

Effect of Bank Competition on Financial Stability: Empirical Evidence from Nepal

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ABSTRACT

There are two hypotheses about the relationship between competition and financial stability in the banking system: “competition-fragility” view argues that competition makes banks more likely to take excessive risks, thereby leading to fragility, while “competition-stability” view suggests that higher interest rates in less competitive environments may cause borrowers to take higher risks, resulting in higher probability of non-performing loans and a more fragile system. This paper empirically examines the impact of competition on Nepalese banking system employing annual data of commercial banks from 1999 to 2012 period using fixed effects panel data model. The study period represents the era of rapid growth in financial institutions in Nepal. The HHI and n-bank concentration ratios are used as measure of competition while Z-index and non-performing loans ratio are used as proxies of financial stability. The effects of macroeconomic factors and bank specific indicators are also taken into account. The results reveal that there is a positive relationship between greater banking competition and financial stability in Nepal, supporting the “competition-stability” view. Competition in banking sector is found to result in decrease in credit risk and contribute for financial stability. Mixed results have been achieved in case of the impact of bank competition on overall stability. The findings indicate that both higher concentration and higher competition are detrimental for stability. Hence, policymakers should facilitate further consolidation in the financial industry, however, it should be ensured that excessive consolidation doesn't result in an environment that hinders competition. In addition, besides competition level in the banking system, macroeconomic situation of the country is found to be an important determinant of banking system stability.

Keywords: Bank Competition; concentration; banking stability; financial system fragility

JEL Classification: G21, G28

1. INTRODUCTION

Competition in the banking market has been at the center of policy debate on financial stability. As in other industries, competition in banking system is considered desirable for efficiency and maximization of social welfare. However, banking sector has specific features that makes it of particular importance to an economy and has properties that distinguishes it from other industries (Miskin, 1999). Banking system is also important since any instability in the 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. Policy makers try to ensure that banking

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system is stable besides ensuring that it is competitive and efficient (Claessens, 2009). Financial stability has been a prime policy concern for central bankers especially in the aftermath of the global financial crisis. There have been recent debates on the relationship between banking competition on the overall stability of the financial system. As such, two opposing views have emerged. The “competition-fragility” view argues a negative relationship between bank competition and financial stability, and the “competition-stability” view, which argues a positive relationship (Berger, Klapper & Turk-Ariss, 2008). Many authors have tested these relationships in various countries and regions and have obtained contrasting results, but not for the Nepalese banking industry.

Competition-fragility View

The competition-fragility views that more competition among banks leads to more fragility. Keeley (1990) was the first study to address the positive relationship between competition and fragility both theoretically and empirically. This so called “competition-fragility” or “concentration-stability” view is mainly based on the “franchise value hypothesis” which states that higher competition erodes profit margins causing banks’ franchise value to drop, thus reducing incentives for prudent behaviour and leading to more aggressive risk taking in an attempt to earn higher profits. Examples of riskier policies that banks may follow are choosing more risky and lower quality portfolios, taking on more credit risk, lowering capital levels, etc. These riskier policies increase the probability of higher non-performing loan ratios and more bank bankruptcies resulting in greater fragility and financial instability. Therefore, less concentrated banking systems are more prone to experience crises (Berger, Klapper & Turk-Ariss, 2008). Beck, Demirguc-Kunt and Levine (2006) find that in systems with restricted entry and therefore limited competition, banks have better profit opportunities, capital cushions and therefore fewer incentives to take aggressive risks, with positive repercussions for financial stability. In addition, in a more competitive environment, banks earn fewer informational rents from their relationship with borrowers, reducing their incentives to properly screen borrowers, against increasing the risk of fragility (Berger et al., 2008). Beck et al. (2010) argue that consolidation and concentration in banking leads to large banks which have diversified portfolio of assets. This diversification results in risk reduction in asset portfolio of the banks. In addition, Vives (2001) opine that the regulatory burden for central bank decreases in concentrated banking industry. Thus, incentive for risk avoidance, risk diversification and effective regulation associated with concentrated banking system contribute to financial stability. Thus concentration in banking industry results in stability (Keeley, 1990; Demsetz et al., 1996; Fungacova & Weill, 2009; Berger et al., 2008; Beck et al., 2010).

Competition-Stability View

The competition-stability hypothesis argues that more competitive banking systems results in financial stability. This “competition-stability” or “concentration-fragility” view is mainly built on the “risk shifting paradigm” which states that increase in market power and the resulting higher loan rates have the potential to negatively affect the stability of banks due to moral hazard and adverse selection problems on the part of borrowers. Boyd and De Nicolo (2005) states increase in concentration or decrease in competition among banks in the loan markets translates into higher interest rates charged on business loans. The higher interest rates charged to loan customers make it harder to repay loans and create moral hazard incentives for borrowers to shift into riskier projects to compensate for the high loan rates. This practice results in an increase in firm default risk and a

higher probability that loans turn non-performing and a higher bankruptcy risk for banks and greater bank instability (Iskenderoglu & Tomak, 2013).

Another argument is about the effect of “too-big-to-fail or “to-important-to-fail policies” in concentrated banking systems on risk taking incentives of banks. The reason is that presence of larger banks constitutes a potential threat to the safety and soundness of the financial system because a failure of a large bank exposes the financial system to systemic risk (Kocabay, 2009). Concerns about contagion and financial crisis resulting from the failure of large banks make regulators reluctant to let them fail in the event of solvency problems. Therefore, governments give the implication that they will guarantee the survival of these banks to avoid country-wide crisis. Hence, the implicit guarantee of government bailout in condition of insolvency provides incentive for big banks for excessive risk taking (Mishkin, 1999; Beck et al., 2006; Beck, 2008). Finally, proponents of the competition-stability view disagree with the proposition that concentrated banking system with a few banks is easier to monitor than a less concentrated banking system with many banks. Their argument is that as bank size increases with the increased concentration and consolidation across activities, banks become more complex and harder to regulate and supervise by authorities. Thus, this argument predicts a positive relationship between concentration and fragility. In other words, competition results in stability (Staikouras & Wood, 2000; Claessens & Laeven, 2004; Boyd et al., 2006; Schaeck et al., 2006; Beck, 2008).

There is a large empirical literature which aims to examine the impact of banking system structure on its stability and hence shed light on the conflicting theoretical predictions and policy debates on this issue. However, similar to the theoretical literature, empirical studies produce different findings and do not offer concrete single evidence on the validity of either the competition-stability or the competition-fragility views (Boyd et al., 2006; Schaeck & Cihak, 2008; Berger et al., 2009; Fungacova & Weill, 2009; Liu et al., 2012; Anginer et al., 2014). Overall, it appears that empirical studies for specific countries have not reached conclusive evidence for either a stability-enhancing or a stability-deteriorating view of competition. Beck et al. (2006) argue that this relation is complex and has important interactions with macroeconomic, regulatory and institutional framework of countries and changes with different model specifications. Martinez-Miera and Repullo (2010) develop as an alternative approach to these two opposite views, a third approach involving the combination of these two approaches. In this approach, the direction of the relationship between competition and bank fragility could differ based on the economic structure and relations. According to this view, risk-shifting effect identified by Boyd and De Nicolo (2005) are prevalent in monopolistic markets, while competitive markets are dominated by the margin effect. Therefore, there should be U-shaped relationship between competition and bankruptcy.

Most of the studies in the area have been done in the context of developed countries. The empirical evidence in case of emerging and developing nations is scanty. Nepalese financial system saw a rapid growth after the liberalization policies adopted by the nation since 1980s. With the economic liberalization and focus on the private sector development, many foreign banks have established joint venture Banks in Nepal and thus the Nepalese financial system has shown a tremendous growth of banking sector. It is therefore interesting to test both hypotheses and find whether bank competition is desired in order to increase financial stability in an underdeveloped bank dominated economy like Nepal. Hence, the study attempts to understand whether competition promotes stability or fragility in the Nepalese banking system.

2. DATA AND METHODOLOGY

The objective of this study is to analyze the relation between competition and stability in the Nepalese banking system for the period between 1999 and 2012. The study period is selected as it represents the era of rapid growth of financial institutions in Nepal. In the empirical study, all the commercial banks operating at least three years during the study period are included comprising a total of 26 sample banks. The empirical investigation is based on individual bank stability measures which are Z-Index and nonperforming loan ratio (NPL). As a proxy for bank competition, structural measures of competition n-Bank concentration ratios (CR3, CR5) and Herfindahl Hirschman Index (HHI) are used. All these measures are calculated using bank level annual data obtained from banking and financial statistics published by the central bank, Nepal Rastra Bank (NRB). The relationship between competition and stability is analyzed using fixed effects panel data model. In addition to measures of competition, macroeconomic variables: inflation rate, economic growth rate and real interest rate and bank specific variables: bank size, profitability and credit deposit ratio are used as explanatory variables. All variables used in the study are calculated from data collected from NRB database. The nature of variables and model specification is described in following section:

Bank Stability Measures

Following Berger et al. (2008), the study uses the Z-index, the Non-Performing Loans to gross loans (NPL) ratio and Return on Assets (ROA) to measure financial stability. Z-index is used as a bank based proxy for financial stability and is an inverse measure of overall bank risks used by various studies. It was first developed by Roy (1952) and then later used in empirical banking studies by De Nicolo (2000), Berger et al. (2009), Boyd et al. (2009), and Turk-Ariss (2010), among others. The Z-index increases with higher profitability and capitalization levels, and decreases with unstable earnings reflected by a higher standard deviation of return on assets. It inversely proxies the bank's probability of failure and is an indicator of financial stability at the firm level. In the empirical analysis of the relation between competition and stability in the Nepalese banking system, we focus on the individual bank stability or fragility and do not examine the systemic bank stability or distress. The use of systemic bank stability indicators is used in cross-country studies. Financial stability depends on the stability of individual banks in the economy.

Z-Index

The first bank stability indicator is the Z-Index which is a proxy for the probability of insolvency of a bank and an inverse measure of overall bank risk. Z-Index is calculated by using financial data of banks. Z-Index combines in a single indicator the profitability given by ROA, capitalization level given by E/TA and return volatility given by $\sigma(\text{ROA})$. Z-Index increases with profitability and leverage or capitalization level and decreases with return volatility or unstable earnings. Thus, a larger value of the Z-Index indicates a smaller risk profile for a bank and higher bank stability (Boyd et al., 2006; Beck, 2008; Berger et al., 2008).

For a specific year t , the Z-Index for bank i is given by:

$$Z - Index_{it} = \frac{ROA_{it} + E_{it}/TA_{it}}{\sigma(ROA_{it})} \dots \dots \dots (i)$$

Where, ROA is the return on assets calculated by the ratio of pre-tax profits to total assets, E/TA is the equity to total assets ratio and $\sigma(\text{ROA})$ is the standard deviation of return on assets. In order to

calculate the standard deviation of ROA, we follow Levy-Yeyati and Micco (2007) and calculate it by using three year moving standard deviation method.

NPL

The second bank stability indicator which is NPL which is the ratio of the volume of non-performing loans to total loans of a bank and it measures credit or loan risk. Higher levels of NPL indicate higher insolvency risk so higher bank fragility or lower bank stability. Unlike Z-Index which indicates overall bank risk, NPL measures the credit or loan portfolio risk (Beck, 2008; Berger et al., 2008).

Bank Competition Measures

As for the structural measures of competition, concentration ratios, namely CR₃, CR₅ and HHI based on total assets are employed. Increase in values of the measures means that the level of concentration in the banking system increases and hence competition in the system declines.

Concentration Ratios

The ratios are calculated as n-Bank Concentration Ratio (CR_n). The n-bank concentration ratio is the sum of market shares in terms of asset size of n largest banks in the banking system. It is calculated by the following formula:

$$CR_{nt} = \sum_{i=1}^n S_{it} \dots \dots \dots \text{(ii)}$$

Where S_{it} is the market share of bank i in year t and n is the number of banks in concern. 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.

Herfindahl-Hirschman Index (HHI)

HHI is the most widely used measure of concentration and a proxy for competition in theoretical research and empirical analysis. It is the sum of the squares of market shares of all the banks and has the following form:

$$HHI_t = \sum_{i=1}^N S_{it}^2 \dots \dots \dots \text{(iii)}$$

Where, S_{it} is the market share of bank i in year t 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. Larger value of HHI indicate larger concentration and vice-versa (Bikker and Haaf, 2002).

Model Specification

To analyze the effect of competition on stability of banks, bank stability measure is regressed on different measures of competition. In addition, macroeconomic and some bank specific factors that have the potential to impact stability are controlled for in the empirical analysis. The data includes both individual bank cross-section entities and annual time series from 1999 to 2012. Panel data is used in empirical analysis when two types of data cross-section and time series are combined. As all banks are not in operation during the period, unbalanced panel data set is constructed. Therefore, the empirical study draws on an unbalanced panel data set which has both bank and time dimension. The primary reason for utilization of panel data is that it offers opportunity for controlling unobserved individual bank and/or time specific heterogeneity (Wooldridge, 2002).

The panel data model takes the following general form:

$$STB_{it} = \alpha_0 + \beta_1 COMP_{it} + \beta_2 MACRO + \beta_3 BANKCHAR_{it} + \mu_{it} \dots \dots \dots (iv)$$

Where, “STB” stands for bank stability measure, “COMP” is the competition measure, “MACRO” denotes macroeconomic indicators, “BANKCHAR” stands for bank specific indicators and μ is the error term. The regulatory variables are excluded from the study as they are same for all sample banks in a country and the study period of five years corresponds to period with no major regulatory changes. The variables are used in cross-country studies.

The Wald, Breusch-Pagan and Hausman tests are used to determine the proper model specification among pooled ordinary least square (OLS), fixed effects and random effects panel data models. The tests detected presence of only fixed effects in the data. Hence, only the fixed effects panel data estimation produce is presented. The least square dummy variable (LSDV) model provides a good way to understand fixed effects. The estimated model takes following specification:

$$STB_{it} = \alpha_0 + \beta_1 COMP_{it} + \sum_{k=1}^n \gamma_k Y_{k,t} + \sum_{j=1}^n \theta_j X_{j,it} + \varphi_1 ED_1 + \dots + \varphi_{n-1} ED_{n-1} + \delta_1 TD_1 + \dots + \delta_{n-1} TD_{n-1} + \mu_{it} \dots \dots \dots (v)$$

Where, i and t represent the bank and time period (year) respectively. $Y_{k,t}$ is k^{th} macroeconomic variable in year k and $X_{j,it}$ is j^{th} bank specific variable of bank i in year t . Inflation rate, growth rate of GDP and real interest rate are used as measures of macroeconomic variables. The credit-deposit ratio, return on equity and natural logarithm of total assets are used as bank specific variables. Similarly, ED_{it} is dummy variable for the bank-specific effect, TD_{it} is time effect and μ_{it} is a random unobserved error component.

3. RESULTS AND DISCUSSION

Structure of Nepalese Banking System

Before moving to the empirical analysis of the relation between competition and stability in the Nepalese banking system, we proceed with a brief review of the banking system in Nepal. In this context, we present basic indicators including the number of banks, composition of banks according to their classification and field of activity, competition measures (CR_3 , CR_5 , and HHI) and stability measures (Z- Index and NPL). Table-I presents the number of banks in the Nepalese banking system between 1990 and 2012. The data shows increasing trend of financial institutions in Nepal. The growth in number of banks has resulted in increased competition in the industry. Due to financial liberalization policy adopted after the mid of 1980s, Nepal observed the rapid growth in number of bank and financial institutions (BFIs) in the last decades. However, the growth has moderated as NRB has imposed moratorium on licensing on BFIs except micro credit development banks.

The financial system in Nepal comprises bank and financial Institutions (commercial banks, development banks, finance companies and micro finance institutions), co-operatives, contractual saving institutions (Employee Provident Fund and Citizen Investment Trust), insurance companies and postal saving banks. At the end of 2011/12 the number of financial institutions stood at 293 comprising 265 banks and financial institutions licensed by NRB, 25 insurance companies, one Employees Provident Fund, one Citizen Investment Trust and one Postal Saving Bank. In this

study, only commercial banks have been included as the Nepalese banking industry is dominated by commercial banks. As of mid-July 2012 commercial banks have the share of 78 percent of total assets of Nepalese banking industry (NRB, 2012).

Table 1: Growth of Financial Institutions in Nepal

Types of Financial Institution	Mid-July											
	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	
Commercial Banks	5	10	13	17	18	20	25	26	27	31	32	
Development Banks	2	3	7	26	28	38	58	63	79	87	88	
Finance Companies		21	45	60	70	74	78	77	79	79	69	
Micro-finance												
Development Banks		4	7	11	11	12	12	15	18	21	24	
Saving & Credit Co-operatives (Limited Banking Activities)		6	19	20	19	17	16	16	15	16	16	
NGOs (Financial Intermediaries)			7	47	47	47	46	45	45	38	36	
Total	7	44	98	181	193	208	235	242	263	272	265	

Source: Nepal Rastra Bank

Figure-1 demonstrates the trends of two concentration ratios, CR₃ and CR₅ based on total assets, of the Nepalese banking system in the period 1999-2012. CR₃ is the sum of market shares of three largest banks in the banking system. Similarly, CR₅ is the sum of market shares of five largest banks in the banking system. For the calculation of market shares Total Assets is used as a measure for bank size. CR₃ and CR₅ are concentration ratio which give equal emphasis to the leading banks and neglect the effect of many small banks in the market. 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 one if there is one monopoly bank. The decreasing trend of the concentration ratios implies that the concentration in Nepalese banking industry is decreasing or the competition is increasing. CR₃ and CR₅ have a parallel trend meaning that the total market shares of the biggest three and five banks change approximately at the same rate.

Figure 1: Indicators of Competition in Nepalese Banking Industry

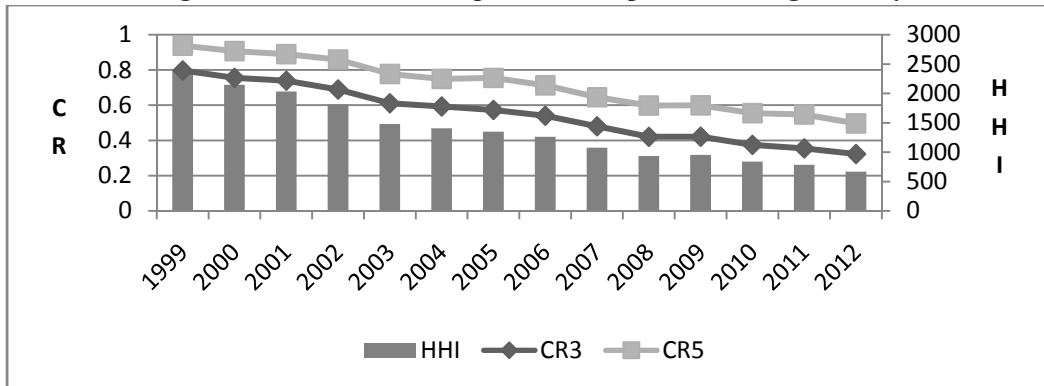


Figure-1 also depicts the progression of Herfindahl-Hirschman Index (HHI) based on total assets between 1999 and 2012. It is the sum of the squares of market shares of all the banks. Compared

to CR₃ and CR₅, for the calculation of HHI, all banks in the market are taken into account. It stresses the importance of larger banks by giving them a higher weight than smaller banks. Generally, HHI index with the result of less than 1,000 is regarded as no concentration in the banking system; a result of 1,000-2,000 to be a moderately concentrated; and a result of 2,000 or greater to be a highly concentrated banking system. The value of HHI in 1999 reveals high concentration while the value in 2012 indicated no concentration. Similar to concentration ratios, HHI also exhibits decreasing trend. The decreasing trend of all competition indicators reveal that the concentration in Nepalese banks is decreasing. In other words, the industry is becoming more competitive every year. This corresponds to the increase in number of banks shown in Table-1. Hence, the results reveal that growth in number of banks has resulted in increase in competition at the Nepalese banking industry.

Empirical Results

Table II and III exhibit the output of fixed effects unbalanced panel data estimation of equation (v) for the Nepalese bank for the 1999-2012 period. The primary reason for utilization of panel data in this study is it offers opportunity for controlling unobserved bank and time specific heterogeneity. The Wald Test, Breusch-Pagan LM test and Hausman Test are employed to select among alternative fixed and random panel data models. The results of the model selection tests are displayed in penultimate rows of the tables. The significant test statistics associated with Wald and Breusch-Pagan test reveal presence of fixed and random effects respectively. If both fixed and random effects are present, Hausman test gives a good idea when choosing between the two. All chi-square values of Hausman Tests are significant suggesting that the fixed effects model results are not significantly different from the random effects. Hence, fixed effect models have been estimated. Fixed effects are preferred if analyzing the impact of variables that vary over time while controlling for cross-section variation. Both stability and competition measures on individual banks used in the study of are expected to vary over time. Consequently, we report the results from the fixed effects model albeit they are essentially the same from the random effects.

Competition and Bank Stability

We first consider the Z-Index as the bank stability measure which is used as dependent variable. Z-Index measures bank stability by taking into account the return on assets or profitability, leverage or capitalization level of banks and the standard deviation of profitability. It is a popular indicator of bank stability used in various studies in the area. Table-II reports the fixed effects estimation of the equation (v) with alternative competition measures, namely CR₃, CR₅ and HHI.

In all the models without the macroeconomic variables, the competition measures appear to be statistically insignificant. However, with the inclusion of the macroeconomic variables; inflation rate (INF), real GDP growth (GDPg) and real interest rate (INTr), the competition measures became all significant. The negative coefficients of CR₃ and CR₅ indicate that as concentration in the Nepalese banking system declines or inversely as competition increases, Z-Index increases. Therefore this result supports the competition-stability hypothesis stating that there is a positive relation between competition and stability in the banking system. However, the positive sign of the coefficient of HHI implies that as the level of concentration in the banking system increases, stability of banks increases. This result is in line with the competition-fragility view which presumes that competition in banking system increases fragility of banks. Therefore, because of this contradictory result, it can be said that there is a difference between n-bank concentration ratios (CR₃, CR₅) and HHI, which includes all banks.

Table 2: Z-Index and Bank Competition

Model	(2.1)	(2.2)	(2.3)
Constant	(105.11) (60.98)	(94.53) (62.99)	(114.24) (60.31)
CR ₃	- 43.43 ^{***} (21.41)		
CR ₅		-51.52 ^{***} (17.12)	
HHI			0.234 ^{***} (0.09)
CD Ratio	13.73 (13.23)	13.24 (13.22)	28.71 ^{**} (11.98)
INF	-21.63 ^{**} (11.52)	- 47.51 ^{**} (22.31)	- 61.12 ^{**} (38.21)
ROE	53.287 ^{***} (21.19)	58.454 ^{***} (19.12)	89.691 ^{***} (29.19)
GDPg	-148.489 ^{**} (81.97)	-158.588 ^{**} (73.22)	-83.078 ^{**} (32.55)
LnTA	5.833 ^{**} (2.20)	5.796 ^{**} (2.18)	6.682 ^{**} (2.18)
INTr	3.33 [*] (1.17)	1.62 (3.12)	(2.32) (3.17)
Wald F	41.43 ^{***}	31.37 ^{***}	34.21 ^{***}
Breusch-Pagan LM	341.87 ^{***}	298.54 ^{***}	311.32 ^{***}
Hausman χ^2	20.78 ^{**}	18.23 ^{**}	29.43 ^{**}
N	246	246	246
Adj. R ²	0.27	0.24	0.29
F-statistics	21.281 ^{***}	25.323 ^{***}	34.152 ^{***}

Note: the figures in parenthesis shows *t'* value and * 10%, **5 % and ***1% level of significance.

As for the effect of macroeconomic indicators on the stability of banks, all the regression equations produce similar results. Estimation results show that rate of inflation has a significant and negative impact on stability of banks. This finding has an economic sense since high inflation levels lead to fragility of many agencies including banks. Secondly, the GDP growth seems to have a significant but negative impact on bank stability. This is an interesting result since, from an economic point of view, it is expected that increase in GDP growth to lead to bank stability. Similarly, both firm specific variables ROE and log of total assets are significant and have positive coefficients Hence, the results reveal that bank profitability and size affects positively to bank stability. In addition, the firm and time dummies are found to be significant.

Competition and Credit Risk

The same estimation procedure is repeated for the second dependent variable, NPL. NPL which is measure of bank fragility is regressed on the competition measures CR₃, CR₅ and HHI respectively. Table-III presents the estimation results for the fixed effects model. Again, the coefficients of all measures of competition are significant when macroeconomic and firm specific variables are included in the model. The results reveal that all the three measures of concentration have positive relation with NPL. It indicates that as concentration in banking industry increases, the non-performing loans in the industry tend to increase. Inversely, increase in competition results in decline in NPL. The results support the competition-stability viewpoint.

Table 3: Non-Performing Loans and Bank Competition

Model	(3.1)	(3.2)	(3.3)
Constant	10.12 (19.19)	8.34 (19.01)	11.48 (19.34)
CR ₃	22.233*** (7.53)		
CR ₅		14.675*** (6.27)	
HHI			0.115*** (0.023)
CD Ratio	10.55*** (3.43)	10.470** (3.42)	10.525*** (3.41)
INF	26.485** (13.92)	29.015** (18.12)	22.356*** (8.93)
ROE	-111.91*** (15.23)	-111.72*** (15.22)	-111.93*** (15.21)
GDPg	10.568*** (22.42)	17.653** (16.91)	19.838** (11.21)
LnTA	(0.24) (0.63)	(0.24) (0.63)	-1.844* (0.63)
INTr	9.255** (2.15)	0.11 (1.14)	0.21 (1.05)
Wald F	43.54***	33.43***	36.58***
Breusch Pagan LM	339.32***	293.24***	322.65***
Hausman χ^2	21.72**	19.33**	31.23**
N	246	246	246
Adj. R ²	0.38	0.39	0.33
F-statistics	32.461***	36.522***	22.521***

Note: the figures in parenthesis shows *t* value and * 10%, **5 % and ***1% level of significance.

As seen from Table-3, when NPL is regressed on the threemeasures of concentration along with the inflation rate, GDP growth rate and real interest rate combined with firm specific explanatory variables, the coefficients of CR₃ turns out to be significant. Moreover, the coefficients of CR₃, CR₅ and HHI are positive suggesting that nonperforming loans ratio which is a solvency measure based on loan risk of banks increases as concentration ratio increases or competition lessens. Therefore, it can be said that the results are in line with the competition-stability paradigm since stability increases with less concentration. Inflation and economic growth have positive relationship with NPL. Among firm specific variables, ROE and credit deposit ratio are found to be significant. The results indicate that profitable banks have lower NPL and banks with higher percentage of loan outstanding have higher credit risk.

The empirical investigation of the relation between competition and stability in the Nepalese banking system provided several important outcomes. First of all, it should be noted in advance that there is a contradiction between the outcomes of the two bank stability measures. When Z-Index is used as a proxy for individual bank stability and n-bank concentration ratios, namely CR₃ and CR₅, are used as an indicator for the level of competition in the system, the results support the competition- stability view or reject the concentration-stability view. Specifically, this result is the opposite of the franchise value paradigm stating that as the banking market becomes more concentrated, the franchise value of banks arising from higher levels of profit discourages banks to take risk and so enhance stability. However, it is in line with the risk shifting paradigm which argues that as competition increases, loan rates decline and this has a mitigating effect on moral hazard and adverse selection incentives of borrowers and hence has a positive impact on bank stability. In contrast, when HHI is used as measure of competition the results support competition-fragility view. The findings support proposition of Martinez-Miera and Repullo (2009) who argue that relationship between competition and stability is U-shaped. Both higher concentration and higher competition are detrimental for financial stability. Similarly, when NPL is used as a proxy for bank stability, the results seem to be in line with the competition-stability view. Specifically, this result seems to support the risk shifting paradigm. Overall, the findings provide empirical evidence for competition stability hypothesis in Nepalese banking industry.

4. CONCLUSIONS

The empirical investigation of the relation between competition and stability in the Nepalese banking system provides several important results. It is found that banking industry in Nepal has become competitive in recent periods. There exists relationship between competition and financial stability. Competition in banking sector is found to result in decrease in credit risk and contribute for financial stability. The findings provide support for risk shifting paradigm. Mixed results have been achieved in case of the impact of bank competition on overall risk. The findings indicate that both higher concentration and higher competition are detrimental for stability. Overall, the results provide evidence for competition stability hypothesis. In addition, besides competition level in the banking system, macroeconomic situation of the country is found to be an important determinant of banking system stability. The findings indicate that policymakers should not only foster competitive environment but also encourage consolidation in Nepalese banking industry through prudent mergers and acquisitions policy. Further studies can build on this study and analyze the impact of bank competition on stability by using non-structural measures of competition.

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