Market Structure and Competition of Nepalese Commercial Banking Industry

Pitri Raj Adhikari
Lecturer, Shanker Dev Campus,
Tribhuvan University, Nepal
Email: mailtoadhikarisir@gmail.com

ABSTRACT

This paper attempts to examine the market structure and competition of the commercial banking industry in Nepal for the period 2001 to 2019. This study has used the OLS regression technique to test market competition by employing domestic data sets sourced from Nepal Rastra Bank and the Security Board of Nepal. An augmented Dickey-Fuller test has been conducted to examine the unit-root problem. Different econometric diagnostic tests are conducted to avoid the parsimony of results. To assess the determinants of interest-based revenue of the banks, staffing expenses, interest expenses, other expenses, loan amount, and total assets are regressed on interest-based income to total assets (dependent variable). It is observed that all explanatory variables are statistically significant except for the loan amount. Further, it is found that Nepalese commercial banks have monopolistic competition, and this structure states that the banks are more profitable but not efficient. Therefore, concerned parties, and policymakers, should focus on market competition because that results in market efficiency and social welfare.

1. INTRODUCTION

The banking industry in Nepal has undergone significant changes over the past three decades. The central monetary authority, Nepal Rastra Bank (NRB), undertook significant changes in policy measures on different aspects, including indirect methods of monetary control and use of open market operations; a market-based forex system; interest rate deregulation; flexible licensing policy; the abolishment of the statutory provision of liquidity ratio; and prudential legal framework. As a result of liberalization, domestic private banks and foreign joint venture banks (JVBs) entered the market, expanding the range and volume of their activities. Developed nations have used economic measures to encourage private

sector participation in economic decision-making (Maghyereh, 2004; Heffernan & Fu, 2005). Following the global trend, the government of Nepal has introduced financial reforms and deregulation programs to balance the economy. The market structure and level of market competition in the banking sector of Nepal have changed as a result of these reforms.

When the Bank and Financial Institution Ordinance was passed in 2004, it replaced several disjointed legal frameworks that governed bank activities. The Nepalese financial system experienced tremendous growth with adopting the liberalization policy, not only in terms of the number of organizations but also the variety of products and technology. A total of 163 financial institutions existed as of May 2020, including one infrastructure development bank, 32 development banks, 27 commercial banks, and 22 financing companies. There are 9695 branches of banks and financial institutions across the country, including 4219 commercial bank branches, 1216 development bank branches, 239 finance company branches, and 4021 microfinance companies. The total number of financial institutions is declining rapidly due to the merger and acquisition policy adopted by the NRB (NRB, 2020).

During the 1990s, Nepal initiated financial sector reform to promote the financial sector, resulting in many joint venture banks and private banks appearing in the industry. Some state-owned banks were also privatized, and as a member of the WTO, the Nepalese market is open to foreign banks. The emerging concept of universal banking and the growing importance of the capital market has added more dynamism to the Nepalese banking industry. Besides, merging, increase in capital structure, increase in the number of banks and their branches with branchless banking facilities, and application of advanced information technology in the banking industry are enhancing competitiveness in all kinds of services in the banking business of Nepal. As a result, in this competitive market, banks should improve their efficiency to maximize their profitability while balancing risk considerations. Hence, market competitiveness analysis is crucial from the perspective of several stakeholders, including regulators. Therefore, this paper focuses more on examining the market competition environment of the banking industry.

The banking industry's structure and market behaviour have evolved due to banks' entry into non-banking markets and other financial institutions' entry into historically supplied banking markets by banks (Gajurel & Pradhan, 2012). Neoclassical organizational and economic theories hold that an industry's structure impacts a firm's behaviour. The number of firms within an industry, barriers to entry and exit, and the like have a greater role in determining the structure of an industry. The same goes for the structure-conduct-performance (SCP) hypothesis, which shows that high concentration may harm competition by encouraging firms to engage in collusive behaviour by lowering the cost of collusion. However, the efficient structure hypothesis states that the market behaviour of firms is related to efficiency. Competitive advantages allow the company to improve performance and grow its market share. Similarly, the market contestability theory maintains that several variables affect market competition, including competition from non-banking financial institutions, barriers to a new entrance, exit costs, market development, and others.

Based on industrial organization, structural and non-structural conduct performances can be used to measure competition in the banking sector. Structural conduct performance theory is an analytical framework used to examine how the structure of the market and the behaviour of sellers of different products affect the market. In this case, the highly concentrated market increases the collusive behaviour of the firms and decreases output while raising the price. According to Bikker and Haaf (2002), depending on the firm's concentration, the structure plays a crucial role in determining the nature of performance. Structure, behaviour, and performance are three variables that interact with one another. Structure impacts conduct, affecting how firms behave, which results in performance (Daly & Zhang, 2011). While conduct and performance refer to the actions of the firms, market structure is determined by the concentration of market share. According to Bos (2004), the structure can

be assessed using HHI statistics, which measure the degree of concentration. However, Claessens and Leavens (2004) noted that it is a poor measure of competition based on market concentration.

The non-structural conduct hypothesis was developed to avoid linearity in banking competition determinants, and this model is widely used in related studies. The competition level is based on firms' entry and exit, which can foster non-linearity instead of a linear relationship. Pranckeviciute et al. (2007) used three measures of competition among commercial banks: the Iwata, the Bresnahan, and the Panzer-Rosse. The Iwata model measures banking competition based on an oligopoly market structure. However, estimating market demand and supply functions in less developed countries is difficult.

Similarly, the Bresnahan model is used to determine market structure depending on loan concentration and takes commercial banks as a single entity and measures each market segment as a loan demand (Bikker & Haaf, 2002). The Panzar-Rosse model also assesses the degree to which changes in factor prices are reflected in the equilibrium industry and is used to test the level of competition based on H-statistics (Thakor & Boot, 2008; Goddard & Wilson, 2009). The macroeconomic theory of the firm equilibrium condition is the foundation for this model.

The literature on banking structures and competition has advanced greatly in the past three decades. The greater attraction of research to the subject area has proved the significance of a properly functioning banking system to the economy in general and the importance of market competition, merger and acquisition, efficiency, deregulation, and universalization on banks' performance in particular.

Molyneux et al. (1994) conducted a study on the banking systems of European countries (France, Germany, Italy, Spain, and the UK) from 1986 to 1989 by using the Panzar–Rosse model and found that all the banking systems of European countries (except Italy) showed an H value of between 0 and 1, which means monopolistic competition. Banks were gaining profit under a monopoly in Italy. Molyneux (1999) assessed the European banking system with the influence and initiation of the Economic and Monetary Union and found that the intense and sufficient competition among European banks led to lower interest margins and keener fee and service charges. The results are evident from the mutual and cooperative banks. Further, European banks benefited from technological progress and lowered the barriers to entry and making markets with the formation of EMU, i.e., the formation of regulation and deregulation. Bikker and Haaf (2002) investigated the banking sectors of 23 countries from 1988 to 1998. They indicated that small banks operate more locally, medium-sized banks operate both locally and nationally, and large banks operate more internationally.

Furthermore, there was a significant impact on the measure of market structure on the competition. Casu and Girardone (2009) used structural approaches, such as CRk and HHI, and non-structural approaches, such as PR H-statistic and Lerner index, to examine the competition conditions of the five largest European Union (EU) banking markets, which are France, Germany, Italy, Spain, and the UK, for the years 2000 to 2005. They found that whereas the selected EU banking markets became more consolidated as a whole, the outcomes of different nations differed greatly. The findings also showed that there are still obstacles to integration into a global retail banking market and even one EU aftermarket. Iveta (2012) studied the banking sector of the Czech Republic from 2000 to 2010 to measure the degree of market power and found that, as per the Lerner index, the banking sector fell between monopoly and perfect competition.

Using Hirschman-Herfindahl indices, concentration ratios, and the Panzar-Rosse model, Gajurel and Pradhan (2012) analyzed the evolution of market concentration. They tested the market competition of the Nepalese banking industry for an unbalanced panel of 15–25 commercial banks from 2001 to 2009. The Panzar-Rosse model states that the Nepalese banking industry is subject to monopolistic competition. Concentration metrics show a falling

trend and a low degree of market concentration across the study period. Further, the income-based market was more competitive than the fee-based market. Besides, equity capitalization had a negative impact, and the size of the bank had a positive impact on revenue generation. Kocisova (2016) analyzed the performance and structure of the American banking sector from 1966 to 2013 and found a positive relationship between performance and concentration, which validates the SCP hypothesis. This shows that the higher concentration of banks enables them to maintain a stable position in the market with decreased competition.

Consequently, there was an influence on the level of interest rates, leading to an increase in interest income and a decrease in interest expenses, resulting in an overall increase in profit for the banks. The rise in competition on the market even leads to competition with bank customers and forcing to offer higher interest rates on deposits. Rahim (2017) studied the Malaysian banking industry between 2003 and 2014 to assess performance in the presence of foreign banks. The study found that domestic banks had higher input and output variables than foreign banks, were more cost and profit-efficient than foreign banks, and had a positive correlation between cost efficiency and competition. Furthermore, increased market power contributed to increased cost-efficiency, and less competition within the banking system is associated with higher economies of scale. Besides, banks enjoy taking the necessary measures to increase their efficiency and productivity with no added pressure. In contrast, competition benefits customers with innovative firms and qualitative services.

Kandaswamy (2018) conducted a study on Namibia's banking sector from 2002 to 2016 and measured the present competitiveness of commercial banks. The author observed banks' concentration on loans on mortgages, and introducing foreign banks within the banking sector is necessary to develop the banking sector and maintain a level playing field. Further, the banking industry in Namibia is monopolistic. Rodriguez et al. (2018) revealed that geographically diverse banks and market volatility and inflation negatively relate to revenue generation. With the H statistic value close to perfect competition, it can be said that the market was near a high level of competition.

Arif and Awwaliyah (2019) analyzed the data from the Islamic banking industry of Indonesia from 2007 to 2016 to understand the market structure and profitability. They found that a larger or smaller market share had no significant impact on profitability. Furthermore, a fair policy should be formed between the Islamic and conventional banking industries and should strengthen the banks' capital through mergers and acquisitions. Joaquim et al. (2019) investigated the banking sector of Brazil from 2002 to 2018. They found the competition effects that there was a decrease in local competition, leading to increased lending spreads and reduced credit due to acquisitions. Also, a reduction in competition is directly associated with decreased employment and output.

Similarly, competition within the Brazilian banking sector decreased during the post-merger and acquisition period. Li et al. (2019) used panel data from 2005 to 2018 to assess the competition in the Indian banking sector. The finding indicated that the policy formulated for increasing banking competition has been successful; thus, the competition has increased after 2014. At the same time, public banks continue to dominate the Indian banking market. Further liberalizing foreign direct investment policy is necessary to increase competition and reap benefits. Yuanita (2019) used the data of 93 Indonesian banks from 2000 to 2015, which the Indonesia Financial Services Authority collected. According to the market structure, a bank must use an expansion strategy to maintain or increase market dominance but does not generate profit in a given year. At the same time, expansion activity, such as increasing the number of branches and outlets rather than merger and acquisition, is associated with a reduction in profitability. Using the non-structural Panzar-Rosse model to determine the level of competition in the Nepalese banking sector from 2010 to 2019, Budhathoki, Rai, and Rai (2020) found that the sector was operating under perfect competition after transitioning from monopolistic competition to perfect competition. In addition, factor prices had a favourable

impact on interest income and were favourably correlated with the macroeconomic variable GDP growth rate.

Several research papers in the banking industry have shown the importance of competition in the area, stating its effects on market concentration and market power, social welfare, pricing, entry of foreign banks, stability, accessibility to financial services, effectiveness, and merger and acquisition (Claessens & Leavens, 2004; Bikker & Spierdijk, 2009; Divino & Silvia, 2017; Kandaswamy et al., 2018; Joaquim et al., 2019; Navin & Sinha, 2019; Yunita, 2019). The idea behind banking competition is that any business, including banking, can be dangerous due to market dominance (Leon, 2014). Against this backdrop, this study analyzes the market structure and competition of commercial banks in Nepal, focusing on interest-based market products. This research paper has four sections. The first section is an introduction. The second section is a methodology that includes data, sample size, method of analysis, and model specification. Similarly, the third section deals with results and discussion, and the final section concludes the paper with policy implications.

2. RESEARCH METHODS

Data

This study's foundation is secondary data drawn from the accounting records of Nepalese commercial banks. Annual reports of the relevant institutions, the security board database, and the NRB database were used to gather the necessary data.

Sample Size

From 2001 to 2019, all Nepalese commercial banks are considered in this study. It makes use of annual time-series data on several variables for a period of 19 years, from 2001 to 2019.

Method of Data Analysis

The model's variables are transformed into natural logarithms. A partial correlation matrix of estimating variables has been estimated, and the unit root of the individual variable has been tested using the Augmented Dickey-Fuller test. Similarly, the variance inflation factor test has been used to identify multicollinearity among explanatory variables. In this study, the autocorrelation of the error term is checked using the Darbin-Watson and Breusch-Pagan-Godfrey Lagrange Multiplier (BPG-LM) tests, and the autocorrelation issue is resolved using the Cochrane-Orcutt approach. The normalcy of error terms is examined using the Jarque-Bera (J-B) test. Heteroscedasticity has been detected by the Breusch-Pagan-Godfrey Lagrange Multiplier (BPG-LM) test. Adjusted R-squared and R-squared statistics are used to evaluate the total explanatory power of independent variables. The F test is also employed to evaluate the model's overall goodness. The t-test has also examined each explanatory variable's coefficient.

Model Specification

The Panzar and Rosse (1987) model (PR Model), described in earlier literature, is one of the most popular methods for examining competitiveness in the banking industry. It investigates the impact of changes in factor costs on revenue under various market arrangements, assuming long-run market equilibrium. Different bank prices react differently to changes in their factor input costs. Examining the level of market competition in the market is supported by the size of the changes. The economic log-linear model's condensed form of the interest-based revenue model is:

$$LNREVN_{it} = \alpha + \beta_1\ LNINTC_{it} + \beta_2\ LNLC_{it} + \beta_3\ LNOTHC_{it} + \beta_4\ LNLOAN_{it} + \beta_5\ LNTA_{it} + \beta_6\ LNEQUTY_{it} + \varepsilon_{it}$$

where REVN$_{it}$ is the ratio of total interest income to total assets, INTCit is the ratio of total interest rates to total deposits, and LCit is the ratio of total labour costs to total assets. Total assets are denoted by TA$_{it}$, which stands for total assets, and OTHC$_{it}$, which stands for the magnitude relation of all distinct operational prices to all total assets. EQUTY$_{it}$ is the ratio of equity to total assets in terms of size. Additionally, εit is the random error term that includes the subscripts i bank range at time t in addition to time-varying and bank-specific random components.

The PR model has a log-linear shape, and the total elasticity of the factors — i.e., the total elasticity of βs — is known as the "H-statistic." The competitive environment and the cross-ponding behaviours of banks affect the H-value. In a perfectly competitive market structure, H-statistics has a value of 1, meaning that a 1% change in cost results in a 1% change in revenues. The value of the H-statistic is 0 in the monopoly market.

Because an increase in factor input costs raises the marginal cost and reduces output, which lowers revenue in a monopoly market. There is monopolistic competition in the market, according to the H-statistics, which have values between 0 and 1. The degree of completion increases with greater H-statistics values and vice versa.

3. RESULTS AND DISCUSSION

In order to determine the association among the variables LNREVN, LNINTC, LNLC, LNOTHC, LNLOAN, LNTA, and LNEQUTY, the correlation matrix is estimated. The correlation matrix of the variables used is shown in Table 1. All explanatory variables except total assets (LNTA) and the ratio of equity to total assets have positive correlations with the ratio of total interest revenue to total assets (LNEQUTY). The ratio of total interest income to total assets is inversely associated with both total assets (LNTA) and the equity to total assets ratio (LNEQUTY).

Table 1
Correlation Matrix

Variables	LNREVN	LNINTC	LNLC	LNOTHC	LNLOAN	LNTA	LNEQUTY
LNREVN	1.00						
LNINTC	0.57	1.00					
LNLC	0.51	-0.20	1.00				
LNOTHC	0.36	-0.18	0.31	1.00			
LNLOAN	0.32	0.15	-0.15	0.27	1.00		
LNTA	-0.22	-0.57	0.18	-0.51	0.42	1.00	
LNEQUTY	-0.27	0.16	0.40	0.08	0.33	-0.56	1.00

Table 2
Unit Root Results (ADF Test Statistics)

Variables	Log Level Form		First Difference		Order of Integration
	τ-statistics	p-value	τ-statistics	p-value	
LNREVN	-2.272158	0.9998	-7.692244	0.000	$I(1)$
LNINTC	-1.498374	0.5796	-7.6305312	0.000	$I(1)$
LNLC	-0.546247	0.8761	-7.290419	0.000	$I(1)$
LNOTHC	-1.537967	0.5461	-7.415414	0.000	$I(1)$
LNLOAN	-1.802075	0.4033	-7.731245	0.000	$I(1)$
LNTA	-0.831822	0.8107	-9.050417	0.000	$I(1)$
LNEQUTY	-0.687704	0.9909	-6.935347	0.000	$I(1)$

Before performing regression analysis, each time series' data must be stationary; else, the findings will be erroneous. The sequence in which the various variables used in the model are integrated must therefore be established. The Augmented Dickey-Fuller (ADF) test is also

used to determine whether a variable's unit root is present. According to the unit root results, all variables experienced unit root at a log level (Table 2).

At the log level, the first difference data are completely root-free, and all series are integrated into order one. Table 2 presents the results of unit root at the log level and log first difference. Likewise, OLS empirical results between dependent and independent variables are shown in Table 3.

Table 3
Regression Results on DLNREVN as Dependent Variable

Variables	Coefficients	SE of Estimates	t-statistics	p-value
DLNREVN	1.4793	-0.1134	-13.0449	(0.0000)*
DLNINTC	0.4125	0.0385	7.1120	(0.0000)*
DLNLC	0.1563	0.0582	2.6856	(0.0056)*
DLNOTHC	0.1869	0.0495	3.774	(0.0000)*
DLNLOAN	0.0953	0.1718	0.5547	0.1931
DLNTA	0.1129	0.0536	2.1063	(0.0005)*
DLNEQUTY	-0.1363	-0.0673	2.0253	(0.0000)*
R^2 = 0.74		DW = 1.96		
Adjusted R^2 = 0.73		F = 2145.9		
		Probability of F statistics = (0.0000)*		

* indicates statistical significance at a 1% level

According to the adjusted R-squared value, the model is statistically significant and has a higher level of explanatory power. It is 0.73 for the adjusted coefficient of determination. The model's total fitness is represented by the F-statistics, which are statistically significant at the 1% level. The DW statistics are close to 2 (1.96), suggesting that there may be no autocorrelation in the equation.

The Breusch Pagan-Godfrey Serial Correlation LM Test is used to assess autocorrelation and its order. At lags 1 and 2, the observed R-squared statistics (Chi-square value) are 21.9645 and 29.8463, respectively, with probabilities of 56.9% and 71.7%. The LM statistics demonstrate that the null hypothesis cannot be rejected because there is no serial correlation at lags 1 and 2. As a result, the residuals lack serial correlation. Further, the model is free from heteroscedasticity and error terms are normally distributed. Likewise, multicollinearity among the explanatory variables is not found. Diagnostic econometrics tests infer that the model is free from any parsimony.

All the coefficients of independent variables and the constant term are significant except the loan. The sum of the elasticity (H-Statistics) of the factor prices is approximately 0.83, suggesting monopolistic completion in the Nepalese banking sector. As the H-Statistics nearly reach 1.0, monopolistic competition is moving toward perfect competition. A higher H-Statistics value implied that Nepalese commercial banks compete more fiercely in the interest-based market.

The price elasticity of funds, labour, and capital is positive and statistically significant, according to an analysis of the sign and significance of the regression coefficient, particularly the price of inputs. The impact of the cost of financing appears to be greatest, while the impact of labour costs appears to be the least. Compared to other bank-specific variables in the regression, the loan-to-total assets ratio, which measures lending activity, is positive, indicating that lending activities positively impact commercial banks' revenue. However, at a normal level, this coefficient is not statistically significant.

Bank size plays a significant role in generating revenue in the interest-based market. The positive and significant coefficient of total assets of commercial banks infers that total asset augment revenue generation in the interest-based market. The equity capitalization sign is negative and significant. This finding is consistent with the banking theories, which claim

that when equity ratios rise, revenue propensity declines since banks with higher risk propensities utilize less equity and generate higher income (Molyneux et al., 1994). According to data from the PR reduced form revenue model, the Nepalese commercial banking sector is competitive, at least in terms of monopolistic competition.

4. CONCLUSION AND IMPLICATIONS

Even though the Nepalese banking industry has been continuously increasing in the last three and a half decades, both in number and size, the empirical results indicated that Nepalese commercial banks had neither monopoly nor perfect competition but rather monopolistic competition. The monopolistic market structure indicated that Nepalese commercial banks were more profitable but not efficient. Hence, policymakers should focus on market competition, which results in market efficiency and social welfare.

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