COMPETITION AND RISK TAKING BEHAVIOR OF BANKS: NEW EVIDENCE FROM MARKET POWER AND CAPITAL REQUIREMENTS

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Abstract

The relationship between competition and banking stability has resulted in two opposing paradigms; competition-fragility view suggests that increased competition erodes market power and encourages banks to take excessive risks. In contrast, the competition-stability view suggests that, low competition results in more market power which may encourage the banks to charge higher loan rates adversely affecting borrowers by risk shifting mechanisms. Given these opposing predictions in the literature, this study aims to test the two views, considering the effects of market power and capital requirements on the riskiness of Pakistani banks. Utilizing annual data for 30 banks over the period of 2004 to 2017, in a dynamic two step system GMM. We construct Lerner index as a direct measure of market power for the banking industry. Our findings support the competition stability paradigm in the case of Pakistan. We also find that the theoretical link between capitalization ratio and market power is sufficiently strong and should be encouraged as greater capital buffers reduce risk exposure.

Keywords: Banking Stability, Capital Adequacy, Competition, Lerner Index, Market Power.

JEL Classification: G210, G320

Introduction

Given the context of banks' safety and soundness, the relationship between competition and stability has long been debated. Several studies have shed light on the said nexus, however the evidence is largely contentious and inconclusive. There are two predominant and contrasting hypotheses which view the relationship between competition and stability in different ways (Berger et al., 2009; Cihák et al., 2006). One is the competition-stability and the other is competition-fragility view.

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The competition-stability view mainly draws from Boyd and De Nicolo (2005), who suggested a tradeoff between risk and incentive mechanisms of banks. Less competitive markets, allow banks to exercise *market power* enabling them to charge higher rates and earn more as their markets become concentrated, which in turn may become difficult for the borrowers to pay off. Thus making it riskier. To supplement higher rates, borrowers tend to undertake risky projects, resulting in increased defaults. More borrowers' defaults affect banks' solvency through risk shifting mechanisms (Stiglitz & Weiss, 1981) and adds on to the fragility of the entire financial system.

In contrast, the competition-fragility view, advocates that due to higher level of competition banks' margins and market power are eaten away, which in turn induce the banks to take on risky projects thus adding into fragility (Keeley, 1990; Marcus, 1984; Matutes & Vives, 2000). Following the seminal work of Keeley (1990), several studies indicate that higher competition results in enhanced moral hazard in banking system and thus it is suggested that less competitive and relatively more concentrated banking conditions are expected to be relatively stable (Martinez-Miera & Repullo, 2010; Jiménez et al., 2013).

In short, the literature largely provides mixed evidence that whether competition and stability are positively or negatively linked. However, it's worth noting that, the said relationship is largely investigated for advanced economies, and very little attention has been paid towards developing and emerging economies. Kasman and Kasman (2015) argues that financial liberalization, deregulation and large scale restructuring across markets have changed the competitive landscape in banking, both in developed and developing economies; forcing the banks to operate on low profit margins and eroding market power. Similarly , Sarkar and Sensarma (2016) argues that since, emerging economies are rapidly undergoing drastic structural changes, it has become extremely challenging for the policy makers to maintain stability. Hence it is imperative to understand the wide ramifications of competition stability and or fragility nexus as any such aggravation can pose systemic risk.

To fill that gap, our study contributes in several ways. First, we investigate the competitive conditions for banks in Pakistan. *Second,* we apply a structural neo-organizational approach for the first time in a country specific settings by estimating Lerner Index as a direct measure of market power by following Berger et al. (2009) and Forssbaeck and Shehzad (2015).

The construction of the Lerner index for Pakistani banks in itself is a contribution as to the best of our knowledge, to date, no such attempt has been made except that of World Bank (2011). The only closely relevant study is that of Mirza et al. (2016) who measures the degree of competition for Pakistani banking sector with Hall-Roeger indicator, Panzer-Rosse's H-statistics, the Boone's indictor and Bresnahan-Lau procedure over 2004 to 2012. Similarly, Khan and Riazuddin (2009) assessed the degree of competition for the banking industry of Pakistan using only the Panzer-Rosse H-Statistic. Similarly, another effort by Afzal and Mirza (2010) measures market power in terms of banks' market

share. However, they still fall short to construct Lerner index as a direct measure of market power. In short this is a major gap and is intended to be traversed in the current study. *Third,* we use two different sets stability measures to have a comprehensive understanding of competition stability and or fragility nexus for Pakistani banks. *Fourth,* we introduce the capital adequacy as a policy framework in the competition-risk framework for Pakistani banks.

Literature Review

The extant literature on competition stability and or competition fragility is comprised of both theoretical and empirical studies and by large produces inconclusive and contrasting evidence.

Competition Fragility Hypothesis: A broader interest in the competition-stability and or fragility nexus has been introduced by the seminal work of (Keeley, 1990), who was the first to address the issue both theoretically and empirically under the auspices of the *charter value hypothesis,* which posits that greater competition erodes market power by reducing charter value which in turn may induce banks to take excessive risks, exacerbating moral hazard and adverse selection and resultantly increases the probability of banks' failures. However, if banks have certain degree of market power and hence positive charter value, they may not have higher incentives for excessive risks. Hence bankers will be more prudent in in this way (Beck, 2008; Kasman & Kasman, 2015). Similarly, Edwards and Mishkin (1995) links excessive risk taking by US banks during 1980s to the erosion of their profit margins due to high competition which suppressed their cost advantage in acquiring deposits with undermined position in loan markets (Carletti & Hartmann, 2002). Moreover, Boot and Greenbaum (1995) argues that highly competitive banking markets restricts banks' informational rents resulting from their relationships with borrowers. This bank-depositors' relationship framework has been extensively explored by (Besanko & Thakor, 1995) and show that increased competition leads to the selection of riskier portfolios. The same idea has also been echoed by (Allen & Gale, 2000, 2004), who supports the charter value hypothesis by adopting an agent based model and concludes that less concentrated banking systems are more likely vulnerable to financial crises.

Similarly, Beck (2008) sheds light on the positive link between market power and stability that in highly competitive markets, banks face greater pressure to maintain their profits as compared to systems where entry is restricted with relatively low competition resulting in better profit opportunities. Thus making risk taking relatively unattractive since banks have fewer incentives to gain, therefore affecting financial stability positively. In this way, to preserve financial system's stability, higher competition has to be restrained. Arguably, the theoretical literature in this realm has been supported by other numerous theoretical studies including (Caminal & Matutes, 2002; Carletti et al., 2007) among others.

Competition Stability Hypothesis: Despite the fact that the charter value hypothesis has got significant support, yet existing theoretical studies by and large produce mixed results. Boyd and De

Nicolo (2005) were among the first to question the competition fragility hypothesis and proposed the competition stability hypothesis. They argue in favor of a positive relationship between competition and stability and take that low competition in banking provides opportunities for banks to exercise market power and to charge higher loan rates. These higher loan rates may increase default probability by inducing borrowers to assume higher risks due to moral hazard and adverse selection issues, leading to a more fragile banking system.

However, Boyd et al. (2009) does not confirm their previous findings by assuming that banks also hold a risk free asset. Moreover, they further suggest that borrowers' default is highly correlated with bank failure. Similarly, (Martinez-Miera & Repullo, 2010) argue that since competition negatively affects interest income thus higher correlation between borrowers' default and bank failure may not necessarily be true. More recently, Arping (2014) presents a puzzling condition by setting a model where banks are shown as relatively more reluctant towards excessive risk in competitive conditions. They show that during greater competition, banks face high risk of failures as their profit margins decline. In such conditions banks tend to reduce their risk taking yet at the same time their risk profile worsens as a result of the direct destabilizing effects of reduced margins. This situation further erodes their capital buffers which leads to contrary implications that the competition effects on risk taking and on risk of failure may move in opposite directions. They conclude that heightened market power spur more aggressive risk taking by increasing the banks' risk appetite. Making the effect of market power, thus more ambiguous and puzzling.

In the context of developing economies, (Ariss, 2010) models to examine how different degrees of market power affect banks' efficiency and stability and reports that greater degree of market power not only enhances banks' stability but also enhances profit efficiency. Similarly, (Yaldiz & Bazzana, 2010) provides support in favor of competition stability for the Turkish banking system by investigating the role of market power on loan risk and overall bank risk. However, another recent evidence for Turkish economy comes from (Kasman & Kasman, 2015) who took into account the effects of concentration and competition on financial stability using the Boone indicator and an efficiency adjusted Lerner index for market power while proxying Z-index and NPL as stability measures. They also allow for non linearities and produce evidence in favor of competition fragility.

Though emerging economies have had very little attention in the literature, however, still a number of contributions are documented. For instance, (Soedarmono et al., 2013) accounts for the effects of Asian crisis for emerging economies in Asia and finds association between holding higher levels of capital and greater degree of market power and higher insolvency ratios. They further suggest that during the crisis periods, market power had stabilizing effects on Asian banks. A similar context was also reported by (Soedarmono et al., 2011) taking into consideration the question of moral hazard for Asian banks. However, they find that greater market power is associated with greater instability albeit the fact that banks are relatively better capitalized in less competitive conditions yet their default risk is higher. More recently , Apergis (2015) takes the effects of the recent global finan-

cial crisis for a panel of emerging economies by utilizing the (Panzar & Rosse, 1987) H-Statistic, and provide support for monopolistic competition. Moreover, Zhang et al., (2013) examines the relationship between concentration, stability and performance for BRICS countries.

For the Indian banks, recently Sarkar and Sensarma (2016) tests the validity of the charter value paradigm and the Boyd & De-Nicolo framework and found that the relationship is relatively more subtle than straightforward. On the one hand they report concentration positively affecting, default, and asset and market risk but on the other, concentration is also positively affecting capital buffers, suggesting that increased competition may deteriorate capital buffers as safety cushion for Indian banks.

From the perspective of Pakistan, the only closely relevant study is that of (Mirza et al., 2016) who investigated the competitive condition for the banking industry of Pakistan with a variety of structural and non-structural measures like the (Panzar & Rosse), (Bresnan & Lau), (Hall & Roeger) and the Boone's indicator. They suggest that Pakistani banking industry is quiet competitive. However, they only account for the prevailing competitive conditions in Pakistani banking industry and do not take into account the risk taking behavior and or stability/fragility notion in the case of Pakistan.

Though in the light of the most of the literature, it is still hard to draw any strong and conclusive deduction. In summary, both the theoretical and empirical literature appears to be divided into two distinct paradigms. One can easily narrow down these dimensions to one that covers the negative relationship under the auspices of charter value paradigm with high competition and low market power. Whereas the other, that comes with the notion that less competition and more market power may undermine stability under the risk shifting paradigm. A possible reason for such extensive heterogeneity in the literature is that the market power-stability-fragility nexus is extremely complex and highly case dependent. Which warrants further investigations to bring into light the opaquer issues in conjunction to market structure and financial stability. There is apparently no clear consensus and neither any compelling theoretical nor any robust empirical evidence to conclude that whether competition leads to fragility or promotes stability.

Tools and Methods

Dependent Variables: Risk Measures

Liquidity Risk: As per the *'Theory of Financial Intermediation,* banks are considered as financial intermediaries, pooling deposits and lending these to create loans (Werner, 2016). Under this theory, banks are also responsible for the creation of liquidity. In the words of (Dewatripont et al., 2010), liquidity is created (by banks) by borrowing short and lending long. This mismatch of maturity timings sometimes creates a potential problem of liquidity risk, which arises when a firm is unable to

meet its liabilities upon becoming due. Furthermore with the implementation of Basel III accord, liquidity risk in particular has received much interest, due to its importance during periods of crises alluded to the fact that banking activity is largely characterized by this key risk (Tanda, 2015). Given this, we adopt the ratio of liquid assets to total assets, where higher ratio indicates lower liquidity risk and vice versa (Bourkhis & Nabi, 2011; Demirgüç-Kunt & Huizinga, 2004; Hussein, 2010; Sarkar & Sensarma, 2016).

$$LiquidityRisk = \frac{LiquidAssets}{Totalassets} \quad \text{.....(1)}$$

Default Risk: Also known as solvency risk, is widely captured in the banking literature by Z-Scores. Unlike liquidity risk, Z-Score indicates the overall bank risk (Abedifar et al., 2013; Bakkar et al., 2016; Cabrera, 2016; Čihák & Hesse, 2010; Kasman & Kasman, 2015). Z-scores are calculated taking accounting based asset returns and equity's volatility as given below;

$$Z_{it} = \frac{ROA_{it} + \left(\frac{E}{TA}\right)_{it}}{\sigma ROA_{it}} \quad \text{.....(2)}$$

Where *ROA* is the accounting measure of return on assets and *E/TA* is the equity ratio for bank *i* at time *t*. Whereas σ*(ROA)* is the standard deviation of *ROA*. The scores combine profitability, leverage and volatility in returns given by its *ROA, E/TA* and σ*(ROA)* respectively and indicates the distance in terms of the number of standard deviation of return on assets a bank is far from solvency and the likelihood of failure (Boyd & Runkle, 1993; De-Nicolò, & Jalal, 2006). A higher Z-score suggests greater stability and lower probability of insolvency and vice versa.

Explanatory Variables

Measuring Market Power: Market power is a reflection of a firm's ability to set prices above its marginal cost (Williams, 2012). A common practice to measure market power in the banking industry is the Lerner index which is been extensively used in the banking literature and indicates the relative price difference between marginal cost scaled by the price of a firm's output and is therefore inversely related to competition (Forssbaeck & Shehzad, 2015). The Lerner index has got several advantages over its peers such as the Panzer and Rosse H-Statistic and the Boone indictor that it measures market power at the bank year level. Furthermore, (Iveta, 2012; Rojas, 2011) indicates that Lerner index illustrates the behavioral departure point for imperfectly competitive markets from the benchmark of perfect competition. The index ranges from 0 to 1, with 0 means perfect competition and 1 indicating monopoly representing the conjectural variations of elasticity of the total banking output in terms of the output by Bank *i* (Soedarmono & Tarazi, 2014). It is expressed as inverse of the

price elasticity such as;

$$Lener = \frac{(P_{it} - MC_{it})}{P_{it}} \quad \text{.....(3)}$$

Where P_{it} indicates output prices, proxied by the ratio of total earning assets to total assets and MC_{it} are marginal costs for bank i at time t respectively. The marginal costs is derived from a translog cost function using a system of equations with respect to one output (the ratio of earning assets over total assets) and three inputs (prices for capital, funding and labor) by following (Degl'Innocenti et al., 2017; Demirgüç-Kunt & Martinez Pería, 2010; Forssbaeck & Shehzad, 2015; Williams, 2012) as;

$$lnTC = \alpha + \sum_{k=i}^{1} \beta_k ln(Y_{kit}) + \sum_{h=1}^{3} \beta_h ln(W_{hit}) + \sum_{h=1}^{3}\sum_{m=1}^{3} \frac{1}{2}\gamma_{hm} ln(W_{hit}) ln(W_{mit}) + \sum_{k=i}^{1} \frac{1}{2}\delta_k \quad \text{.....(4)}$$

The above specification indicates total cost *(TC)* as a function one output *(Y_k)* with three inputs of capital, labor and funding presented by *(W_h),* a time trend *(T)* representing technological and technical change. A set of bank level specific control variables are presented by the vector *(X_p)* which in our case is equity. We follow the stochastic frontier approach and estimate the above system as constrained linear regression with restrictions of linearity and homogeneity (Degl'Innocenti et al., 2017; Koetter, Kolari, & Spierdijk, 2012). Finally, to construct the Lerner index, the marginal costs are then derived by differentiating as given by;

$$MC_{Lit} = \frac{\partial TC_{it}}{\partial lnY_t} = \left[\begin{matrix} \beta_L + \beta_{L1} lnY_t \\ + \sum \beta_{hL}\, lnW_{hit} + \theta_L T \end{matrix}\right] \frac{TC_{it}}{Y_t} \quad \text{.....(5)}$$

Capital Adequacy Ratio

Capital adequacy ratio is a measure of banks' capital buffer against contingent losses (Afzal, 2015). Banks having higher capital buffer are considered less risky as higher capitalization provides with a safety cushion and makes the banks less vulnerable to negative shocks. We consider capital adequacy ratio as a measure of regulatory framework, as every bank is required to maintain a healthy CAR (minimum 11.3% as of December 2017 in the case of Pakistan) as per regulatory mandatory minimum capital requirements under the auspices of Basel Committee for Banking Supervision

(BCBS) and Basel accords. The association between risk taking and capitalization ratio is well documented in literature (for instance see (Haq et al., 2016;) and (Tanda, 2015) for a comprehensive review). Moreover, we consider banks' CAR for its potential effects on bank lending behavior and as a potential indicator of capital crunch issues (Soedarmono & Tarazi, 2014). Following the BCBS guidelines we estimate CAR as follows;

$$CAR_{it} = \frac{ln(CapitalBase)_{it}}{ln(RWA)_{it}} \quad \text{.....(6)}$$

Whereas the capital base indicates the sum of Tier-I and Tier-II capital while RWA indicates risk weighted assets.

Control Variables: To control for different bank specific characteristics, we include natural log of total assets to control for size and possible heterogeneity arising from economies of scale. Similarly, heterogeneity arising from profitability is controlled for by return on assets (ROA). Whereas a macroeconomic control variable in the form of real GDP growth rate is also included to control for business cycle variations. As we believe that risk related measures of banks are pro-cyclical, thus a macroeconomic control variable is necessary and important. 2.3

Empirical Research Design and Econometric Specifications

In order to test the relationship between market power, riskiness of Pakistani banks and capital requirements, we set up a general model to specify the relationship as follows;

$$Risk_{it} = \alpha_{it} + \beta_1 MP_{it} + \beta_2 CAR_{it} + \sum_{i=1}^{k} \beta_{3+i} (BankSpecificControl)_{kit} + \sum_{j=1}^{m} \beta_{4+m} (Macro - LevelControl)_{mit} + \varepsilon_{it}, \quad \text{.....(7)}$$

Where, MP presents the measures for market power, i.e. the Lerner index, CAR indicates the capitalization ratio. Bank specific control include, bank size and ROA whereas macroeconomic control include business cycle proxied by real GDP growth rate as in (Kasman & Kasman, 2015). Finally, risk indicates distress indicators for liquidity and default risk. Whereas the εit is the stochastic disturbance term that is believed to be white noise and is expressed under the assumptions as;

$$\varepsilon_t \; IID(0, \sigma^2) \quad \text{.....(8)}$$

Equation (10) summarizes that ε_t should be independently and identically distributed

(Aleemi & Azam, 2015; 2017).

Estimation Methodology: We employ dynamic panel data methods to cater for several issues such as simultaneity, endogeneity and unobserved biases from bank level heterogeneity. Further, dynamic panel models are also appropriate to cope with the issues of reverse causality that may arise between dependent and explanatory variables. To cope with these and other such potential issues such as elimination of serial correlation, several studies adopt dynamic models such as Dynamic Ordinary Least Squares (DOLS), Instrumental Variables Regression and Two-Stage Least Squares (2SLS) methods with instrumental variables. However, (Hall, 2005) has shown that these techniques are not that much robust as they do not account for heteroscedasticiy. (Baum et al., 2003) calls it an omnipresent issue in empirical research and suggests taking advantage of the GMM's orthogonality conditions to cater for heteroscedasticiy of unknown form. Thus in this study we follow the procedures outlined by (Arellano & Bover, 1995) and (Blundell & Bond, 1998) and employ a two-step system Generalized Method of Moments (GMM) technique.

The System GMM is an extension of the standard GMM approach proposed by (Arellano & Bond, 1991). Furthermore, (Hall, 2005) argues that system GMM is more efficient than 2SLS as it accounts for heteroscedasticiy and is free of the requirements for distributional assumptions about the error term, which in many cases could be a huge advantage. Moreover, the system GMM is shown by (Baltagi, 2008) to produce more precise and efficient estimates compared to the standard GMM and helps to reduce biases and precision issues by way of differencing variables.

The system GMM is first estimated in levels and then in differences by including lagged explanatory variables as instruments. The right hand side variables in a system GMM are considered as endogenous variables and are allowed to orthogonally adopt their first differenced lags as instruments. Following (Kasman & Kasman, 2015) we include a lagged explanatory variable for bank stability measures. As a relatively unstable bank is likely to exhibit distress in the following period which is an indication of the persistency in bank risk taking behavior.

Finally, to test the stability and goodness of fit of our estimated models, we apply the Hansen-J Test and AR (2) test to check for the over identifying restrictions and second order correlation respectively. When both the Hansen-J test and the AR(2) tests are insignificant at a given level of confidence interval, show the validity that the identifying restrictions are valid and that second order correlation among first-differenced errors do not exist respectively.

Sampling and Data

Our sample period comprises of the post reforms era and spans from 2004 to most recent 2017 whereby the regulatory, supervisory and disciplinary requirements of Basel II accord was adopted in Pakistan. Data is collected from the official annual financial statements for 30 scheduled banks

during the period.

Findings

Lerner Index

The mean annual Lerner index are reported in Table 1 and their evolution through the sampled period is depicted in Figure 1. A great advantage of Lerner over other measures of competition and market power is that it provides a direct measure of pricing power per year at bank level.

Table 1:
Lerner Index over the sampled period

Year	Lerner
2004	0.434
2005	0.531
2006	0.515
2007	0.549
2008	0.613
2009	0.657
2010	0.632
2011	0.617
2012	0.623
2013	0.596
2014	0.556
2015	0.492
2016	0.414
2017	0.381

Consistent with theory, the mean Lerner index indicate competitive conditions in Pakistani banking industry. Overall, the industry witnessed slight to moderate improvement in terms of market power (from 0.434 in 2004 to 0.381 in 2017). On average, the industry remained to be monopolistically competitive during the entire sampled period that could be alluded to the higher level of concentration and amalgamations and stringent monitoring of SBP. The intuition of this line of reasoning is consistent with that of (Beck et al., 2006; Beck, 2007). Moreover, increased consolidation can potentially lead to collusion among larger banks as corroborated by (Bos et al., 2013).

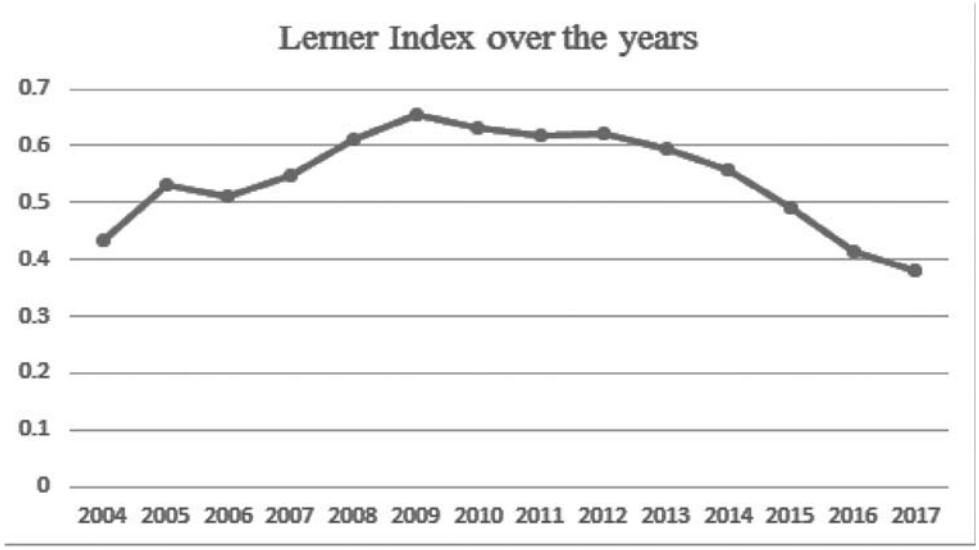

Figure 1: Evolution of Lerner Index over the years

Furthermore, our results are in line with (Bikker et al., 2007; Claessens & Laeven, 2004; Hassan, 2009; Khan & Riazuddin, 2009). In addition, the downward bias of competition levels despite multilevel deregulations and liberalization reforms, are also in line with recent empirical literature such as (2008; Bos et al., 2013; Degl'Innocenti et al., 2017; Koetter et al., 2012; Stiroh & Strahan, 2003) among others. However, these findings are in contrast with (Hanif, 2017; Mirza et al., 2016) who reports perfect competition through estimation of Panzer and Rosse H-statistic for Pakistan, to which, our results are difficult to compare if not comparable at all.

Impact of Market Power and Capital Requirements on Banking Stability

Table 3 reports findings estimated through two step dynamic system GMM, suggesting significantly positive influence of market power in case of liquidity risk whereas negative influence in terms of default risk. Indicating that increased competition results in decrease in riskiness of banks. This line of reasoning is consistent with the competition stability view.

Focusing on the liquidity risk, reveals that market power positively influences liquid assets and hence decreasing liquidity risk in the case of Pakistan. The estimated coefficients are statistically significant and consistent across specifications. These findings are in line with (Sarkar & Sensarma, 2016) who reported similar findings for Indian banks. Moreover, profitability measure is positively influencing liquidity ratio suggesting that those banks who are generating higher profits will tend to have lower liquidity problems. However, the coefficient is statistically insignificant. Similarly, coeffi-

cients for size and cycle are significantly positive indicating that large banks are having slightly higher levels of liquid assets and that these large banks may not have difficulties in meeting their obligations. Similarly, higher level of economic activity is also associated with holding slightly higher levels of liquid assets in the case of Pakistan. These findings are consistent with (Sarkar & Sensarma, 2016).

Similarly, in line with the competition stability view, market power is negatively affecting default risk. This finding is in contrast with (Forssbaeck & Shehzad, 2015) and suggests that increased competition is negatively associated with default risk. Similarly, ROA, size and cycle are negatively associated with default risk suggesting that increased profitability, enhanced economic activity and larger bank size will result in lower default risk in the case of Pakistan.

Table 2
Descriptive Statistics and Pairwise Correlations

Variable	**Mean**	**Standard Deviation**	**Maximum**	**Minimum**	**N**
LR	0.472	0.127	0.819	0.074	385
DR	2.126	3.684	28.190	-2.854	385
Lerner	0.706	0.197	0.867	-2.028	385
CAR	16.555	10.244	61.83	-4.62	385
ROA	0.378	1.943	6.430	-7.430	385
Size	18.890	1.375	21.710	15.207	385
Cycle	3.821	1.401	6.18	1.61	385

	LR	***DR***	***LL***	***CAR***	***ROA***	***Size***	***Cycle***
LR	1						
DR	0.278	1					
Lerner	0.087	0.152	1				
CAR	0.358	0.137	0.181	1			
ROA	0.305	0.676	0.287	0.399	1		
Size	0.232	0.315	0.306	0.078	0.445	1	
Cycle	0.204	0.139	0.217	0.085	0.220	0102	1

Focusing on the restraining effects of capitalization requirements on stability indicators, we postulate that risk exposure of banks will be reduced with higher capital buffers. Our results support this view suggesting that holding higher capital will significantly reduce bank's risk exposure in terms of liquidity as well as default risk. These findings are consistent with most of the relevant literature.

Moreover, for robustness purposes, we also report bank level fixed effects for both models. Where it can be clearly observed that our results largely remain unchanged and are robust across specifications with only a few exceptions. However, we prefer and go by the results of two step system GMM for its dynamic nature and properties.

Table 3
Regression Results

Dependent Variable	***Liquidity Risk***		***Default Risk***	
	GMM	***FE***	***GMM***	***FE***
Constant	-0.839	-0.928	2.789	3.440
	(0.198)*	(0.221)*	(1.817)	(1.801)***
Lerner	0.077	0.165	-2.569	-0.128
	(0.054)***	(0.068)**	(0.803)*	(0.041)*
CAR	0.037	0.004	-0.035	-0.005
	(0.001)**	(0.009)*	(0.014)*	(0.007)**
ROA	0.012	-0.008	-0.598	-0.557
	(0.009)	(0.003)	(0.138)**	(0.032)
Size	0.064	0.0519	-0.024	-0.062
	(0.010)*	(0.011)	(0.117)**	(0.090)*
Cycle	0.066	0.005	-0.188	-0.039
	(0.002)**	(0.004)***	(0.053)*	(1.801)***
F- Stat	24.96*	3.81*	97.18*	13.59*
R^2 Within		0.426		0.608
Between		0.742		0.868
Overall		0.561		0.704
AR2 Test	-0.33		-0.17	
(P-Value)	(0.742)		(0.85)	
Hansen J Test	19.28		21.22	
(P-Value)	(0.38)		(0.19)	

, ** and * indicates statistical significance at 1, 5 and 10% levels respectively. Robust standard errors are reported in parenthesis*

Finally, the estimated specifications exhibit strong goodness of fit as all of the estimated F-statistics are highly significant. Similarly, AR2 test indicates that second order correlations among first differenced errors do not exist in our estimated models. Similarly, the Hansen J-statistics is also found to be insignificant indicating that the identifying restrictions are valid.

Discussion

Given the unique services provided by the banks, soundness and stability concerns were always at the center of banking policy debates (Danisman & Demirel, 2018). In the banking literature, the tradeoff between competition and stability has resulted in two opposing views. The one advanced by (Keeley, 1990) is commonly known as the competition fragility view, which has drawn major support in the literature. On the other hand, a relatively new body of literature supports the competition stability view advanced by (Boyd & De Nicolo, 2005).

Given these opposing predictions, in this study, we tested the two views for Pakistani banking industry. Using a relatively recent annual data set (2004 to most recent 2017, a period characterized by extensive and sweeping regulatory changes, consolidations and other market pressures that could potentially alter the competitive landscape and condition banks' behavior), for an unbalanced panel of 30 banks, we used dynamic panel data analysis techniques of two step system GMM. Our findings could be summarized as follows.

The Lerner index for market power reveals that monopolistic conditions prevail in Pakistani banking industry. These dynamics could be attributed to the increased concentration and recent wave of amalgamations in the industry commensurate with the too big to fail sentiment and can have profound implications[4] as it can potentially lead to collusive practices among others (Bos et al., 2013). These findings are in contrast to (Khan & Hanif, 2017a, 2017b, 2017c; Mirza et al., 2016) who found perfect competition in the case of Pakistan utilizing various measures of competition. However, our findings are consistent with (Bikker et al., 2007; Claessens & Laeven, 2004; Khan & Riazuddin, 2009).

Subsequently, we tried to find out the effects of market power on risk measures including liquidity and default risk indicators. Our findings render support towards the competition stability paradigm of (Boyd & De Nicolo, 2005) in both cases. Suggesting that infusing further competition will lead to enhanced stability in the banking industry. These findings are consistent with (Demsetz et al., 1996; Salas & Saurina, 2003; Bofondi & Gobbi, 2003; Beck et al., 2006; Berger et al., 2009; Agoraki et al., 2011; Forssbaeck & Shehzad, 2015) among others.

Finally, we introduced capital requirements as a determinant of risk and find evidence in favor that higher capital buffers make the banks more risk averse (Keeley, 1990; Allen & Gale, 2000; Hellmann et al., 2000; Ghosh, 2009; Sarkar et al., 2016). This further imply that higher capitalization ratios should be encouraged.

[4] Recently the central bank of Pakistan designated three domestic banks to be systemically important.

Conclusion

Given that, competition stability nexus has been established in the case of Pakistan. This essentially implies that at policy level, infusing greater competition may break the monopoly power and may lead to higher stability. Our results support this view to improve the competitive conditions of banking industry by and large. In addition, we suggest to mediate the tradeoff between competition stability and or fragility with regulatory tools such as capital requirements which is found to be strongly associated with risk exposure of banks. This essentially imply that as banks will have greater capital buffer, there will be lesser stability concerns.

Limitations

Just like any other study, this study too has certain limitations. For instance we largely rely on accounting based data and ignores market based instruments for risk measures. Moreover, we did not study the underlying causes that resulted in changes in competitive conditions in the banking system. In addition, we relied on a single measure of competition only, which could be a major binding factor in terms of alternative implications. Finally we introduce all the banks into our analytical framework controlling only for size and profitability and did not differentiate between different types of banks such as Islamic and conventional banks or public, private and local and foreign banks. Similarly, we ignored Islamic banking window operations of several conventional banks which could reveal an entirely different story.

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