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BANK COMPETITION AND STABILITY RELATIONSHIP: EVIDENCE FROM SELECTED SOUTH ASIAN ECONOMIES

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ABSTRACT

This study explores the impact of bank competition on the stability of 88 banking institutions in four South Asian economies (Bangladesh, India, Pakistan and Sri Lanka) for 2012-2018. Both structure and non-structure measures of competition are used in empirical measurements along with z-score that is mostly used measure of stability. The results using two-step system generalized method of moment (GMM) suggests that structure measures of bank competition (Concentration ratio and Hirschman-Herfindahl index) have a significant positive impact on the stability of banks while non-structure measures of bank competition (Panzar and Rosse H statistics, Conventional, Adjusted Lerner index and Boone indicator) have a significant negative impact on the stability of banks. The results are strongly in the favour of competition-fragility hypothesis which proposes that an increase in competition reduces the stability of banking institutions in the financial market.

Disciplinary: Banking, Finance and Management Sciences.

1. INTRODUCTION

The financial failure of 2008-2009 led to financial risk and fragility for all banks that create an interest to know the real problems associated with financial stability. The banking sector has to manage with numerous potential tasks and their stability as well. The global financial crisis (GFC) of 2008-2009 highlights real concerns not only for individual bank stability but also for the stability of the whole financial sector. The soundness of the financial system is not guaranteed even in a secure environment at the macroeconomic level. The reason is the complex nature of the relationship holds between individual bank stability and stability of banks at the macroeconomic level. So, the banking sector stability analysis cannot be ignored. The financial sector is the strength of the economy of any country. The whole economy suffers from the insolvency of the financial sector due to its impact on governments, corporations and also all stakeholders which include shareholders, employees, managers, lenders and creditors. So, policymakers and researchers need to

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determine the factors that influence stability.

Theoretical, as well as empirical literature on the stability of the financial sector, indicates that competition in banking institutions is the main factor of financial stability. So, the linkages between bank competition and stability in a financial environment especially in banking sector a prime question for policymakers especially in South Asian economies as government intervene through financial sector which has entailed mostly of the organization of restructuring strategies through acquisitions or mergers and bailouts since Global Financial Crisis (GFC) of 2008-2009 to prevent the financial institution from the forthcoming financial crisis. Furthermore, the banking sector also faces liberalisation through tremendous consolidation, foreign bank penetration and regional integration. Two main hypotheses define the linkage between bank competition and stability in literature. The first one is the competition-stability hypothesis which proposes that competition in banking institutions accelerates the stability of banks (Mishkin, 1999; Minh *et al.*, 2020). The second one is the competition-fragility hypothesis that proposes that competition reduces the stability of banks (Keeley, 1990; Bulatova et al., 2019).

This study adds existing banking literature in various ways. Firstly, it gives addition to growing literature on bank competition-stability/fragility linkages through empirical support from four economies of the South Asian region. Secondly, it uses both structure and non-structure indicators of bank competition to enhance the robustness of the final results. Thirdly, this study explores the after a consequence of the global financial crisis (GFC) on the linkage between competition in the banking sector and stability while capturing the policy implications regarding liberalisation, activity restriction, deregulation, capitalization and consolidation using recent data from 2012 to 2018. Finally, the issue of endogeneity is controlled by using a two-step system (GMM) estimation technique by incorporating lag of variables as instruments.

2. LITERATURE REVIEW

The review is given to bank competition and stability relationship

2.1 THE COMPETITION-STABILITY

Supporters of the competition-stability hypothesis state that bank competition enhances stability. Firstly, charging higher loan rates by banks having market power would lead to a moral hazard problem on the borrower's side. The loans provided to these borrowers increased their risk of the portfolio (Stiglitz & Weiss, 1981). Secondly, too-big-to-fail (TBTF) or too-important-to-fail (TITF) banks are more likely present in concentrated markets. These TBTF-banks are the main cause of contagion risk and hence threaten bank stability (Nier *et al.*, 2007). Managers of larger (TBTF) banks take the excessive risk due to the idea that they will be rescued when in trouble (Mishkin, 1999). Thirdly, the theory of "Too-many-to-fail" explained that banks having market power can diversify risk regardless of the related reduction in individual value of risk in banking. In a similar case, bank's incentives to diversify their assets lower when the charter value of banks decreases as competition increased and however, it may enhance bank risk individually but helpful for bank stability as well (Acharya & Yorulmazer, 2007).

Goetz (2018) conducted a study on this type of linkage in the US. In the bank-level analysis, results using a fixed-effect model described that high competition positively contributes to bank stability. Noman *et al.* (2017) used Panzar and Rosse H statistics (PRHS), the Lerner index used as

a proxy of competition. Results using the system generalized method of movement showed that there exists a direct linkage between competition in the banking sector and stability in ASEAN-5. Leroy (2016) worked on the systemic measures of bank stability rather than conventional measures of bank stability. The results using systemic measures of bank stability are in favour of the competition-stability hypothesis. Liu *et al.* (2013) suggested that bank competition and stability are directly related to selected South East Asian economies. Soedarmono *et al.*, (2013) found favourable results in the competition-stability hypothesis in the case of 12 Asian economies consisting the banking sector in the post-Asian financial crisis.

2.2 THE COMPETITION-FRAGILITY

Proponents of the competition-fragility hypothesis state that bank competition reduces stability. Firstly, the Merton model on the pricing of deposit insurance has been extended under the traditional view on competition in the banking sector. Merton (1977) described that the value of put option of underlying assets in banking institutions is the same as the value of deposit insurance. Meanwhile, the changes in the price of underlying assets depend upon the price of an option. So, the bank has reason to enhance the variations in the price of assets with secured deposits. This strategy of increasing the value of assets of the banking sector in the existence of deposit insurance also increases default risk. Keeley (1990) extended the earlier argument by describing that bank charter has no value because it increases bankruptcy costs and resultantly, the charter of the bank is lost in case of default. Similarly, sometimes, the charter value of the bank also called franchise value.

Moreover, an increase in competition in the deposit market alleviated the bank's future rents (profits) and thus, decreasing the values of the charter of the bank so that large banks found it ideal to select risk maximizing policy. Hence, bank competition is a detriment to stability (Allen & Gale, 2000). Additionally, Hellmann *et al.* (2000) simplify the results in which capital requirements included in the model. They also explored that limiting competition in the deposit market using deposit rate ceilings are an active way to enhance bank stability due to the reason of the charter value-maximizing approach.

Secondly, a model developed by Cordella and Yeyati (2002) in which proper screening of borrowers (loan applicants) reduced the degree of bank risk. They described that accelerating bank competition would result in the reduction of screening benefits. Thus, a reduction in the screening benefits of loan applicants made banks riskier (Chan *et al.*, 1986). Thirdly, Marquez (2002) examined that the screening of borrowers is not easy in case of when a large number of banks present in the market due to the reason that each bank screen loan applicants in a smaller portion among the larger number of loan applicants. As a result, finance is given to low-quality loan applicants with negative consequences for bank stability in the long run. Lastly, some argued that it is difficult to monitor a structure with a large number of small banking institutions in the whole banking system (Wagner, 2010).

Leroy and Luccotte (2017) explored the linkage between competition and stability of banking institutions. Z-score, Merton distance to default, systemic risk is used measures for bank stability. Results using random effect, fixed effect and two-stage least square are in the favour of competition-fragility hypothesis which means that competition in the banking sector and stability are negatively related. Kabir and Worthington (2017) investigated a similar hypothesis in sixteen developing countries for 2000-2012. Results demonstrate that accelerating competition would result

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in a reduction of the stability of banking institutions in the financial market. Albaity *et al.*, (2019) deeply worked on the linkages between competition and stability of banking institutions in MEANA-18 countries using the moderating role of Islamic banks. Results are similar to competition-fragility hypothesis and also Islamic bank moderates this relationship.

3. METHODOLOGY

Bank balance sheet data for empirical analysis used for four countries (Bangladesh, India, Pakistan and Srilanka) across the South Asian region for 2012-2018 has been taken from bank focus. The bank-level sample included commercial banks of four countries for which bank focus provide data for seven years. Following (Duprey & Le, 2015), this paper dropped duplicate values using the Duprey-Le algorithm to iteratively for sample banks to kept time series data for every single bank as long as needed and also used combined data wherever needed (Bikker *et al.*, 2012). Data on variables (e.g. GDP growth rate, real interest rate and inflation) has been taken from the World Bank.

For discovering the linkage between bank competition, and stability, the detailed description of variables is given as;

3.1 BANK COMPETITION

Structure and non-structure measures of competition have its benefit and drawbacks. The scholars are not reached at a consensus that which measure is a more suitable measure of competition. This is the reason; this paper used the maximum measure of competition to reach the robustness of findings.

3.1.1 COMPETITION: STRUCTURE MEASURES

Structure measures of bank competition under traditional Industrial Organization (IO) literature are concentration ratios (CRn) and Hirschman-Herfindahl Index (HHI). This approach demonstrates that competition is derived from the market structure. Lower values of these measures indicate low market power which shows high competition. This paper followed by khan *et al.* (2017) to calculate the concentration ratio and Hirschman-Herfindahl Index.

3.1.2 COMPETITION: NON-STRUCTURE MEASURES

3.1.2.1 PANZAR-ROSSE MODEL

It is a more commonly used non-structure indicator of competition in the financial industry (Panzar & Rosse, 1982). For the calculation of PRHS, this model is given as (Bikker *et al.*, 2012).

$$ln(R_{i,t}) = \alpha_i + \beta_1 ln(W_{1,i,t}) + \beta_2 ln(W_{2,i,t}) + \beta_3 ln(W_{3,i,t}) + \gamma_j \sum_{j=1}^{n} X_{j,i,t} + \varepsilon_{i,t} \quad (1),$$

where $R_{i,t}$ represents the income of banking institution i in time t; input prices are indicated by W_1 (financial cost), W_2 (operating cost), and W_3 (personal cost). $X_{j,i,t}$ is a matrix of bank-level control variables and $\varepsilon_{i,t}$ is the error term. PRHS is calculated by adding the coefficients on (W_1), (W_2) and (W_3) i.e. $(\beta_1 + \beta_2 + \beta_3)$. The term γ is the regression coefficient for $X_{j,i,t}$. The term ε is the regression error term.

The dynamic PRHS is given as

$$\Delta ln(R_{i,t}) = \beta_0^G \Delta \ln(R_{i,t-1}) + \beta_1^G \ln(W_{1,i,t}) + \beta_2^G \ln(W_{2,i,t}) + \beta_3^G \ln(W_{3,i,t}) + \gamma_j \sum_{j=1}^{n} X_{j,i,t} \quad (2).$$

3.1.2.2 LERNER INDEX (CONVENTIONAL)

A well-used indicator of competition in finance and economics literature is the Lerner index (Lerner, 1934)

$$Lerner_{i,t} = \frac{(Price_{i,t} - MC_{i,t})}{Price_{i,t}} \quad (3),$$

where the price of output price (bank's price) is denoted by $Price_{i,t}$ and marginal cost is denoted by $MC_{i,t}$. Marginal cost is the cost incurred to make an extra item of output individually. For the calculation of marginal cost, the trans-log cost function is given as

$$lnCost_{i,t} = \beta_0 + \beta_1 \ln Q_{i,t} + \frac{\beta_2}{2} \ln Q_{i,t}^2 + \sum_{k=1}^{3} \gamma_{k,t} \ln W_{k,i,t} + \sum_{k=1}^{3} \emptyset_k \ln Q_{i,t} \ln W_{k,i,t} + \sum_{k=1}^{3} \sum_{j=1}^{3} \delta_{i,j} \ln W_{k,i,t} \ln W_{j,i,t} + \sum_{i=1}^{3} \left(\frac{\delta_i}{2}\right) \ln W_{t,i,t}^2 + \sum_{k=1}^{2} \eta_k \, trend^k \sum_{i=1}^{3} \omega_i \ln W_{j,i,t} \, trend + v \ln Q_{t,j} \, trend + \varepsilon_i \quad (4),$$

where total cost and output for banking institution i in time t is denoted by $Cost_{i,t}$and $Q_{i,t}$ respectively. The input prices of deposit funds, labour and capital is represented by W_1,W_2 and W_3. Equation (5) shows the trans-log function of Equation (4).

$$Mc_{i,t} = \frac{Cost_{i,t}}{Q_{i,t}} \left[\beta_1 + \beta_2 \ln Q_{i,t} + \sum_{k=1}^{3} \theta_k \ln W_{k,i,t} + \delta_3 trend_{i,t}\right] \quad (5).$$

3.1.2.3 ADJUSTED LERNER INDEX

For the adjustment of conventional to Adjusted Lerner index, this paper followed the method used in (Koetter *et al*., 2012). The adjusted Lerner index is

$$Lerner(Adjusted) = \frac{\pi_i + tc_i - mc_i * q_i}{\pi_i + tc_i} \quad (6),$$

where π_i ,tc_i, $mc_i * q_i$ denote the total profit, cost, marginal cost and output of banking institution i. The interpretation of values is the same just like the conventional Lerner index.

3.1.2.4 BOONE INDICATOR

Based on the efficiency assumption, the Boone indicator defined as efficient banks is more compensated in a more competitive environment as compared to inefficient banks which are less compensated and more penalized (Boone, 2008). A complete explanation of the Boone indicator is given in (Boone *et al*., 2013). Profitability is used to capture the competition in the market

$$ln\pi_i = \alpha + \beta \ln c_i + \varepsilon_i \quad (7),$$

where π_i, c_i represent the indicator of profit and costs; β shows the slope and gives the value of competition. Theoretically, β is not a positive value. This work used marginal cost instead of the average cost in the Boone indicator calculation. Equation (8) incorporates both changes that are marginal cost instead of average cost and market share instead of total profit Van *et al*. (2013).

$$\ln ms_i = \alpha + \beta \ln mc_i + \varepsilon_i \quad (8).$$

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3.2 BANK STABILITY

This study used the z-score as a proxy for the calculation of bank stability. Financial statements (Income statement & Balance sheet) data have been used (Roy, 1952; Ijtsma *et al.*, 2017). Z-score is generally used in the calculation of the stability of financial institutions that include information about capital buffers, profitability, and standard deviation (SD) of return of assets. Z-score of banking institution i at time t is described as

$$Z_{it}^{B} = \frac{(ROA)+K_{it}}{\delta(ROA)} \qquad (9).$$

Bank return on an average asset at time t is denoted by ROA. Furthermore, $k_{it} = \frac{e_{it}}{a_{it}}$ is the total equity to total asset ratio of banking institution i at time t, measured as a fraction of total equity denoted by (e_{it}) by total assets denoted by(a_{it}). Finally, SD of bank return on average assets is denoted by $\sigma(ROA)$.

3.3 ECONOMETRIC MODEL

This section discussed the model at the individual bank level that this study used in our empirical calculations to measure the bank competition and stability relationship in the financial market. The following studies will help select the appropriate model (Noman *et al.*, 2017).

$$Stab_{i,j,t} = \omega_0 + \omega_1 Stab_{i,j,t-1} + \omega_2 BC_{j,t} + \lambda m \sum_{m=1}^{n} X_{i,j,t} + \tau k \sum_{k=1}^{n} Z_{j,t} + \mathcal{E}_{i,j,t} \qquad (10),$$

where, $BS_{i,j,t}$ refer to bank stability of bank i in a country j at time t, $BS_{i,j,t-1}$ is the lag value of bank stability of banking institutions i in a country j at time t and $BC_{j,t}$ is bank competition of country j at time t. $X_{i,j,t}$ and $Z_{j,t}$ represent control variables respectively. $\mathcal{E}_{i,j,t}$ is the error term. Country related control variables are GDP growth, Inflation, and real interest rate. Bank specific control variables are Assets, Loan loss provision ratio, loan to asset ratio, net interest margin and cost to income ratio. This study concerned only the significance of ω_2. Significant positive value is in the favour of financial inclusion-stability view which positive association of financial inclusion and stability (z-score).

4. RESULTS AND DISCUSSION

This section discusses the sample statistics, correlation analysis, pre-diagnostics of using the generalized method of moment (GMM), and mainly the regression results under the two-step system (GMM) methodology.

4.1 PRELIMINARY ANALYSIS

The results of the descriptive statistics of the variables used in the model are shown in Table 1. The Z-score mean value shows that insolvency risk in these South Asian economies is not so high. It means that the commercial banks operating in these economies are stable. The mean values of bank and country-specific control variables are not so high. The mean values structure and non-structure indicator of bank competition show that the banking sector in these economies is competitive in nature. All variables under the Levin-Lin-Chu test of stationary of all the variables in the paper are significant, so there is no issue of a unit root in data and data is stationary at level. The significant value of Wooldridge test, Breusch-Pagan/Cook-Weisberg test and Wu-Hausman test indicated that there is a problem of autocorrelation, heteroscedasticity, and endogeneity in the data.

Therefore, the generalized method of the moment is an appropriate technique for estimation and better options to counter these problems. Table 2 demonstrates the pairwise correlation matrix among the variables of interest. There are two important repercussions of these correlations. Firstly, the correlation between bank competition (Structure and non-structure measures) and bank stability is significant. Secondly, the correlation between the right-hand side variables of the econometric model is not so high. This means that there is no issue of multi-collinearity in the variables that are regressed against the dependent variable. ***, ** and * demonstrates the coefficient are significant at 1%, 5%, and 10% significant level.

Table 1: Sample statistics

Variables Name	Mean	SD	Minimum Values	Maximum Values
Z-Score	27.094	10.481	17.504	43.644
CR3-Assets	.391	.140	.189	.651
CR3-Deposits	.338	.133	.194	.640
CR3-Loans	.384	.134	.182	.656
CR5-Assets	.531	.174	.305	.849
CR5-Deposits	.462	.165	.273	.847
CR5-Loans	.521	.170	.296	.852
HHI-Assets	.094	.037	.048	.178
HHI-Deposits	.092	.038	.048	.172
HHI-Loans	.092	.035	.047	.182
PRHS	.697	.175	.322	.914
Lerner Index(C)	.031	.041	.002	.241
Lerner Index(A)	.262	.086	.031	.452
Boone Indicator	-.031	.041	-.241	-.002
Cost to Income Ratio	55.793	28.326	19.327	591.836
Net interest Margin	3.080	1.599	-0.704	16.808
Loan to Asset ratio	58.136	11.930	19.117	86.730
Loan Loss Provision ratio	.843	.919	-2.849	8.379
Total Assets	24793.42	57841.66	16.524	562150.3
GDP-Growth rate	6.288	1.421	3.209	9.144
Real Interest rate	5.214	1.537	2.214	8.321
Inflation	5.072	2.186	.400	10.828

Table 2: Correlation Matrix

Variables names	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1)Z-Score(log)	1															
(2)CR3-Assets	-.14***	1														
(3)CR5-Assets	-.11**	.98***	1													
(4)HHI-Assets	-.11**	.98***	.99***	1												
(5)PRHS	.03	-.66***	-.72***	-.691***	1											
(6)Lerner Index(C)	.10*	-.41***	-.29***	-.38***	.022	1										
(7)Lerner Index(A)	.21***	-.88***	-.84***	-.83***	.55***	.23***	1									
(8)Boone Indicator	-.09*	-.022	-.11**	-.08*	.041	-.35***	-.10*	1								
(9)Cost to Income Ratio	-.13***	.24***	.26***	.26***	-.21***	.02	-.22***	-.13**	1							
(10)Net interest Margin	.16***	.39***	.43***	.41***	-.37***	-.08*	-.28***	-.12**	-.01	1						
(11)Loan to Asset ratio	.17***	-.39***	-.39***	-.34***	.32***	-.33***	.54***	.09*	-.08*	.04	1					
(12)Loan Loss Provision ratio	-.32***	-.09*	-.18***	-.14***	.33***	-0.29***	.10**	-.13**	-.15***	-.14***	.08*	1				
(13)Total Assets(log)	-.15***	.04	-.09*	-.05	.24***	-.40***	-.17***	.34***	-.36***	-.29***	-.11**	.33***	1			
(14)GDP-Growth rate	-.021	-.44***	-.54***	-.49***	.56***	-.19***	.35***	.13**	-.20***	-.30***	.27***	.33***	.37***	1		
(15)Real Interest rate	-.037	.10**	.09*	.087*	-.06	.04	-.16***	-.154***	.03	-.00	-.23***	.08*	.07	0.06	1	
(16)Inflation	.12**	-.29***	-.24***	-.25***	.15***	.17***	.35***	.10*	-.04	.01	.22***	-.15***	-.26***	-0.16***	-0.62***	1

4.2 MAIN FINDINGS

The two-step system generalized method of movement is applied to the stability model of Equation (10) and results are depicted in Tables 3 and 4. Models (1-9) consist of a structure measure of bank competition and the dependent variable (stability) is measured as Z-score (log). Models (10-13) consist of a non-structure measure of bank competition. In Models (1-3), the

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Concentration ratio of the three largest banks based on Assets, deposits and Loans are used as an independent variable that is bank competition. In Model (4-6), the Concentration ratio of five largest banks based on Assets, Deposits and Loans are used as an independent variable.

Table 3: Regression Results (Dependent variable: Bank stability)
(Z values are in the parenthesis).

Variables	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
L.Z-Score	.353*** (2.49)	.395*** (2.45)	.365*** (2.66)	.347** (2.34)	.405*** (2.64)	.355*** (2.54)
Competition	.354*** (3.02)	.038 (.98)	.279*** (3.27)	.568*** (3.45)	.051 (1.47)	.409*** (3.82)
Cost to Income ratio	-.002* (-1.8)	-.001* (-1.74)	-.001* (-1.85)	-.001* (-1.72)	-.001* (-1.77)	-.001* (-1.88)
Net Interest Margin	.009*** (2.65)	.009** (2.90)	.009* (2.68)	.009* (2.75)	.009*** (2.73)	.009** (2.54)
Loan to Assets ratio	-.002 (-.58)	-.001 (-.92)	-.001 (-.81)	-.001 (-.42)	-.001 (-.97)	-.001 (-.73)
Loan Loss Provision ratio	-.006** (-2.55)	-.004** (-1.89)	-.006*** (-2.61)	-.006** (-2.47)	-.005** (-1.94)	-.006*** (-2.59)
Total Assets(log)	-.055*** (-2.17)	-.066** (-2.47)	-.052** (-2.12)	-.052** (-2.05)	-.068** (-2.47)	-.049** (-1.92)
GDP-Growth rate	-.004* (-1.67)	-.003 (-1.12)	-.001 (-.58)	-.003 (-1.30)	-.003 (-1.15)	-.001 (-.31)
Real Interest Rate	-.001 (-.54)	.001 (.81)	-.001 (-1.06)	-.002 (-1.33)	.001 (.83)	-.002 (-1.28)
Inflation	.002** (1.98)	.002** (1.98)	.001 (.72)	.001 (.69)	.002** (2.16)	.001 (.48)
AR(2)	0.839	.557	.775	.84	.514	.56
Hansen Test	.439	.328	.525	.455	.312	.464
Wooldridge test	35.101***	35.199***	35.199***	35.665***	34.806***	34.580***
Breusch-Pagan / Cook Weisberg test	52.60***	46.01***	51.36***	55.20***	45.62***	53.30***
Wu-Hausman test	3.701***	3.521*	3.371*	3.037*	3.027*	3.056*

Table 4: Regression Results (Dependent variable: Bank stability)
(Z values are in the parenthesis).

Variables	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)	Model (13)
L.Z-Score	.343** (2.21)	.377*** (2.43)	.372*** (2.57)	.428*** (3.10)	.425*** (2.94)	.409*** (2.78)	.393*** (2.83)
Competition	.272*** (2.65)	.101** (2.17)	.236** (2.10)	-.022** (-2.42)	-.011** (-2.21)	-.004** (-2.44)	-.00259** (-2.47)
Cost to Income ratio	-.001* (-1.72)	-.001* (-1.80)	-.001** (-1.95)	-.001* (-1.88)	-.001** (-2.03)	-.001** (-1.89)	-.001** (-1.89)
Net Interest Margin	.009*** (2.81)	.009*** (2.86)	-.009*** (-2.78)	.009*** (2.60)	.007** (2.21)	.009*** (3.04)	.009*** (2.83)
Loan to Assets ratio	-.001 (-0.84)	-.001 (-1.30)	-.001 (-1.67)	-.001 (-1.36)	-.001 (-.90)	-.001 (-1.30)	-.001 (-.91)
Loan Loss Provision ratio	-.006*** (-2.44)	-.005** (-2.25)	-.005** (-2.39)	-.005* (-1.93)	-.004** (-2.05)	-.005** (-2.26)	-.006** (-2.45)
Total Assets(log)	-.051** (-2.29)	-.050 (-2.25)	-.056** (-2.43)	-.070*** (-2.64)	-.076*** (-2.99)	-.066*** (-2.65)	-.055** (-2.19)
GDP-Growth rate	-.058** (-2.08)	-.006* (-2.08)	-.004 (-1.65)	-.004 (-.070)	-.002 (-1.06)	-.002 (-.99)	-.001 (-.67)
Real Interest rate	-.001 (-.48)	-.002 (-.89)	.001 (.48)	.002 (1.48)	.001 (1.27)	.001 (1.49)	.001 (.07)
Inflation	.001* (1.65)	.001 (.79)	.002* (1.83)	.003*** (2.79)	.003*** (2.98)	.003*** (3.26)	.002** (2.21)
AR(2)	.713	.575	.595	.711	.64	.668	.829
Hansen test	.477	.269	.472	.218	.295	.313	.308
Wooldridge test	36.606***	36.146***	37.715***	44.731***	33.046***	34.807***	35.852***
Breusch-Pagan / Cook Weisberg test	53.22***	52.83***	53.11***	52.50***	45.46***	71.16***	36.33***
Wu-Hausman test	4.022**	0.001	3.008*	4.599*	3.111*	3.234*	4.285*

Note: ***, ** and * demonstrates the coefficient are significant at 1%, 5% and 10% level of significance. The time dummy variable also included in the regression models.

In models (7-9), the Hirschman Herfindahl index on the base of Assets, deposits and Loans is used as an independent variable that bank competition. In model (10), PRHS is used as a measure of bank competition. In model (11), the Conventional Lerner index is used to capture bank competition. In model (12), the Adjusted Lerner index is used as a measure of bank competition. In

model (13), the Boone indicator is used as an efficiency adjusted measure of bank competition. The values in the table demonstrate that the coefficient for structure measures of bank competition is positive and also coefficient on non-structure measures of bank competition is negative for all models. The results also in favor of the negative linkage between bank competition and stability; that is a higher level of competition reduces the stability of banks. The findings using the structure and non-structure measures of bank competition for South Asian economies are in favour of the competition-fragility hypothesis. The results are also aligned with those suggested by (Leroy & Lucotte, 2017; Albaity et al., 2019).

5. CONCLUSION

This study explores the relationship between bank competition and stability of banking institutions in the financial market covering four South Asian region economies. These four economies include Bangladesh, India, Pakistan and Sri Lanka covering the period 2012-2018 using a variety of measures of competition. Balanced panel data is used for analysis. Every measure of bank competition is regressed separately in bank stability models. Our results support the competition-fragility hypothesis that indicates that bank competition has a negative impact on stability. In simple words, enhancement in bank competition results in reduce the stability of banks in South Asian economies. The main findings have significant policy implications for policymakers. Firstly, key results do not only highlight the correlation between bank competition and stability but also demonstrate a correlation between bank concentration and stability as well. The overall results are strongly in the favour of competition-fragility hypothesis which explains that banks having higher market power are usually stable in the long run. A strict policy of mergers of small and medium-sized banks should be adopted to stabilize the financial sector of the economy. The overall performance of the financial sector achieves by merging small with large banks. However, policymakers are cautious in merging of banks as it would ultimately enhance the bank concentration in the market. Furthermore, minimum capital requirements and entry barriers are also imposed to enhance financial soundness. The government can scrutinize these types of strategies like a greater capital requirement, bank consolidation and degree of co-integration of markets internationally to prevent future financial crises. To strengthen Global Financial Safety Net (GFSN), the Financial Stability Board (FSB, 2018) works with G20, since the Global financial crisis incurred. These developments emphasize four key aspects: arrangements of regional financing, adequate foreign reserves, two-way swap lines between state banks of two countries, fiscal space at the international level and IMF as a supplier of finance globally.

6. DATA AND MATERIAL AVAILABILITY

The corresponding author will be liable to provide information regarding this paper.

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