Does Market Competition Contribute to the Banking Stability of South Asian Emerging Economies?

Muzammal Khan[1], Dr. Muhammad Sajid Amin[2]

Abstract
We investigate the impact of competition among South Asian banks on their financial stability, focusing on those operating in India, Pakistan, and Sri Lanka. Utilizing annual data from 121 banks spanning the period 2011-2021, we specifically choose the post-global financial crisis era to explore the lessons learned by banks from the 2007–2008 global financial crisis. Our objective is to understand how these banks sustain their stability by maintaining an optimal level of competition. Our study is unique in that it employs the large dataset of three countries and uses Lerner index and the adjusted Lerner index to capture the broader dimensions of South Asian financial stability. Bank-level Z-scores is used to measure the stability of the banks. Our findings reveal strong evidence of competition among South Asian banks contributing to the sustainability of their financial stability. We conclude that maintaining an optimal level of competition helps protect the South Asian banking system from the vulnerable and spillover effects of potential financial crises.
Keywords: competition, stability, Lerner index, banking sector, south Asian economies, Pakistan, India, Sri Lanka, sustain

1. Introduction

The stability of the financial system is a key factor in the economic growth of any country. A financially stable banking system can facilitate the efficient allocation of financial resources among competitive economic sectors, assist management in identifying liquidity risks, and reduce the likelihood of financial losses on the assets of banks. A stable banking system possesses the ability to absorb financial shocks through self-corrective mechanisms (Albaity et al., 2019), preventing the recurrence of adverse events that may impede or negate economic growth (Nguyen, 2018; Sajid & Ali, 2018).

The literature has recognized that financial sector rivalry is critical for the good functioning of the financial sector and financial system stability (Boyd et al., 2005). The studies of Keeley (1990) and Boyd et al. (2005) provide conflicting augments on the relationship between market competition and the stability of the banking sector. The two conflicting views are known as the charter value hypothesis (competition fragility hypothesis) and the risk shifting hypothesis (competition stability hypothesis). The charter value hypothesis postulates that an increase in competition will deteriorate stability and it has been empirically tested by many studies (Zheng, 2018; Tabak et al., 2012). On the other hand, the risk shifting hypothesis predicts that increased competition improves the stability of the banking sector and it is also empirically supported by many studies (Anginer, 2014; Nguyen, 2018).

The objective of our study is to investigate the impact of market competition on the sustainability of financial stability of the banking sector in the South Asian emerging economies i.e. India, Pakistan and Sri Lanka. Though the discussion over whether the competition affects bank stability is still ongoing, the results are inconclusive (Goetz, 2018; Nouman, 2017; Audi et al., 2023). As a result, both hypotheses i.e. charter value and risk shifting still co-exists in the literature on banking stability. The researchers have linked the contrary results of studies with variations in the data sample, measures of competition and stability employed and statistical techniques used to predict the results (Moussawi, 2022; Guidara et al., 2013; Ali et al., 2023).

We attempt to fill these gaps highlighted in the literature by examining the influence of market competition on the financial stability of the banking sector in South Asian emerging economies. Further, we used a relatively large sample of data from 121 banks over the 2011–2021 period to get more reliable results. A two-step system GMM estimation method is employed to address endogeneity, serial correlation, and heteroscedasticity, which are often found in the panel data of the banking sector. We add many bank specific and country specific measures to control the bias of the results. The study also discusses the implications of the results for policymakers, regulators and bank managers.

The levels of financial and economic development are different in South Asian emerging countries than in developed countries. The study of emerging South Asian countries helps policymakers and investors understand the complex relationship between competition and stability in the presence of diversification and capital regulations in an environment where these countries have many cross-border economic and financial ties. Our study provides fresh evidence for researchers, policymakers, and investors.

The remaining document is organized as follows: Section 2 discusses the theoretical and empirical literature review. Section 3 describes the methodology and measurement of the variables under study. Section 4 discusses the results and discussion. Section 5 concludes the findings of our study.

2. Literature Review

Theoretical work on the connection between competition and stability remains inconclusive. Consequently, two opposing theoretical perspectives have been proposed, each finding support in numerous empirical studies. The first is the charter value hypothesis or competition fragility hypothesis (Keeley, 1990), which posits that competition erodes stability. Intense competition in the banking sector compels banks to take on more risks to boost their income, leading to the fragility of the financial system. On the other hand, the risk-shifting hypothesis or competition stability hypothesis (Boyd & De Nicolo, 2005) suggests that robust competition fosters a more adaptable financial system by transferring risk from banks to borrowers, making the bank more vigilant about stability.

Traditionally, bank competition has been perceived as detrimental to financial stability, a viewpoint supported by various theoretical works (Wu et. al, 2022; Audi et al., 2023).

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[1] Assistant Professor, Department of Management Sciences COMSATS University Vehari campus, Pakistan, muzamilkhan@cuivehari.edu.pk
[2] Lecturer, Department of Commerce, Is/lamia University Bahawalpur, Pakistan, sajid.amin@iub.edu.pk

According to the bank charter value or competition fragility view, reduced competition empowers banks to exercise more market control, leading to higher interest rates on loans and increased profitability. In response, banks tend to take fewer risks by minimizing diversification, aiming for greater stability. Conversely, increased competition prevents banks from charging premiums, encouraging them to take more risks, thereby compromising stability. This perspective is also known as the interest rate effect in the literature (Masten et al., 2019).

Angier (2014) investigated empirically the links between bank systemic risk and competition in commercial banks and found that increased competition motivates the banks to engage in more diversified risks, which in turn improves the stability of the market. However, the study of Anginer (2014) employed just one measure of competition, and their results were more acceptable for developed countries than for developing countries like South Asian emerging economies. Goetz (2018) examined the impact of entry barriers and their removal in the multinational banks of the USA and concluded that bank stability can be increased by decreasing the entry barriers.

The literature supports empirically two opposite views. It is unclear how competition actually influences stability. Berger (2009) showed that higher bank competition promotes a high-risk portfolio of products. However, the use of capital buffers and risk mitigation techniques can reduce this increased level of risk, resulting in enhancing the stability of the banking system. Some studies found a positive relationship between bank stability and competition. For example, Leroy and Lucotte (2017) investigated the competition-stability trade-off and found a positive relation between the bank's competition-stability nexus. They measured the individual and systemic risks of banks and pointed out the negative impact of competition on individual risk and the positive relation with systematic risk.

Chan (2015) used Spanish data on the banking sector and tested the relationship between market concentration and stability using the Lerner index and Z-score. He concluded that using the loan market, competition improves the stability of the market, and the charter value hypothesis is not supported in the Spanish banking system. Moussawi (2022) studied the nexus between competition, cost efficiency, and bank stability using the data of 222 banks operating in the Middle East and North Africa (MENA) region. The study used the Lerner and Adjuster Lerner index for measuring market competition and the Generalized Method of Moments (GMM) for obtaining the results. He showed that competition positively impacts the financial stability and cost efficiency of the banks.

The study formulates the following hypotheses:

H1: *The banks' competition positively impacts the emerging South Asian banks' stability.*
H1a: *The banks' competition negatively impacts the emerging South Asian banks' stability.*

3. Methodology

3.1. Data

The study tests whether bank competition influences bank stability by employing bank-level data from emerging South Asian economies including Pakistan, India and Sri Lanka. Although the population under study includes all the commercial banks operating in this region, the study includes only selected commercial banks. The reason for selecting only the commercial banks is due to different regulatory requirements than other banks (investment, microfinance, and saving banks). The prior studies (Nguyen, 2018; Moussawi, 2022) on this topic have also selected only commercial banks.

The data spans the period from 2011 to 2021. The reason behind this duration is to maximize the sample size, as data from some banks was not available before 2011, especially for private banks in Sri Lanka. Another justification for the data collection range is that the study intends to focus on the post-global financial crisis of 2007–08. The sample contains a total of 121 commercial banks operating in these countries. The data is sourced from databases of the World Bank, the IMF, the central banks of respective countries, and the annual reports of selected banks.

3.2. Measurement of Variables

The stability of the banking sector is measured by the Z-score and the competition is measured by the Lerner index and the efficiency-adjusted Lerner index. The control variables include cost-to-income ratio, total assets, return on assets (ROA), non-performing loans (NPL) ratio, gross domestic product (GDP), annual growth rate, inflation rate interest rate of selected economies. The definition and measurements of all variables are given in Appendix A. The summary of dependent and independent variables in the study is given below.

3.2.1. Stability of banking sector

The Z-score is a commonly employed measure for stability of banking sector and provides an indication of a bank's distance from insolvency. Following Goetz (2018), the Z-score is computed as follows;

$$Z - score = \frac{ROA + E/TA}{\sigma ROA}$$

3.2.2. Competition Measurement

Market competition is measured using Lerner index and efficiency adjusted Lerner index. This study utilizes a bank-specific measure for market power, known as the Lerner index, which represents an inverse indicator of market competitiveness. Lerner and efficiency adjusted Lerner indices measure the market power of a firm (Azmi et al., 2019).

(a) Lerner Index

Lerner model is most frequently used for measurement of competition in banking literature. Lerner (1934) proposed the model to measure the market power of firm. It measures the strength competition by calculating the individual market power. A value from 0 to 1 indicates lower to high market power or competition respectively (Brei et al., 2020). Lerner index uses following equation to measure difference in marginal cost and price of products;

$$Lerner_{jt} = \frac{(P_{it} - MC_{it})}{P_{jt}} \tag{1}$$

Where, P_{it} is price of total earning assets that can be measured with the ratio of total revenues to total assets for bank $_i$ at time $_t$). While MC_{it} is the marginal cost of bank which is estimated using a translog cost function from Berger et al. (2010);

$$lnTC_{it} = \eta_0 + \eta_1 lnQ_{it} \frac{\eta_2}{2} lnQ_{it}^2 + \sum_{k=1}^{3} \beta_k lnW_{kit} + \sum_{k=1}^{3} \phi_k lnQ_{it} lnW_{kit} + \sum_{k=1}^{3} \sum_{j=1}^{3} \frac{pk_j}{2} lnW_{kit} lnW_{jit} + \lambda_1 T + \lambda_2 T^2 +$$

$$\lambda_3 T lnQ_{it} + \sum_{k=1}^{3} \phi_k T lnW_{kit} + \mu_{it}$$

Here, ordinary least squares method is used to estimate the translog function of total cost, TC_{it}. Banks output is represen (2) measured by total loans, W represents the input by banks namely funding (interest expenses), labor (salary expenses) and physical capital (other operating expenses), logged by total assets. Than MC can be calculated as;

$$mc_{it} = \frac{TC_{it}}{Q_{it}} [\eta_1 + \eta_2 Q_{it} + \sum_{k=1}^{3} \phi_k lnW_{kit} + \lambda_3 T] \tag{3}$$

Where TC is the total cost of bank and Q is total loans of banks.

(b) Efficiency Adjusted Lerner

Koetter et al. (2012) stated that the Lerner index has multiple problems since banks may "enjoy a quiet life" while not being cost and profit efficient. As a result, the Lerner index was modified for efficiency and renamed the adjusted Lerner index.

$$Lerner_{jt} = \frac{\pi_{jt} + TC - MC.Y_{jt}}{\pi_{jt} + TC} \tag{4}$$

Where bank's profit at time t is represented by π_{it}, its total cost by TC_{it}, its marginal cost by MC_{it} and its total output by y_{it}. MC_{it} is calculated using the translog function as described in Lerner index calculations. The adjusted Lerner index can take values between zero and one, with higher results reflecting stronger market power.

3.3. Model Specifications

Considering the nature of panel data of banking sector and economics, the issues of heterogeneity and serial correlation might result in spurious results and conclusions. Therefore, following the methodology of previous studies, two step system GMM is employed to address the statistical biases and issues (Goetz, 2018). To control for potential correlation of the dependent variable, a lag of the dependent variable in the model is introduced. The addition of the lagged dependent variable in the model makes the traditional panel data estimation techniques like fixed effect regression inappropriate for the analysis (Roodman 2009). Further, the system GMM estimator is predominantly well-suited for situations where there are relatively few time periods (T is small), a large number of cross-sectional units (N is large), and when the dependent variable exhibits persistence behaviour over time. The basic equations of the model are as follows:

$$Z - score = \beta_0 + \beta_1 Z - score_{jt-1} + \beta_2 Lerner_{jt} + \beta_3 BS + \beta_4 CS_{jt} + \varepsilon_{jt} \tag{3.5}$$

$$Z - score = \beta_0 + \beta_1 Z - score_{jt-1} + \beta_2 Adjusted\ Lerner_{jt} + \beta_3 BS + \beta_4 CS_{jt} + \varepsilon_{jt} \tag{3.6}$$

Where BS_{jt} represents banks specific control variables including cost to income ratio, total assets, ROA and ratio of non-performing loans (NPL) to gross loans. CS_{jt} represents the country specific controls like gross domestic product (GDP), rate of annual inflation and annual lending interest rates. ε_{jt} shows the residuals of models. The detail of variables and measurements is given in appendix-A at the end of the article.

4. Discussion

Table 1: Descriptive Statistics

	India				Pakistan				Sri Lanka			
	Mean	Min	SD	Max	Mean	Min	SD	Max	Mean	Min	SD	Max
Z-score	3.257	-2.972	2.67	9.931	0.491	0	0.927	4.534	0.113	0.002	0.309	2.782
SD ROA	1.077	0.009	1.134	7.493	0.077	0.001	0.123	0.331	0.095	0.001	0.121	0.323
Lerner Index	0.685	-0.12	0.207	0.993	0.79	-0.75	0.13	0.995	0.872	-0.46	0.07	0.98
Adjusted Lerner	0.557	-0.36	0.091	0.968	0.695	-0.88	0.23	0.898	0.764	-0.36	0.031	0.895
Cost to Income ratio	3.804	-4.24	13.215	232	0.141	0.039	0.049	0.429	0.124	0.046	0.224	2.423
Total Assets	9.914	3.672	2.561	15.327	19.512	15.561	1.369	22.128	13.267	10.181	1.824	18.619
ROA	0.745	-26.22	2.606	17.86	0.06	-0.11	0.167	0.885	0.012	-0.426	0.044	0.131
NPL	2.053	0	2.472	30.246	1.439	0.012	2.057	8.3	0.149	0	0.19	0.774
GDP Growth	5.687	-5.8	3.883	9.1	3.864	-0.9	1.734	6.1	4.136	-3.5	3.501	8.7
Inflation	6.145	3.4	2.284	10	7.491	2.9	3.301	13.7	5.082	2.2	1.688	7.5
Interest Rate	9.752	8.698	0.541	10.604	10.815	8.21	2.044	14.419	10.982	6.958	2.079	14

4.1. Descriptive statistics

The summary of descriptive statistics in Table 01 offers valuable insights into the stability and competition dynamics of the banking sectors of India, Pakistan, and Sri Lanka. The findings unveil notable variations among the three countries, exhibiting the

unique characteristics and challenges faced by their banking sector. The stability measures, represented by the Z-score and SD ROA indicate that Indian banks have a relatively higher mean Z-score of 3.257, while the SD ROA stands at 1.077 suggesting a strong level of stability. In contrast, Pakistani banks present a significantly lower mean Z-score of 0.491, underscoring a relatively lower level of stability.

Overall, the descriptive statistics give a holistic picture of South Asian emerging economies. The stability of banking sector is moderate in these countries while the competition is on rise due to poor economic performance of Pakistan and Sri Lanka. These results reveal that banking sector has maintained its stability despite increasing competition in the market.

4.2. Correlation Matrix

This correlation Table 2 provides insight into the relationships between the variables in the context of stability and competition in the banking sector. Correlation coefficients are used to measure the strength and direction of these relationships. The table illustrates that all the variables exhibit low correlation with each other, despite having significant coefficients. This is evident from the fact that the pairwise correlation coefficients among the regressors are below 0.50. As a result, it can be inferred that there is no substantial issue of multicollinearity among the regressors.

Table 2: Pair wise Pearson correlation Matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Z Score	1.000										
(2) SD ROA	0.095*	1.000									
(3) Lerner Index	-.286*	-.304*	1.000								
(4) Adjusted Lerner	-.422*	-.308*	0.920*	1.000							
(5) Cost to Income ratio	-0066*	.101*	0.016	0.034	1.000						
(6) Total Assets	-.399*	-.380*	0.655*	0.664*	-0.802*	1.00					
(7) ROA	-0.055	0.035	-.076*	-.097*	0.157*	0.023	1.00				
(8) NPL	0.111*	0.131*	-.157*	-.171*	0.198*	-.031	0.047	1.00			
(9) GDP Growth	0.108*	.217*	.195*	.215*	0.236*	-.001	0.021	-0.204*	1.000		
(10) Inflation	-.038	0 .236*	.104*	.088*	-0.123*	0.038	-0.041	0.185*	-0.062*	1.000	
(11) Interest Rate	-0.214*	-0.032	0.312*	0.313*	-0.372*	0.000	0.068*	0.295*	-0.076*	-0.076*	1.000

5. Relationship of competition and financial stability

The results of the two-step system GMM regression models assessing the relationship between Z-score (banking sector stability) and competition measures (Lerner Index and Adjusted Lerner index) while controlling for various variables are discussed in this section. The models 1 and 2 in Table 3 show regression of Z-score with the Lerner index and adjusted Lerner index. In order to handle these issues, this study adopts the instrumental variable technique and uses two step GMM estimation method. Roodman (2009) argued that the two step system GMM controls the serial correlation, heteroscedasticity and endogeneity problems and improves precision of estimates. The significance of AR (1) and the lack of significance in AR(2) suggest the existence of first-order serial correlation but its absence in the second order.

The significant and positive coefficient of L Z-score validates the choice of taking the lag of Z-score in the model. The model (1) in Table 3 represents the relationship of Z-score and Lerner Index.

The Lerner Index has a coefficient of -3.364, indicating a significant negative association with Z-score. It highlights that any decrease in the level of market power or increase in the level of competition enhances stability because the higher value of Lerner index represents less competition. The results portray that a decrease in competition also reduces the variation of the standard deviation of returns. According to the quiet life hypothesis (Berger, 2009), banks tend to avoid the risk taking when there is no competition and maintain a steady stream of income. This hypothesis supports the results of the study. The results of models (1) support the risk shifting hypothesis in the emerging South Asian economies. The control variables are also part of this model, but none of them exhibit significant relationships with Z-score.

In model (2), the relationship between Z-score and the adjusted Lerner index is explored. The coefficient for adjusted Lerner is -9.981 and the relation is significant at 1%. The coefficient value of adjusted Lerner is less than the classical Lerner index due to the adjustment of efficiency in the calculations. The adjusted Lerner index also reveals the same results: any decrease in the level of market power or increase in the level of competition enhances stability.

The results from models (1-6) reveal a positive relationship between competition and the bank's Z-score and we can conclude the optimal competition is necessary for sustainable banks stability. These finding support the concept of the risk shifting hypothesis instead of the charter value hypothesis, which predicts a negative relationship between stability and competition. The hypothesis

H1 is hence accepted and H1a is rejected. These results are supported by some studies on competition and stability (Moussawi, 2022). Tran (2022) studies the relationship of concentration, capital, and stability of the banking system in the developing countries of the Asia-Pacific region. They found similar results that the competition and capital positively impact bank stability. The results suggest that the Lerner index and the adjusted Lerner index are important indicators of banking sector stability. These findings offer valuable insights into the sustainable banking sector stability and competition, highlighting the importance of market structure and competition indicators.

Table 3: The effect of Lerner index and Adjusted Lerner Index on Z-score

	(1) Z-score	(2) Z-score	(3) Z-score
L.Z Score	.034**	.045**	.023**
	(.06)	(.059)	(.065)
Lerner Index	-3.364***		
	(.839)		
Adjusted Lerner		-9.981***	
		(1.575)	
ROA	-.144***	-.143***	-.163***
	(.05)	(.051)	(.053)
NPL	.036	.022	.036
	(.028)	(.026)	(.033)
Cost to Income Ratio	-.018*	-.011	-.03**
	(.01)	(.007)	(.013)
Total Assets	.02	.014	.022
	(.029)	(.028)	(.024)
GDP Growth	-.007	-.014	-.004
	(.025)	(.024)	(.026)
Inflation	-.015	-.026	.007
	(.042)	(.038)	(.039)
Interest rate	-.033	-.017	-.074**
	(.033)	(.03)	(.033)
Year Dummy	Yes	Yes	Yes
Country Dummy	Yes	Yes	Yes
Constant	5.354***	11.289***	4.825***
	(.625)	(1.304)	(.562)
Observations	1070	1070	1070
AR(1) (P-value)	-3.34	2.36	-4.10
	(0.00)	(0.01)	(0.02)
AR(2) (P-value)	-1.80	3.35	-0.31
	(0.133)	(0.823)	(0.639)

Standard errors are in parentheses
*** p<.01, ** p<.05, * p<.1

6. Conclusion

This research work investigates the dynamic relationship between market competition and financial stability in the banks of emerging South Asian countries, i.e. India, Pakistan and Sri Lanka. The study has used secondary data of 121 commercial banks over the 2011–2021 periods. The market competition is measured with the Lerner index and adjusted Lerner index while financial stability is measured with the Z-score. Various banking and country-level control variables were used in the analysis to capture reliable results. All the models are estimated through the two-step GMM estimation method and necessary checks are applied to ensure model fitness and validation.

It is revealed that a decreased Lerner index is associated with decreased risk indicators and increased stability. The adjusted Lerner index also exhibit the same relationship with Z-score and NPL. This suggests that greater market competition can strengthen overall stability and decrease credit risk, providing evidence for the validity of the risk-shifting hypothesis. In particular, fierce competition in the banking systems of emerging economies can have a positive effect on sustainable stability, provided the economy grows sustainably.

The study carries some implications for shareholders and regulators. For shareholders, this study can provide information on the impact of an increase in competition on stability, which can help them identify the most suitable bank for investment according to their level of risk tolerance. The shareholders can influence the banks to control the risk level as proposed by the study. The results of this study can help policymakers devise policies according to the uniqueness of South Asian emerging economies for sustainable banking. For future researchers, more qualitative techniques can be used to analyze the relationship between competition and stability.

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Appendix A
Variables and their measurements

Sr#	Variable	Measurement
	Dependent Variable	
1	Stability	
1.1	Z-score	It is measured as sum of equity to total assets ratio and return on assets divided by the standard deviation of return on average total assets (Goetz 2018).
	Independent Variable	
2	Competition	
2.1	Lerner Index	Lerner index measures the difference in marginal cost and price of products (Brei et al., 2020).
2.2	Adjusted Lerner Index	It is measured by adjusting the lerner index with profitability of the firm.
	Control Variables	Following the studies of Ngoc Nguyen (2019) , following variables are selected;
	Return on total assets (ROA)	It is calculated as net income to total assets.
	Total Assets	It is calculated as Natural log of total assets.
	Non -performing loans (NPL) ratio	Non -performing loans to gross loans ratio
	Cost to income ratio	Ratio of Total expenses to total income.
	GDP	It is calculated as Annual GDP growth rate.
	Inflation rate:	It is calculated as Consumer price index.
	Interest rate	Annual interest rate fixed by central bank