

Do Financial Stability and Competition Differ in Islamic and Conventional Banks in Pakistan? A System-GMM Approach

Muhammad Shahzad Ijaz¹

Mahnor Hanif²

Fazal Muhammad³

Abstract

Recent banking literature provides mixed results about the relationship between competition and financial stability. The franchise value paradigm supports a negative relationship, whereas the risk-shifting paradigm supports a positive relationship. This study investigates the dynamic relationship between competition and stability for Islamic and Conventional Banks (IBs and CBs) in Pakistan using the data of 38 IBs and CBs over 17 years. Bank Z-score and Lerner index are used to measure financial stability and competition, respectively. Results are estimated by employing system GMM estimator which controls the problem of endogeneity and reverse causality. The competition fragility paradigm is supported for the banks in Pakistan. The adverse effect of competition on stability is stronger for IBs. Though CBs are found to be less stable than IBs. The study has policy implications for regulators on devising the relevant competition policy. For the stance of developing Sharia-compliant banking, the study supports this rationale from the lens of banking sector stability.

Keywords: Financial stability, Bank competition, Islamic banking, Z-Score, Lerner index, System GMM

Introduction

Banks provide financial intermediation services that facilitate fund transfer between lenders and depositors and contributes to the stable economic system. Competition is among the drivers that researchers and policymakers find it essential for a healthy banking system. This study investigates the competition and financial stability links in Pakistan in a comparative way for CBs and IBs.

Islamic finance and banking have witnessed enormous growth since its inception in Egypt in the 1980s. Since then, Islamic countries are attempting to establish and grow Islamic financial systems. Presently, many European countries are adopting the Islamic financial system. There are 22 countries around the globe at present which are having IBs or operating with the dual banking system. The study motivates the stance of developing the Islamic financial system. The size of global Islamic financial services is increasing quickly, and this industry's assets have now amount up to \$2 trillion, of which 80% of assets are held by IBs (Reuters, 2018). Maintaining the significant size of this sector and

¹ Visiting Lecturer, Arid University, Rawalpindi

² MBA Candidate, PMAS-Arid Agriculture University, Rawalpindi

³ PhD. Scholar, Université de Rennes1, Rennes, France

the fundamental differences between these two banking systems, this paper presents a comparative analysis of the association between competition and stability in dual banks operating in Pakistan.

Pakistan is among those countries where a dual banking system exists. In Pakistan, efforts were started in 1977 for financial system Islamization and Participation Term Certificates (PTCs) were issued by Mudaraba companies. Now, efforts are in place to eradicate the “Riba” from the financial system. In Pakistan, twenty-two IBs are present which are providing banking and financial services. While keeping in mind the growth of IBs in Pakistan, this study examines two important aspects of modern banking literature i.e. the bank competition and financial stability which are comparatively investigated in IBs and CBs.

Recent literature mainly focuses on various areas of IBs. For instance, efficiency in IBs (Rosman, Wahab, & Zainol, 2014), risk-taking and performance (Mollah *et al.*, 2017), regulation in IBs (Aljabrin *et al.*, 2014), and bank size and financial stability (Ibrahim & Rizvi, 2017) have been studied. With a primary focus on IBs comparative evidence, extant studies do not focus directly on competition-stability nexus. It is therefore timely to provide comparative evidence on competition-stability relationships across Islamic and conventional banks, which is still an unstudied area in the context of Pakistan. The findings of this study present significant insights into the stability of IBs in Pakistan.

This study adds to the existing literature in various ways. Our study is the first study, as per the authors’ knowledge, in the context of Pakistan that focuses on the impact of bank competition on stability. The State Bank of Pakistan (SBP) has conducted a study that estimates the degree of competition in Pakistani banks (Hanif, 2017) but its relationship with bank stability is not studied. Second, this study presents a comparative analysis of this relationship between IBs and CBS. Third, instead of using concentration measure i.e. CR3 and CR5, this study incorporates a direct measure of competition based on new empirical industrial organization as concentration ratios under the industrial organization paradigm are considered weaker measures of competition. Fourth, this study uses a dynamic approach to investigate the relationship using a system Generalized Method of Moment estimator (GMM) due to endogeneity and reverse causality concerns. As Pakistani institutions are attempting to establish the Islamic financial system, the findings are important in understanding that IBs are more stable which may increase the financial system stability and further encourages the stance for the advancement of the Islamic financial system.

After presenting the introduction, this study discusses the related literature. Then, variable construction, data, and estimation technique are explained. In the next section,

empirical findings are presented. Conclusion and recommendations are presented at the end of the study.

Related Literature and Research Focus

The literature on the link between competition and stability produces contradictory evidence, both theoretically and empirically. Two views dominate the literature on this linkage. One of them is the competition-stability view given by Boyd and De Nicoló (2005) which suggests that an increase in competition improves bank stability. While other is the competition-fragility view given by Keeley (1990) which states that increased competition results in bank instability.

Higher competition reduces bank franchise value which promotes incentives to involve in risky activities (Marcus, 1984). Keeley (1990) also indicates that banks increase their risk-taking incentives as a result of a reduction in franchise value. On the other hand, concerning the effect of competition on the risk transfer of borrowers, a different conclusion is drawn, which posits that increased competition enhance bank stability (Boyd & De Nicoló, 2005).

Ariss (2010), by using a developing countries sample finds that although banks that have high market power cause banks to take excessive risk and improve banks' profits. Tabak *et al.* (2012) examined the impact of competition on bank risk-taking from 2003 to 2008 in 10 Latin American countries. For estimation of competition, the Boone indicator is employed while the stochastic frontier is developed for measuring stability. They conclude that both the increase and decreases in competition enhance bank stability.

Craig and Dinger (2013) argue that banks which have low market power usually prefer to involve in more risky activities. In terms of cross-country analysis, Beck *et al.* (2013) found support for the competition-fragility paradigm, where Z-Score is used as an indicator of stability while competition is estimated with the Lerner index. Besides, they also reveal that competition significantly affects the stability of banks in countries where restrictions on banking activities are strict, and the credit sharing system is more effective.

Recently, Islamic banking has gained considerable attention from academic as well as professional fronts. The sharia-compliant industry has about \$2,000 M asset size worldwide at present. Iran and Sudan are the only Muslim countries where only Islamic banking exists. Excluding them, all other Muslim countries have a dual banking system. For example, 35% of Saudi Arabia's banking assets comply with sharia laws, 22% for UAE, and 20% for both Malaysia and Qatar. Hence, this sector is growing at a higher rate than conventional banking, especially following the financial crisis of 2008. There is the hope of this continuous growth in the future (The Economist, 2014).

In terms of Islamic banking and finance, Abedifar *et al.* (2015) contributed to the existing mixed empirical literature about the market power of dual banking economies. They state that although the degree of competition has been estimated by numerous studies, its effect has not been studied separately for Islamic and conventional banks. Their study comparatively analyzes the association between stability and market power of banks across Islamic and conventional banks. They found that there is no difference in the competitiveness, efficiency, and level of riskiness of Islamic and conventional banks although IBs tend to be less risky as compared to CBs. Bushman, Hendricks, and Williams (2016) use an instrumental variable approach to investigate the relationship between risk-taking and competition. Their study shows that greater competition is related to higher bank risk.

Kasman and Kasman (2015) noticed that during 2002–2012, competition and concentration have decreased stability and increased credit risk in Turkish banks. Čihák and Hesse (2010) present seminal work on IBs by comparatively analyzing 474 dual banks from 1993 to 2004. They conclude that size is a significant determinant of the stable banking sector. Moreover, they also find that small size banks are more stable than larger ones. IBs that are larger than CBs in size tend to be riskier.

Jiang, Levine, and Lin (2017) employ a novel approach in their study for assessing changes in the competitive pressures that an individual bank faces. They discovered that competition reduces banks' profits and the charter value. Moreover, they also reveal that greater competition increases banks' involvement in non-traditional banking services. Meslier, Risfandy, and Tarazi (2017) consider dual banking economies to resolve the issue of competition by analyzing factors affecting deposit rates in Islamic and conventional banks. Their study indicates that CBs have higher market power than IBs and have lower deposit rates.

A recent study by Kabir and Worthington (2017) observed a direct link between the stability and market power of IBs and CBs operating in 16 emerging economies during 2000–2012. However, findings are more pronounced for CBs than IBs. Leroy and Lucotte (2017) take a sample of European banks from 2004–2013 to examine competition-stability trade-off. They revealed that competition encouraged banks to take excessive risks. It nevertheless continued to foster financial stability by reducing the banks' risk.

A study conducted by Clark, Radić, and Sharipova (2018) examines the effect of competition on bank stability in transition countries of CIS found that competition-stability view prevails in CIS. Furthermore, they indicate that the supervisory power of the regulator positively impacts CIS bank stability. In the context of US banks, Goetz

(2018) found that market contestability increases banks' stability by reducing banks' probability of default, non-performing loans ratio, and increases profitability.

Danisman and Demirel (2019) explore how competition and regulation affect the stability in developed countries. They used the data of 6936 banks from 2007-2015. Their study reveals that the higher market power of banks reduces bank riskiness and supports the competition-fragility hypothesis. Albaity, Mallek, and Noman (2019) investigate the link between competition and stability in eighteen MENA countries between 2006-2015. They conclude that less competition in banks results in lower insolvency risk and higher profitability. Their findings also indicate that the competition-fragility view is more prominent in IBs than CBs.

Li (2019), by taking a sample of 22 transition countries during 1998-2016, investigates the effect of competition and banking sector reforms on bank stability. The results of the study indicate that the market power of banks is positively linked with bank fragility, while bank reform has a positive effect on the stability of banks. Findings reveal that higher activity restrictions and asset diversification positively influences bank stability. Ibrahim, Salim, Abojeib, and Yeap (2019) assess competition and risk implications post IBs penetration and CBs consolidation in the Malaysian banking sector. By comparative analysis of IBs and CBs, they conclude that the concentration of the CBs results in credit risk reduction of IBs in Malaysia.

Moudud-Ul-Huq (2020) study the link between competition, performance, and risk-taking concerning the impact of recent GFC and bank size in banks of BRICS countries during 2000-2015. This study confirms the competition-fragility view. Minh *et al.* (2020) examine the effect of bank market power on bank stability. For this purpose, they incorporate the data of 24 banks operating in Vietnam from 2008 to 2017. The findings of their study show that the lower competition in Vietnamese commercial banks results in less stability and supports the competition-stability view. Moreover, they also find that bank size positively influences bank stability.

Saif-Alyousfi, Saha, and Md-Rus (2020) assess the competition and stability nexus pre- and post-financial crises in GCC markets. They found support for both views, competition-stability and competition-fragility hypotheses, in GCC countries. Further, they also find that higher credit protection and greater regulatory restrictions increase bank risk and decrease stability in the selected countries.

Variable Construction, Data, and Estimation

Bank Competition

This study uses the Lerner index to measure competition (Li, 2019)⁴. It describes the market power of a firm composed of the firm's output price (P) and marginal cost (MC). Its value varies from 0 to 1. A higher score of index denotes greater market power or less competition. Most of the studies concerning competition used the Lerner index for measuring competition. The formula for obtaining output prices is total revenues over total assets, and the trans-log cost function is estimated for obtaining marginal costs. The lower (higher) values inclined to 0(1) indicate higher (lower) competition. Thus, an index of 0 shows perfect competition, and an index of 1 shows monopoly power.

Financial Stability and Control Variables

Following recent studies, this study adopts the Z-score ratio, as a measure for bank stability. The formula for obtaining the Z-score ratio is the additive of the Return on Assets (ROA) and equity-to-asset ratio divided by the sigma of ROA. The Z-score anticipates the distance remaining from the point of default or insolvency. Hence, a higher Z-score depicts a greater level of bank stability (Goetz, 2018). To specify the type of banks, a dummy variable is used. To construct this variable, CBs are taken as a reference category. More specifically, IBs take the value of 1 and the value of CBs is set to 0. The control variables included in our study are net interest margin (NIM), regulatory tier 1 capital adequacy ratio (CAR), bank total deposits measure (LDP), non-interest income (NII), interest income ratio (IIN), bank size (log of assets, LTA), return on equity (REQ), and capital ratio (EAR). These bank-level control variables are selected by following the work of Williams (2016), DeYoung and Torna (2013), Distinguin, Roulet, and Tarazi (2013), Laeven & Levine, (2009), Hsieh and Lee (2013), Shrieves and Dahl (1992), and Casu *et al.* (2011) and are based on their frequent use in the literature.

Sample and Data Source

The present study analyzes the bank competition and stability link in Pakistan. So, the banks working in Pakistan are the population of the study. The sample of this study consists of banks (IBs as well as CBs) working in Pakistan¹ from 1996 to 2013. Data of this study is obtained from BankScope (now available as Bank Focus) which is published by the BvD (Bureau van Dijk). The BvD database has been discontinued since December 2013. However, this study does not use the SBP data set for further years due to

⁴ See Beck *et al.*, (2013), Kasman and Kasman (2015), and Berger, Klapper and Turk-Ariss (2009) for detailed estimation using marginal cost with $mc_{it} = \frac{TC_{it}}{Q_{it}} \left[\beta_1 + \beta_2 TA_{it} + \sum_{k=1}^3 \phi_k \ln W_{k,it} + \delta_3 T \right]$ using $\ln TC_{it} = \beta_0 + \beta_1 \ln Q_{it} + \frac{\beta_2}{2} \ln Q_{it}^2 + \sum_{k=1}^3 \gamma_k \ln W_{k,it} + \sum_{k=1}^3 \phi_k \ln Q_{it} \ln W_{k,it} + \sum_{k=1}^3 \sum_{j=1}^3 \frac{\rho_{kj}}{2} \ln W_{k,it} \ln W_{j,it} + \delta_1 T + \delta_2 T^2 + \delta_3 T \ln Q_{it} + \sum_{k=1}^3 \phi_k T \ln W_{k,it} + \epsilon_{it}$

differences in the methodology of the BvD and SBP dataset. Further, SBP is encouraging the commercial bank to open Islamic windows which are prominent in the post-2013 period. At present, there are 17 commercial banks in Pakistan which are offering Islamic financial services (through dedicated branches or Islamic services counter). However, these banks report their consolidated data of all branches which may nullify the differences in the risk-taking patterns. Regarding the number of banks in the sample, we retrieve the data for all the banks from the BvD database. Following the literature (Beck, 2005), we keep those banks in the analysis for which data for at least three consecutive years are available.

Estimation Technique

This study uses a two-step System GMM technique proposed by Blundell and Bond (1998) and Arellano and Bover (1995) which can handle the endogeneity problem by using two simultaneous equations. The following equation is estimated to analyze the link between bank competition and financial stability using System GMM.

$$ZSR_{it} = \gamma_0 + \alpha ZSR_{it-1} + \gamma_1 CMP_{it} + \sum_{i=1}^8 \delta CTRLS_{it} + \varepsilon_{it} \quad (1)$$

In equation 1, ZSR is the bank Z-score (dependent variable) and measures the financial stability of banks in each year. CMP is the competition of individual banks and is calculated by using the Lerner index. This equation is estimated with a set of control variables to cater to the bank-specific factors that may cause variation in the financial stability of banks (ZSR). γ_1 is the main coefficient of interest. Its significance and sign are important for the decision about the nature of the linkage of competition and stability. ε is the random disturbance term. A dummy variable is included in equation 1 to compare the stability of IBs and CBs. The new equation with control variables is of the following form:

$$ZSR_{it} = \gamma_0 + \alpha ZSR_{it-1} + \gamma_1 CMP_{it} + \varphi_2 IBD_i + \delta_1 CAR_{it} + \delta_2 NIM_{it} + \delta_3 LDP_{it} + \delta_4 NII_{it} + \delta_5 IIN_{it} + \delta_6 LTA_{it} + \delta_7 REQ_{it} + \delta_8 EAR_{it} + \varepsilon_{it} \quad (2)$$

In equation 2, the dependent variable is bank Z-Score (ZSR) estimated over previous two years rolling window, CMP is the score of Lerner index estimated from trans-log cost function using the quantity of output, input prices and time trend (*see Annex 1 for detailed estimation*), IBD is a dummy variable where 1 represent IBs and 0 represents CBs. CAR is tier 1 regulatory capital, NIM is net interest margin, LDP shows the deposits of bank, NII shows the ratio of non-interest income, IIN shows the net interest income ratio, LTA is the natural log of assets, REQ is the return on equity and EAR shows equity to asset ratio. Further, the interactive dummy variable (DIT*CMP) is

added to the equation to analyze the competition-stability for IBs and CBs. The equation is of the following form:

$$ZSR_{it} = \gamma_0 + \alpha ZSR_{it-1} + \gamma_1 CMP_{it} + \gamma_2 IBD_i * CMP_{it} + \delta_1 CAR_{it} + \delta_3 NIM_{it} + \delta_3 LDP_{it} + \delta_4 NII_{it} + \delta_5 IIN_{it} + \delta_6 LTA_{it} + \delta_7 REQ_{it} + \delta_8 EAR_{it} + \varepsilon_{it} \quad (3)$$

The equations mentioned above are estimated in panel specification in Stata software. The decision of using System GMM over the fixed-effect model relies on the banking literature and data properties. As the dependent variable is dynamic, the use of a static panel equation may lead to biased estimation. Moreover, the data is of the short panel in which the number of cross-sections (38 banks) exceeds the number of year observations (12). System GMM estimator, for which a command is developed by Roodman (2008), is the best choice to estimate the results in such a situation. The competition may also not be a strictly exogenous variable. System GMM can easily handle this problem by using instruments and it provides strong control over the instrument matrix used in the estimation.

Results and Discussions

Results of Descriptive Analysis for IBs and CBs

Table 1 reports the results of descriptive statistics for IBs and CBs for twenty-nine conventional and nine IBs over 1997-2013. The mean difference of variables for IBs and CBs is also reported along with *t*-values. The results show that the mean Z-score value of IBs is significantly higher than of CBs. This shows that IBs in Pakistan are more stable than their conventional counterparts. On the contrary, the value of the Lerner index (*CMP*) is lower for IBs which shows that IBs exercise higher competition intensity.

Financial Stability in IBs and CBs

This section reports the results of the difference in the financial stability of IBs and CBs (Table 2) using a dummy variable. We first apply the Wu-Hausman test to test the presence of endogeneity in the data in Stata. The results of the test show the significant test value (*F*-value=16.87, *p*-value=.001) which means that endogeneity is present in the data.

Table 1: *Descriptive Statistics*

Variables	Overall Sample		CBs			IBs			Difference	
	Mean	SD	Mean	SD	Obs.	Mean	SD	Obs.	IB-CB	<i>t</i> -stat
ZSR	28.89	242.4	10.59	22.71	186	25.9	13.72	37	15.31	8.0***
CMP	.23	.13	.122	.121	183	.035	.026	40	-.087	13.1***
IBD	.16	.37	.00	.00	184	1.00	.00	39	-	-
CAR	11.67	7.58	9.53	6.95	183	26.48	24.72	40	16.95	6.3***
NIM	4.25	2.58	4.82	23.60	185	23.72	52.23	38	18.9	3.2***

LPD	2665	5641	1795	5028	183	1217	764	40	-578	-3.0***
NII	27.89	23.90	36.34	32.48	184	24.71	28.90	39	11.63	-3.2***
IIN	2632	3726	2175	3432	185	332	521	38	-1843	10.2***
LTA	11.52	1.35	10.93	1.73	185	9.33	1.60	38	-1.6	-8.3***
REQ	.38	2.82	.53	6.20	183	1.43	8.05	40	.900	.966
EAR	9.21	1.22	8.45	1.61	183	7.74	1.08	40	-.71	-5.0***

This table shows the results of descriptive statistics for the full sample, IBs, and CBs. ZSR is bank Z-Score, CMP is the Lerner index, IBD is a dummy variable where 1 represents IBs and 0 represents CBs, CAR is tier 1 regulatory capital, NIM is net interest margin, LDP is the deposits of bank, NII is the ratio of non-interest income, IIN is the net interest income ratio, LTA is the natural log of assets, REQ is the return on equity and EAR is the capital ratio.

Table 2: *Financial Stability in IBs and CBs*

Variables	β	Std. Error	t-Stat
ZSR (-1)	2.124***	.614	3.460
CMP	5.915**	2.717	2.177
IBD	8.692**	4.449	1.95
CAR	6.165	3.910	1.577
NIM	1.591*	.952	1.671
LDP	.105**	.046	2.274
NII	-1.511	4.756	-.318
IIN	.412**	.184	2.234
LTA	9.231	5.773	1.599
REQ	6.903**	2.931	2.356
EAR	-1.494*	7.336	-.019
C	2.619	1.885	1.389
No. of banks	38	GMM Instruments	1-3
No. of Obs.	233	IV Style	19
Wald test	10.042	p-value	.000
AR (2) test	1.24	p-value	.193
Hansen Stat	43.689	p-value	.273

This table shows the results of equation 2 using system GMM. In this estimation, the dependent variable is the bank Z-score. ZSR(-1) is the lag value of bank Z-Score, CMP is the Lerner index, IBD is a dummy in which 1 represents IBs and 0 represents CBs, CAR is tier 1 regulatory capital, NIM is net interest margin, LDP is the deposits of bank, NII is the ratio of non-interest income, IIN is the net interest income ratio, LTA is the natural log of assets, REQ is the return on equity and EAR is the capital ratio; *** p<.01, ** p<.05, * p<.1

In Table 2, the lag dependent variable is significant at 1% level and shows the persistence of financial stability. The coefficient of Islamic Bank Dummy (IBD) is positive and significant at 5% level. These findings show that IBs are more stable as compared to CBs in terms of Z-score and consistent with the study of (Abedifar *et al.*, 2015). This may be due to the different business model of IBs which follow Sharia-compliant mechanism. The competition variable (Lerner index) is also significant at the 5% level which highlights the overall importance of competition for the whole sample. Table 2 also reports the diagnostics of the GMM estimator. Both the Hansen test and AR(2) test are insignificant which shows the validity of the instrument matrix and absence of serial correlation in the error term at second order.

In Table 2, the capital assets ratio shows a negative relationship with bank stability meaning that higher capital requirements may destabilize the banks. Generally, this relationship is assumed to be positive. This study finds contrasting results. There are other theories (Koehn & Santomero, 1980) that explain the negative relationship due increase in portfolio risk with the increase in bank capital. Besanko and Kanatas (1996) also supported this view and have argued that the reduction in moral hazard due to higher capital requirements is offset by the costs associated with the insiders as their ownership is diluted with an increase in the capital level. Recently, Anginer and Demirguc-Kunt (2014) have observed a negative relationship between capital and bank stability.

Bank Competition in IBs and CBs and Financial Stability

This section reports the results of the competition-stability relationship for IBs and CBs using an interaction term of competition measure and IBs dummy (*IBD*CMP*).

Table 3: *Bank Competition in IBs and CBs and Financial Stability*

Variables	β	Std. Error	t-Stat	p-value
ZSR (-1)	2.567**	.663	3.87	.034
CMP	5.42**	2.414	2.246	.026
IBD*CMP	1.211**	.597	2.028	.031
CAR	.689*	.394	1.746	.083
NIM	1.544*	.906	1.704	.090
LPD	.103**	.044	2.344	.020
NII	-1.169	4.577	-.255	.799
IIN	.401**	.174	2.302	.023
LTA	9.526*	5.671	1.680	.095
REQ	6.699**	2.752	2.434	.016
EAR	-1.896*	7.076	-1.964	.051
C	4.200	1.818	2.311	.182
No. of banks	38	GMM Instruments	1-3	
No. of Obs.	233	IV Style	21	
Wald test	12.042	p-value	.000	

AR (2) test	1.974	<i>p</i> -value	.253
Hansen Stat	29.643	<i>p</i> -value	.226

This table shows the results of equation 3 using system GMM. In this estimation, the dependent variable is the bank Z-score. ZSR(-1) is the lag value of bank Z-Score, CMP is the Lerner index, IBD*CMP is the interactive term of IBs dummy and competition variable, CAR is tier 1 regulatory capital, NIM is net interest margin, LDP is the deposits of bank, NII is the ratio of non-interest income, IIN is the net interest income to gross revenue ratio, LTA is the natural log of assets, REQ is the return on equity and EAR is the capital ratio; *** $p < .01$, ** $p < 0.05$, * $p < .1$

In Table 3, the coefficient of CMP is positive and significant at 5% level. It shows that the increase in market power (or lower competition) upturns the stability of banks, which favors the competition-fragility view of this relationship. Our findings are empirically consistent with studies of Bushman *et al.* (2016) and Moudud-UI-Huq (2020). The coefficient of the interaction term is positive and significant at 1% level. This coefficient shows that competition has a stronger impact on stability for IBs. More specifically, an increase in competition (lower Lerner index) reduces the stability of IBs more as compared to CBs which is empirically supported by Čihák & Hesse (2010). This may be due to the fact that IBs exercise less market power. Post-diagnostics of system GMM shows the valid use of estimator as the Hansen test and AR (2) test are insignificant.

Robustness Checks

This study also assesses the robustness of the results presented in Tables 2 and 3. In doing so, we use a three-year rolling window to calculate the Z-scores. Instead of relying on the authors' calculation, we use the Lerner index data provided by the World Bank (from Global Financial Development Database) in this analysis. We adopt a single-step and two-step GMM procedure to estimate the results. Careful examination of the results shows that the results of equations 1 and 2 do not suffer much from these variations⁵.

Conclusion and Recommendation

Prior studies on Islamic and general banking mainly revolve around the competition-stability trade-off. For Pakistani banks, however, no study addresses this gap. Besides, a comparative study on this relationship across IBs and CBs is a demanded issue. This paper answers these questions and dynamically analyzes and contrasts the financial stability and banking competition of IBs and CBs in Pakistan. For this purpose,

⁵ We do not report these results. These results may be obtained by writing an email to corresponding author.

this study considers data of 38 banks (29 CBs and 9 IBs) of Pakistan over 1996-2013. A two-step system GMM estimator is used to estimate the results. Hansen test and AR(2) diagnostic tests indicate the validity of this estimator. We also employ a dummy variable to assess the stability of IBs and conventional counterparts. IBs are found to be stable than conventional counterparts. Besides, to assess the effect of competition on the stability of IBs and CBs, an interaction term is used. Although overall results indicate an adverse effect of competition, the stability of IBs is more adversely affected by increased competition. Mean Z-score and Lerner values indicate that IBs are more stable and competitive than CBs.

This study makes a valuable contribution using a direct proxy measure of bank competition in Pakistan. The result provides the regulators with useful information to decide on devising the relevant competition policy. The regulator must carefully oversee the competition condition in the dual markets which will help to limit risk-taking and improve the stability of the financial system. For the stance of developing Sharia-compliant effectively. It will complement CBs on the one hand while it may also increase financial inclusion on the other hand.

Future studies may investigate the link between competition and stability for IBs and CBs along with window-CBs (which are the CBs that are operating Islamic windows to provide Islamic financial services) using recent data. Future studies may consider the use of the Boone indicator or H-statistics to measure competition. This study uses Z-score to measure financial stability which is an accounting measure of financial stability. The use of market-based measures (e.g. VaR, PD, DD, S-RISK) to measure financial stability is an important area for future research.

References

- Abedifar, P., Ebrahim, S. M., Molyneux, P., & Tarazi, A. (2015). Islamic banking and finance: Recent empirical literature and directions for future research. *Journal of Economic Surveys*, 29(4), 637–670.
- Albaity, M., Mallek, R. S., & Noman, A. H. M. (2019). Competition and bank stability in the MENA region: The moderating effect of Islamic versus conventional banks. *Emerging Markets Review*, 38, 310–325.
- Anginer, D., & Demirguc-Kunt, A. (2014). *Bank capital and systemic stability*. The World Bank.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2006). Bank concentration, competition, and crises: First results. *Journal of Banking & Finance*, 30(5), 1581-1603.
- Beck, T., De Jonghe, O., & Schepens, G. (2013). Bank competition and stability: Cross-country heterogeneity. *Journal of Financial Intermediation*, 22(2), 218–244.
- Berger, A. N., Klapper, L. F., & Turk-Ariss, R. (2009). Bank competition and financial stability. *Journal of Financial Services Research*, 35(2), 99–118.
- Besanko, D., & Kanatas, G. (1996). The regulation of bank capital: Do capital standards promote bank safety?. *Journal of Financial Intermediation*, 5(2), 160-183.
- Boyd, J. H., & De Nicoló, G. (2005). The theory of bank risk taking and competition revisited. *Journal of Finance*, 60(3), 1329–1343.
- Bushman, R. M., Hendricks, B. E., & Williams, C. D. (2016). Bank Competition: Measurement,

- Decision-Making, and Risk-Taking. *Journal of Accounting Research*, 54(3), 777–826.
- Casu, B., Clare, A., Sarkisyan, A., & Thomas, S. (2011). Does securitization reduce credit risk taking? Empirical evidence from US bank holding companies. *European Journal of Finance*, 17, 769–788.
- Čihák, M., & Hesse, H. (2010). Islamic Banks and Financial Stability: An Empirical Analysis. *Journal of Financial Services Research*, 38(2–3), 95–118. <https://doi.org/10.1007/s10693-010-0089-0>
- Clark, E., Radić, N., & Sharipova, A. (2018). Bank competition and stability in the CIS markets. *Journal of International Financial Markets, Institutions and Money*, 54, 190–203.
- Craig, B. R., & Dinger, V. (2013). Deposit market competition, wholesale funding, and bank risk. *Journal of Banking and Finance*, 37(9), 3605–3622.
- Danisman, G. O., & Demirel, P. (2019). Bank risk-taking in developed countries: The influence of market power and bank regulations. *Journal of International Financial Markets, Institutions and Money*, 59, 202–217.
- DeYoung, R., & Torna, G. (2013). Nontraditional banking activities and bank failures during the financial crisis. *Journal of Financial Intermediation*, 22(3), 397–421.
- Distinguin, I., Roulet, C., & Tarazi, A. (2013). Bank regulatory capital and liquidity: Evidence from US and European publicly traded banks. *Journal of Banking and Finance*, 37, 3295–3317.
- Goetz, M. R. (2018). Competition and bank stability. *Journal of Financial Intermediation*, 35, 57–69.
- Hanif, M. N. (2017). Measuring Competition in the Banking Sector of Pakistan: An Application of Boone Indicator. *Journal of Independent Studies and Research-Management, Social Sciences and Economics*, 15(2).
- Hsieh, M. F., Chen, P. F., Lee, C. C., & Yang, S. J. (2013). How does diversification impact bank stability? the role of globalization, regulations, and governance environments. *Asia-Pacific Journal of Financial Studies*, pp. 42(5), 813–844.
- Ibrahim, M. H., & Rizvi, S. A. R. (2017). Do we need bigger Islamic banks? An assessment of bank stability. *Journal of Multinational Financial Management*, 40, 77–91.
- Ibrahim, M. H., Salim, K., Abojeib, M., & Yeap, L. W. (2019). Structural changes, competition and bank stability in Malaysia's dual banking system. *Economic Systems*, 43(1), 111–129.
- Jiang, L., Levine, R., & Lin, C. (2017). Does Competition Affect Bank Risk? *SSRN Electronic Journal*.
- Kabir, M. N., & Worthington, A. C. (2017). The 'competition–stability/fragility' nexus: A comparative analysis of Islamic and conventional banks. *International Review of Financial Analysis*, 50, 111–128.
- Kasman, S., & Kasman, A. (2015). Bank competition, concentration and financial stability in the Turkish banking industry. *Economic Systems*, 44, 97–103.
- Keeley, M. C. (1990). Deposit insurance, risk, and market power in banking. *American Economic Review*, 80(5), 1183–1200.
- Koehn, M., & Santomero, A. M. (1980). Regulation of bank capital and portfolio risk. *The Journal of Finance*, 35(5), 1235–1244.
- Laeven, L., & Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics*, 93(2), 259–275.
- Leroy, A., & Lucotte, Y. (2017). Is there a competition-stability trade-off in European banking? *Journal of International Financial Markets, Institutions and Money*, 46, 199–215.
- Li, S. (2019). Banking Sector Reform, Competition, and Bank Stability: An Empirical Analysis of Transition Countries. *Emerging Markets Finance and Trade*, 55(13), 3069–3093.
- Marcus, A. J. (1984). Deregulation and bank financial policy. *Journal of Banking and Finance*, 8(4), 557–565.
- Mejia, A. L., Aljabrin, S., Awad, R., Norat, M., & Song, I. (2014). Regulation and Supervision of Islamic Banks. *IMF Working Papers*. <https://doi.org/10.5089/9781498361590.001>
- Meslier, C., Risfandy, T., & Tarazi, A. (2017). Dual market competition and deposit rate setting in Islamic and conventional banks. *Economic Modelling*, 63, 318–333.

- Minh, S. N., Hong, V. N. T., Le Hoang, L., & Thuy, T. N. T. (2020). Does banking market power matter on financial stability? *Management Science Letters*, *10*, 343–350.
- Mollah, S., Hassan, M. K., Al Farooque, O., & Mobarek, A. (2017). The governance, risk-taking, and performance of Islamic banks. *Journal of Financial Services Research*, *51*(2), 195–219.
- Moudud-Ul-Huq, S. (2020). Does bank competition matter for performance and risk-taking? empirical evidence from BRICS countries. *International Journal of Emerging Markets*.
- Reuters, T. (2018). Islamic Finance Development Report 2018. *Thomson Reuters*.
- Rosman, R., Wahab, N. A., & Zainol, Z. (2014). Efficiency of Islamic banks during the financial crisis: An analysis of Middle Eastern and Asian countries. *Pacific Basin Finance Journal*, *28*, 76–90.
- Saif-Alyousfi, A. Y. H., Saha, A., & Md-Rus, R. (2020). The impact of bank competition and concentration on bank risk-taking behavior and stability: Evidence from GCC countries. *North American Journal of Economics and Finance*, *51*.
- Shrieves, R. E., & Dahl, D. (1992). The relationship between risk and capital in commercial banks. *Journal of Banking and Finance*, *16*(2), 439–452.
- Tabak, B. M., Fazio, D. M., & Cajueiro, D. O. (2012). The relationship between banking market competition and risk-taking: Do size and capitalization matter? *Journal of Banking and Finance*, 3366–3381.
- Turk Ariss, R. (2010). On the implications of market power in banking: Evidence from developing countries. *Journal of Banking and Finance*, *34*(4), 765–775.
- Williams, B. (2016). The impact of non-interest income on bank risk in Australia. *Journal of Banking and Finance*, *73*, 16–37.

ⁱ Twenty nine conventional banks include Allied Bank Ltd, American Express Bank Ltd (Pakistan Branches), Askari Bank Ltd., Atlas Bank Ltd., Bank Al Habib, Bank Alfalah Ltd., Bank of Khyber, Bank of Punjab, Faysal Bank Ltd., First Dawood Investment Bank Ltd., First Women Bank Ltd., Habib Bank Ltd., Habib Metropolitan Bank Ltd., Indus Bank Ltd., JS Bank Ltd., KASB Bank Ltd., MCB Bank Ltd., Mybank Ltd., National Bank of Pakistan, NIB Bank Ltd., PICIC Commercial Bank Ltd., The Royal Bank of Scotland Ltd., Samba Bank Ltd., Silk bank Ltd., Soneri Bank Ltd., Standard Chartered Bank (Pakistan), Summit Bank Ltd., Union Bank Ltd., and United Bank Ltd. Nine Islamic banks include Albaraka Bank (Pakistan) Ltd., Albaraka Islamic Bank BSC - EC (Pakistan Branches), BankIslami Pakistan Ltd., Burj Bank Ltd., Dubai Islamic Bank Pakistan Ltd., First Habib Modaraba, First National Bank Modaraba, Meezan Bank Ltd., and Standard Chartered Modaraba.