman Index - HHI

HHI is a commonly accepted measure of market concentration. It is calculated by squaring the market share of each firm competing in a market, and then summing the resulting numbers (Investopedia). Generally, higher HHI indicates a lower degree of market competition and significantly higher market power of larger firms. A lower HHI suggests higher market competition. The HHI is computed as,

$$\text{HHI} = \sum_{i=1}^{n} (\text{MS}_i)^2$$

Where MSi is the market share of bank i and n is the total number of banks in the system. In calculating market shares, total assets are usually taken as a measure of bank size. Contrary to the n-bank concentration ratios, in the calculation of HHI, all banks in the market are taken into account. HHI stresses the importance of larger banks by giving them a higher weight than smaller banks. If n is the total number of banks, HHI ranges between 1/n and 1. It reaches its lowest value, the reciprocal of the number of banks, when all banks in a market are of equal size and it reaches unity in the case of monopoly (Bikker and Haaf, 2002; Alegria and Schaeck, 2006). For this study, HHI has been determined on the basis of both total assets and total deposits of Nepalese commercial banking.

Panzar-Rosse Approach

Panzer-Rosse (1987) model is most commonly applied tool to assess the market competition. The Rosse–Panzar model is based on the estimation of the H-statistic, which aggregates the elasticities of total revenues to input prices. Assuming long-run equilibrium, this approach accesses the impact of changes in factor prices on the revenue under the different market situation. Panzar-Rosse approach measures the effect of factor prices on the observed equilibrium values of total revenue. By following the approach applied by Bikker and Haaf (2002), Claessens and Laeven (2004), Shaffer (1982), Gajurel and Pradhan (2012) and many others, this study has employed the reduced form of revenue equation as specified by Panzar and Rosse (1987) to measure competition in Nepalese banking industry.

The individual bank prices differently in response to the change in its factor inputs cost. The magnitude of changes helps to determine the degree of market competition in the market (Gajurel and Pradhan, 2012).The reduced-form revenue equation of Panzar-Rosse model is:

$$\ln REVN_{it} = a + b_1 \ln INTC_{it} + b_2 \ln LC_{it} + b_3 \ln OTHC_{it} + b_4 \ln LOAN_{it} + b_5 \ln TA_{it} + b_6 \ln EQUITY_{it} + \varepsilon_i$$

where $REVN_{it}$ is the ratio of total interest revenue to total assets for bank i at time t, $INTC_{it}$ is the total interest expenses to total deposits and borrowings, LC_{it} is the ratio of personal/staff expenses to total assets, $OTHC_{it}$ is the ratio of total other operating expenses to total assets, $LOAN_{it}$ is the ratio of total loans to total assets, TA_{it} is total assets, $EQUTY_{it}$ is the ratio of equity to total assets, and ε_{it} is the stochastic error term that capture time-varying and bank-specific random components. In Panzar-Rosse equation, first three independent variables are the factor input prices for funds, labor and capital respectively and latter three are bank-specific control variables. Since the PR model follows the log-linear form, the sum of factor price elasticities is termed as 'H-statistic'.

The value of H-statistic depends on the competitive environment and corresponding behaviors of banks. In fact The PR model assumes that

- if H<0, a monopoly balance is emerging: each bank is operating separately as if they were maximizing their profits in a monopolistic situation or in a perfect cartel (the latter being more likely in a multi-player market);

- if $0 < H < 1$, the market is characterised by monopolistic competition (H is increasing as a function of the elasticity of demand);

- if H = 1 , the market operates in a perfect competition.

Equilibrium Test: The basic premise on which PR model rests is the long-run equilibrium where factor prices are not related with industry return (Panzar and Rosse, 1987). To test this proposition empirically, following empirical model is used (Casu and Girardone, 2006; Perera et al., 2006) that validates the result of above results if sum of elasticities of factor costs is equals to zero ($\beta1 + \beta2 + \beta3 = 0$).

$$\ln ROA_{it} = a + b_1 \ln INTC_{it} + b_2 \ln LC_{it} + b_3 \ln OTHC_{it} + b_4 \ln LOAN_{it} + b_5 \ln TA_{it} + b_6 \ln EQUITY_{it} + \varepsilon_i$$

where ROA is the return on assets (pre-tax profits to total assets) and explanatory variables are same as in reduced-form revenue equation of Panzar-Rosse model. Market equilibrium condition indicates that the sum of the coefficients on the input prices ($\beta1 + \beta2 + \beta3$) equals zero. In other words, input prices are uncorrelated with returns since a competitive system will equalize risk-adjusted rates of return across banks in equilibrium. The idea behind this test is that in equilibrium, returns on bank assets should not be related to input prices (Claessens and Laeven, 2004; Schaeck and Cihak, 2007).

Results and Discussion

Concentration Ratios

The concentration ratio is the measure of the percentage market share in an industry held by the largest firms within that industry. In other words, concentration refers to the degree of control of economic activity by large firms (Sathye, 2002). The increase in concentration levels could be due to considerable size enlargement of the dominant firms and/or considerable size reduction of the non-dominant firms. Conversely, reduction in concentration levels could be due to considerable size reduction of the dominant firms and/or considerable size enlargement of the non-dominant firms (Athanasoglou et al., 2008). The degree of concentration in a market is measured by the proportion of assets or deposits controlled by the largest banks serving that market (Rose, 1999). Table 1 presents the values of 5-bank and 3-bank concentration ratios of the 5 and 3 largest banks measured on the basis of assets and deposits.

Table 1: Concentration Ratios

Year	No. of Banks	Assets		Deposit	
		CR3	CR5	CR3	CR5
2005	17	0.4484	0.5752	0.4083	0.5427
2006	17	0.4302	0.5652	0.3695	0.5150
2007	18	0.3761	0.5439	0.3595	0.5211
2008	18	0.3332	0.4720	0.3142	0.4656
2009	18	0.3110	0.4455	0.2821	0.4121
2010	18	0.2662	0.3992	0.2616	0.3880
2011	18	0.2535	0.3867	0.2527	0.3825
2012	18	0.2420	0.3647	0.2314	0.3562
2013	18	0.2258	0.3483	0.2133	0.3361
2014	18	0.2248	0.3434	0.2129	0.3252
Mean		0.3111	0.4444	0.2906	0.4245
S.D.		0.0791	0.0857	0.0658	0.0767

Table 1 presents the value of concentration ratios for five and three largest banks over the sample period of 2005 to 2014. On the basis of total assets, average of sum of market share of three largest banks is 31.11 percent where as it is 44.44 percent for five largest banks. Sum of the market share of three largest banks was 44.84 percent in 2005 and it decreased to 22.48 percent in 2014. It shows that the sum of three largest banks has been gradually decreased over the period. Similar trend can be observed for the sum of total market share of five largest banks (CR5). Value of CR5 was 57.52 percent in 2005 and it reaches to 34.34 percent in 2014. So, in terms of value of assets, the concentration of largest banks has been decreased over the period. In terms of value of deposits, sum of market share of three banks was 40.83 percent which is just 21.29 percent in 2014 with mean value of 29.06. Similarly, the sum of five largest banks was 54.27 percent in 2005 which reaches to 32.52 percent in 2014 with average of 42.45 percent. It clearly advocates the decreasing concentration of few large banks in the banking industry. The

standard deviation of concentration ratios is highest for five bank concentration ratios on the basis of total assets and it is lowest for three bank concentration ratios on the basis of deposits. It suggests that the degree of concentration of banks in terms of asset size changes more than in terms of their deposits over the study period.

In conclusion, the market share of largest banks has been gradually decreasing over the study period. It shows that the largest banks have been losing the monopoly power in the Nepalese banking industry.

Herfindahl-Hirschman Index

The HHI accounts for the number of firms in a market, as well as concentration, by incorporating the relative size (i.e. market share) of all firms in a market. It is calculated by squaring the market shares of all firms in a market and then summing the squares. Though the study is based on the accounting data of 18 commercial banks, HHI has been determined in each year by considering all banks that are in operation to measure the level of bank's concentration in entire commercial banking industry. The values of HHI for Nepalese commercial banks for 2005 to 2014 have been presented in table 2.

Table 2: Herfindahl-Hirschman Index

Year	No. of Banks	HHI(Assets)	HHI(Deposits)
2005	17	0.0909	0.0800
2006	18	0.0867	0.0731
2007	20	0.0806	0.0786
2008	25	0.0669	0.0677
2009	26	0.0606	0.0576
2010	27	0.0536	0.0531
2011	31	0.0509	0.0515
2012	32	0.0470	0.0465
2013	31	0.0478	0.0470
2014	30	0.0443	0.0006
Mean		0.0629	0.0556
S.D.		0.0175	0.0230

Table 2 presents the value of Herfindahl-Hirschman index (HHI) of Nepalese commercial banking industry for the period of 2005 to 2014. HHI is the sum of square of market shares of each banks operated in banking industry in each years. As per the table, there were only 17 commercial banks which have reached to 30 in 2014. The highest numbers of banks were in operation in 2012 in Nepalese banking industry. The market share has been determined on the basis of value of total assets and deposits. So, HHI for both assets and deposits has been presented in last two columns.

In table, the value of HHI when market share is determined on the basis of total assets (HHIassets) was 0.0909 in 2005 which decreased to 0.0443 in 2014. This decreased value of HHI suggests the increase in market competition. The same trend can also be observed from the value of HHI determined on the basis of value of deposits of the banks.

Value of HHI (Deposits) was 0.0800 in 2005 which reaches to 0.0006 in 2014. This shows the extreme level of market competition in banking industry in terms of deposits.

Panzar-Rosse H-Statistics

Panzar-Rosse (1987) approach is one of the most widely used non-structural techniques to study competitive conditions in the banking industry which assesses the impact of changes in factor prices on the revenue under the different market structure. This study used the reduced form of revenue equation to assess the degree of competition in Nepalese banking industry. The descriptive statistics of variables used in Panzar-Rosse model has been shown in table 3.

Table 3: Descriptive statistics of Panzar-Rosse variables

(Rs. in millions)

	Mean	S.D.	Minimum	Maximum
REV	0.0647	0.0191	0.0100	0.1100
INTC	0.0560	0.0196	0.0200	0.1200
LC	0.0101	0.0084	0.0000	0.0500
OTCH	0.0092	0.0031	0.0000	0.0200
LOAN	0.5779	0.1386	0.1200	0.8300
TA	37852.53	26522.34	3193.20	130046.90
Equity	0.0482	0.0755	-0.2763	0.1807

Table 3 presents the mean, standard deviation, minimum and maximum values of all variables that are used in Panzar-Rosse model. This model has been used to calculate the H-statistic which measures the degree of competition in Nepalese commercial banking industry. As per the table Nepalese commercial banks earn 6.47 percent of interest income on their total assets investment on average. The interest income of sample commercial banks earns at least 1 percent and at most they earn 11 percent on their assets investment. Similarly, commercial banks have average interest expenses of 5.6 percent and it is minimum of 2 percent and maximum of 12 for the selected banks. Table 3 in addition shows that the commercial banks invest very low for their staffs. On average Nepalese commercial banks spent around 1 percent to pay for their employees where most of the banks pay less than this as stated by nil value of minimum value of LC. Further, the banks have the average other operating expenses of 0.92 percent and they invest 57.79 percent of their assets in the form of loans and advances. Over the last ten years, bank invests at least 12 percent of their assets on loan and highest of 83 percent. The average size of Nepalese commercial banks in terms of assets is Rs.37852.53 million and on an average, they have only 4.82 percent of equity on their total assets investment over the study period.

Before running the regression, due consideration has been taken to be safe from the problem of multicollinearity among the explanatory variables used in the Panzar-Rosse model. It can be detected through the calculation of correlation coefficients among the

explanatory variables. Correlation matrix showing correlation coefficients between the variables have been presented in table 4.

Table 4: Correlation matrix: PR model variables

	INTCit	LCit	OTHCit	LOANit	TAit	EQUITYit
INTCit	1					
Lcit	-0.018	1				
OTHCit	0.201	0.003	1			
LOANit	0.177	-0.068	0.491	1		
TAit	-0.019	0.351	-0.252	-0.463	1	
EQUITYit	0.202	0.067	0.433	0.405	-0.044	1

Table 4 presents the Pearson correlation matrix of variables used in Panzar-Rosse model. All the values of correlation coefficients between the variables are not too high (i.e. lower than 0.50). So, the measurement of Pearson's correlation coefficients reveals that there exists no higher correlation among explanatory variables. Hence multicollinearity may not be the serious problem while estimating the parameters by using Panzar-Rosse model.

In Panzar-Rosse equation, first three independent variables are the factor input prices for funds, labor and capital respectively and latter three are bank-specific control variables. Since the PR model follows the log-linear form, the sum of factor price elasticity is termed as 'H-statistic'. So the sum of coefficients of INTCit, LCit, and OTHCit is H-statistics which measures the degree of competition in banking industry. The value of H-statistic gives the information about competitive environment. Under perfect competition, the value of H-statistic is 1 that means change in cost will lead to the change in revenues by equal percentage point. On the other hand, under the monopoly market structure, the value of H-statistic is 0 because in monopoly market, increase in factor inputs' cost increases the marginal cost, reduces the outputs and ultimately decrease in revenue. The value of H between 0 and 1 indicates the monopolistic competition in the market; the higher value indicates higher degree of competition (Goddard et al., 2001). Result of Panzar-Rosse model for all sample banks has been shown in table 5.

Table 5: Regression result of PR model (all sample)

	Coefficients	Std. Error	t-value	p-value
lnINTCit	0.305	0.024	12.807	0.000
lnLCit	0.134	0.020	6.772	0.000
lnOTHCit	0.278	0.036	7.679	0.000
lnLOANit	0.464	0.053	8.718	0.000
lnTAit	0.076	0.015	5.084	0.000
lnEQUITYit	0.058	0.021	2.778	0.006
Constant	-0.118	0.254	-0.466	0.642

| Adjusted R-Square: | 0.903 | F-statistic: 237.771 | p-value of F-statistics: 0.000 |
| H-statistics: | 0.717 | No. of observations: 178 | |

Result of Panzar-Rosse model presented in table 5 shows that the value of F-statistic is 237.771 and p-value is less than 0.05 indicating that the regression model is statistically significant. Further the value of adjusted R-square is 0.903 advocates that the independent variables explain 90.3 percent variation in dependent variable and hence the independent variables used in the model have reasonably sound explanatory power. All the coefficients are statistically significant. The sum of elasticity of factor prices is 0.717 i.e. 0<H<1; suggesting that the existence of monopolistic competition and the market is characterized by monopolistic competition, with free entry in Nepalese banking industry. This result is consistent with the study of Gajurel (2010) and Gajurel and Pradhan (2012) who discovered the monopolistic market competition among Nepalese commercial banks.

The basic premise on which PR model rests is the long-run equilibrium where factor prices are not related with industry return (Panzar and Rosse, 1987). So the validity of calculated value of H statistic crucially depends on the existence of equilibrium condition. For the equilibrium condition, the sum of coefficients of lnINTCit, lnLCit, and lnOTHCit ($\beta1 + \beta2 + \beta3$) in equation should be equal to zero (Panzar and Rosse, 1982, 1987 and Claessens and Laeven, 2004). The test of hypothesis that the sum of the coefficients is equal to zero yields insignificant value of F-statistics (p> 0.05) suggesting the presence of the equilibrium condition. Therefore, the joint test result suggests that the sum of the elasticities is not significantly different from zero, validating the equilibrium condition required in PR model.

Similar analysis has also been made for different set of banks. For the analysis purpose, all eighteen sample banks have been grouped in three strata on the basis of their ownership pattern. Out of 18 sample banks, three banks are grouped as a government owned banks (Nepal Bank Limited, Rastriya Banijya Bank, and Agricultural Development Bank Nepal), four as the joint-venture banks (Standard Chartered Bank Nepal, Himalayan Bank, Nepal SBI Bank, and Everest Bank) and remaining eleven are categorized as other banks. Regression result of Panzar-Rosse model for different types of banks on the basis of their ownership have been presented on table 6.

Table 6: Regression result of PR model (government owned, joint-venture, & others)

	Government Owned Banks	Joint-Venture Banks	Others
	Coefficients	Coefficients	Coefficients
lnINTCit	0.312	0.341	0.399
lnLCit	0.036	0.141	0.244
lnOTHCit	0.266	-0.094	0.116
lnLOANit	0.791	0.109	0.657
lnTAit	0.001	0.085	0.086
lnEQUITYit	-0.085	0.130	0.013
Constant	1.283	-1.829	-0.177
Adj. R-square	0.955	0.871	0.954
F-statistic	36.158	44.997	357.606
p-value of F-statistics	0.002	0.000	0.000
H-statistics	0.614	0.388	0.759
No. of Observations	28	40	110

Table 6 demonstrates the result of regression equation under Panzar-Rosse model for government owned banks, joint-venture banks, and others. In total, this study covers 178 observations of 18 different sample banks which are categorized in three set of banks. First section of table 6 presents the result for government owned banks. There are three government owned banks for this study and contain only 28 observations. Though, the study is based on the data set of three government owned banks for 10 years period, Agricultural Development Bank was classified into commercial bank on 16th march, 2006. Therefore, the data after 2007 have only been considered for Agricultural Development Bank. Further, the value of F-statistic is 36.158 with p-value is less than 0.05 indicating that the model for government owned banks is significant and value of adjusted R-square is 0.955 indicating that the independent variables explain 95.5 percent variation in dependent variable. So, the regression model has reasonably sound explanatory power evident from adjusted R-square value. The sum of elasticities of factor prices is 0.614 i.e. higher than zero but less than one; suggesting that the market is characterized by monopolistic competition for government owned banks.

The result of regression model for joint-venture banks has been presented at the middle part of table 6. This study includes four joint-venture commercial banks for ten years of study period. Therefore, there are 40 observations under the study of joint-venture banks. Value of F-statistics is 44.997 and p-value is less than 0.05 which marked that the regression model is fit and statistically significant. In addition, adjusted R-square of 0.871 advocates that 87.1 percent variation in revenue of joint-venture banks are explained by explanatory variables included in the model. This also confirms the reasonably sound explanatory power of Panzar-Rosse model for the joint-venture banks. Finally, the sum of elasticities of factor prices is 0.388 i.e. higher than zero but less than one; suggested that the market has been characterized by monopolistic competition for joint-venture banks.

Last column of table 6 presents the result of regression equation for the banks other than government owned and joint-venture banks. This study covers 11 other banks which are neither government owned nor joint-venture for the period of 2005-2014. So, there are 110 observations in the case of these banks. The regression model for these banks is also statistically significant at 5 percent level of significance as the p-value of F-statistic is less than 0.05. In addition the model has reasonably sound explanatory power because the independent variables used in Panzar-Rosse model explain 95.4 percent variation in dependent variable (revenue of the banks). Further, the sum of elasticity of factor prices is 0.759 i.e. higher than zero but less than one; suggesting that the market for other banks is characterized by the monopolistic competition.

The comparison of the sum of elasticities of factor prices under Panzar-Rosse model or H-statistics of government owned banks, joint-venture banks, and others reveled that, it is highest (H=0.759) for other banks. It suggests that the banks other than government owned and joint-venture banks have been facing highest degree of competition in Nepalese banking. In contrast, joint-venture banks have lowest value of H-statistics among others (H=0.388) suggesting that they face least degree of competition in Nepalese banking as comparison to all other banks operated in Nepal. The value of H-statistics for government owned banks lies in between joint-venture banks and others suggesting that government owned banks face higher degree of competition as

comparison to the joint-venture banks but lower level of competition as comparison to the others. This result is contradict with the findings of Neupane (2014) which showed that the government owned banks faced lowest degree of competition, others faced highest degree of competition and joint-venture banks was in between them when the data were taken for the same banks during the period of 2003-2013.

The values of H-statistics for three set of banks (government owned, joint venture and others) presented in table-6 are different but they lies in between 0 and 1. It suggests that the degree of competition among three set of Nepalese commercial banks slightly vary but overall market structure of all set of banks is characterized by monopolistic competition.

IV. CONCLUSION

The result of this study shows that the market structure of Nepalese commercial banks is characterized by the monopolistic competition. Monopolistic competition is a type of imperfect competition such that many firms sell products that are differentiated from one another and hence are not perfect substitutes. In this context, NRB should initiate more effective and appropriate instruments to achieve its key objectives of ensuring financial stability and creating fair competition in Nepalese banking.

Further, it is observed that the banks other than government owned and joint-venture banks have been facing highest degree of competition, joint-venture commercial banks face lowest degree of competition and the government owned banks lies in between them in terms of degree of competition faced by the Nepalese commercial banks. This result again suggests that NRB can implement distinct regulatory and supervisory instruments for different types of banks. Finally, the study suggests that the degree of competition slightly vary among three set of commercial banks but overall banking market structure is characterized by monopolistic competition.

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