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THE ADJUSTED MARKET POWER, COMPETITION, AND PERFORMANCE: ISLAMIC VS CONVENTIONAL BANKS

Mudeer Ahmed Khattak[1], Mohsin Ali[2], Noureen A. Khan[3] and Fawad Ahmad[4]

[1] Iqra University Islamabad, Pakistan, mudeerkhattak@gmail.com
[2] Taylor's University, Malaysia, mohsin.ali121@gmail.com
[3] Iqra University Islamabad, Pakistan, phdnorin@gmail.com
[4] School of Business Studies, Institute of Business Administration, Pakistan, afawad2385@gmail.com

ABSTRACT

This study explores the relationship between competition and performance in a dual banking setting. More specifically, we compare whether using the Traditional Lerner index (TLI) the efficiency-adjusted Lerner index (EALI) would yield different conclusions. We take data from 2008 to 2020 and take Malaysia as a case study. Considering the nature of the dataset and the variables within, we employ the system Generalized Method of Moments. Our findings reveal contradictory results when market power is measured differently. Based on the overall sample, the models using the adjusted market power is supportive of the 'competition-stability view' while the models with TLI report evidence in favor of the 'competition-fragility view.' The Islamic banks' results support the 'competition-fragility view' when competition is measured with the efficiency-adjusted Lerner index (EALI) and the 'competition-stability view' when measured with the TLI. These findings are robust to different econometric estimators and carry important policy implications.

Keywords: Competition, Risk-adjusted performance, Efficiency, Lerner index, GMM.
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I. INTRODUCTION

It is a traditionally believed that more competition increases the availability of innovative products in the markets, thereby making them more fragile simultaneously. Competition may lead to less profitability for the banks. Therefore, to maintain profits, banks have to survive in a challenging environment by adopting risky strategies that sometimes end up with credit disappointments and instabilities. On the other hand, restricted competition leads banks to adopt secure ventures and assurance to achieve soundness.

The debate on the competition-performance nexus began in the 1980s but is still inconclusive. The contention on this very issue has divided the researchers into three dimensions. First, banking competition encourages risk-taking, the argument known as 'competition- fragility' view (Repullo, 2004; Besanko & Thakor, 1993; Soedarmono et al., 2013). Secondly, more competition encourages reduced risk-taking, which is recognized as a 'competition-stability view. The third one suggests that this nexus is nonlinear and has a U or inverted-U shaped relationship (Tabak, Fazio, and Cajueiro, 2012). All these arguments have received their respective supports from existing studies on bank competition – performance relations.

The differing impact of competition on bank profitability and banking system soundness is well-debated. In many existing studies, researchers have employed traditional competition measures like the Lerner index or concentration to proxy the market competition. The conventional Lerner index is an advanced proxy for market competition compared to concentration, but it has also been criticized widely due to its assumption of cost and price efficiency that is very unlikely (Kasman & Kasman, 2015; Koetter et al., 2012; Tan & Floros, 2018). Another critical aspect of this line of research is controlling for inefficiency since it is the major factor in the relationship between price and marginal costs. Therefore, to deal with the issues of the traditional approach, the efficiency-adjusted Lerner index (EALI) has been suggested.

The ideal setting based on the objective of this current research is to study the same relationship in a dual banking system. Since most of the studies in this area have focused on developed economies, Malaysia seemed one of the most potential economies to study the same in a dual framework. A glimpse of the Malaysian economy shows that a significant portion of the Islamic banking system is operational with Islamic subsidiaries and windows of conventional and foreign banks. Since Malaysia intends to increase the share of Islamic financing in the banking sector, the chances of an escalation in market competition are expected. Therefore, this makes it necessary to study the relationship between competition and performance in dual banking settings, especially in an economy like Malaysia.

The above inconsistencies made it worthwhile to examine the said relationship in a recognized dual-banking system like Malaysia, with different Lerner indices. We employ the TLI as well as the EALI. This study employs comprehensive data from 2008 to 2020. A significant difference in the impact is observed while employing different measures of market power. For our overall sample, the findings with the EALI support the 'competition-stability view' and contrary to these results, estimations with TLI are supportive of the competition-fragility view'. Moreover, for Islamic banks, the use of EALI results in favor of the 'competition-

fragility view' and when proxied with TLI, it supports the 'competition-stability view.' Given the contradiction in the impact of bank competition on the bank's performance (profit and risk), our findings carry important implications for market power measures. They potentially suggest that the problem might be with the assumption of complete profit and cost efficiency. Therefore, it is suggested that profit and cost efficiency should be considered or adjusted when measuring Lerner indices.

The following section offers the existing evidence; section 3 describes the data, variables, and methodology. Section 4 presents the findings, followed by the concluding remarks and policy insights.

II. LITERATURE REVIEW

The advocates of the negative association between banking sector competition and profitability assert that increasing competition decreases banks' charter values and causes a decline in bank profits. Keeley (1990) argues that a decline in the bank's profit ratios makes banks to relax screening standards for the borrowers, resulting in bad credit. Marquez (2002) contends that heightened competition scatters the borrower's information prompting increased financing expenditure and offering more benefits to the more risky borrowers. Matutes & Vives (1996, 2000) assert that increased market power reduces the probability of a bank's default. Caminal and Matutes (2002) argue that excessive competition promotes less regulated strategies for loan offerings that attract more loans, and banks may face repercussions resulting in increased risks and decreased profits.

On the other hand, the advocates of the positive association between competition and bank performance suggest that increased competition leads to reduced financing costs to the borrowers, prompting them to invest in safe modes of investments with secure activities, henceforth, more secure banks. Mishkin, (1999) asserts that governments offer compensation plans to more concentrated businesses which may lead to moral hazard, leading the banks towards a more challenging environment and making the business more fragile. By employing the TLI as a proxy for bank-specific market power, Kick and Prieto (2015) suggest that market power reduces the chances of bank panics and bank runs. Whereas employing the Boone indicators, the results report that reduced market power (increased competition) decreases the risk of default. A significant increase in market power offers higher capital generation, an unpredictable rise in salaries, and an increased danger of bankruptcy of the banks (Soedarmono et al., 2013).

Tabak et al. (2012) observe nonlinearity between competition and the risk-taking activities of financial institutions that improve financial performance. The study suggests that an average level of competition offers more risk than a low or high level. Studying Spanish financial institutions, Jiménez et al. (2013) report that diminishing trends of competition in the banking sector increase risks. With a nonlinear finding, these results align with Tabak et al. (2012). The same findings are documented by the González, Razia, Búa, & Sestayo (2017) regarding the dual banking system in the MENA region.

III. METHODOLOGY

3.1. Data and Sample

This study employs data at the bank level from 2008 to 2020, obtained from the database of FitchConnect, whereas macro-level data are from World Development Indicators. Taking Malaysia as a case study, we include 27 conventional banks and 15 Islamic banks in the sample.

3.2. Financial Performance

Several studies have used 'return on assets' and the 'return on equity' as proxies for financial performance. The net income as a percentage of total assets represents the returns on assets (ROA), while the proxy of return on equity is calculated as net income as a percentage of total equity (ROE). In this paper, we use risk-adjusted returns on assets and risk-adjusted returns on equity instead. We calculate these proxies by dividing ROA and ROE by their respective standard deviations.[1] Both of these proxies are widely utilized to proxy the financial performance of the banks in literature (Amidu & Wolfe, 2013; Demirguc-Kunt et al., 2013; Gangi et al., 2020; Stiroh & Rumble, 2006). Higher values of these two proxies reflect higher profitability. Therefore, these proxies can be compared among different bank groups, including Islamic and conventional banks. The banks' risk is proxied by the z-score that measures the deviations of the bank from its capital and captures the chances of a bank failure (Chalermchatvichien et al., 2014; Chang, 2017; Chiaramonte et al., 2015; Dima et al., 2014; Gamaginta & Rokhim, 2009)**:**

$$\text{Zscore} = \frac{Equity\ ratio + ROA}{SD\ of\ ROA} \tag{1}$$

The standard deviation of ROA (SD of ROA) used in the construction of the z-score is computed using three years rolling window. Higher values of this ratio refer to more stability or less risk. Note that, due to the skewness of the z-score, the natural log is taken.

3.3. Competition Measure

We employ two different measures to proxy bank competition, the traditional Lerner index (TLI) and the efficiency-adjusted Lerner index (EALI). The TLI is estimated in a conventional way following the studies of Kouki & Al-Nasser (2017), Louhichi et al. (2019), M. Nguyen et al. (2016), T. P. T. Nguyen et al. (2016) and Risfandy et al. (2022). However, the main weakness of the TLI is that its construction assumes both profit and cost efficiency, which is unlikely to be the case. Therefore, the EALI by Koetter et al. (2012) is also adopted for this study. The index is given by:

$$EALI = \frac{P_{it} + C_{it} - M_{it} * O_{it}}{P_{it} + C_{it}} \tag{2}$$

1 The standard deviations of ROA and ROE are based on 3-years rolling window.

In the above equation, EALI refers to the efficiency-adjusted-Lerner index; i is the bank in a year t, 'P' is the net income (Bank's profits), 'C' includes the interests and non-interest costs of the banks referring to the total costs, 'M' represents the marginal costs, and finally, 'O' reflects the total output. Stochastic Frontier Analysis (SFA) by Battese and Coelli (1995) is preferred over data envelopment analysis. The DEA analysis ignores the effect of random errors and assumes efficiency through deviations, whereas SFA is preferred due to its quality to split the error component into two. While modeling the efficiency-adjusted Lerner index, equity is also included in this study since it refers to the various characteristics of the banking sectors.

For the cost-efficient frontier, the model is given below:

$$lnC_{it} = \partial_0 + \partial_1 lnO_{pit} + \frac{1}{2}\partial_2\left(lnO_{it}^2\right) + \sum_{j=1}^{3}\delta_j\, lnI_{jit} + \gamma_1 lnE_{it} + \frac{1}{2}\sum_{j=1}^{3}\sum_{j=1}^{3}\delta_{jk}\, lnI_{jit}\, lnI_{kit} + \sum_{j=1}^{3}\gamma_j lnO_{pit} ln\, I_j + \theta_1 T + \frac{1}{2}\theta_2 T^2 + \theta_3 T lnQ_{pit} + \sum_{j=1}^{3}\sigma_j T\, lnI_{jit} + \varepsilon_j + \varphi_j \quad (3)$$

where C is total costs, O is output, I is input prices, including the prices of labor, deposits and capital, T is time trend to capture technological changes. The error term contains the impact of both ε_j, φ_j, where ε denotes the noise and φ is the inefficiency.

This research homogenizes all the factors of prices i.e. (I) and (C), that guarantee linear homogeneity. M is modeled by taking the derivative of ' C ' and is given below.

$$M_{it} = \frac{C_{it}}{O_{it}}\left(\partial_1 + \partial_2 lnO_{pit} + \sum_{j=1}^{3}\gamma_j ln\, I_{jit} + \theta_3 T\right) \quad (4)$$

As asserted by Koetter et al. (2012), profit inefficiency is a greater worry than the cost inefficiency since it creates inefficiencies in profit handling. Our main objective is to identify the bank-level competition adjusted for efficiency given that the assumption of such market efficiencies might be impractical. Therefore, we employ a substitute model that does not assume such efficiencies in the banking system. We have included profit before taxes (PBT) as a substitute dependent variable and remodeled the equation as given below.

$$lnPBT_{it} = \partial_0 + \partial_1 lnO_{pit} + \frac{1}{2}\partial_2\left(lnO_{it}^2\right) + \sum_{j=1}^{3}\delta_j\, lnI_{jit} + \gamma_1 lnE_{it} + \frac{1}{2}\sum_{j=1}^{3}\sum_{j=1}^{3}\delta_{jk}\, lnI_{jit}\, lnI_{kit} + \sum_{j=1}^{3}\gamma_j lnO_{pit} ln\, I_j + \theta_1 T + \frac{1}{2}\theta_2 T^2 + \theta_3 T lnO_{pit} + \sum_{j=1}^{3}\sigma_j T\, lnI_{jit} + \ln NPI + \varepsilon_j + \varphi_j \quad (5)$$

In the above equation, we add a negative profit indicator to deal with the negative values of the log of the PBT. The NPI reports '1' if the PBT is zero or positive, while NPI shows the absolute value of the PBT if it is negative.

3.4. Controls

This research utilizes the bank and country-specific variables in the analyses to control for bank and country characteristics. Banks with high capital performance ratios perform well due to their ability to use higher equity in their businesses; therefore, the equity ratio is controlled in this analysis. It is argued that the size of the banks does impact the banking risk, where bigger banks might have higher profits and lower risks. We use banks total assets to control for bank size and gross loans as a percentage of total assets (GLTA) to control the banking lending behavior. The ratio of non-intermediation income as a percentage of total income is used to control for revenue diversification. We employ only a few bank-specific relevant variables in the analysis to keep the specification simple and avoid multicollinearity. We also control for market concentration with the Herfindahl Hirschman Index (HHI). Some relevant macroeconomic indicators include GDP growth rates and inflation rates. Islamic is a dummy control variable that captures the difference between Islamic and conventional banks; it takes the value '1' for Islamic banks and '0' for conventional banks. Since our analysis covers the period of the Global Financial Crisis, the crisis dummy is included, and it is '1' for the period of 2008 – 09 and '0' otherwise.

3.5. Statistical Modelling and Methodology

This study estimates a dynamic panel model to examine the association between profitability and banking sector competition. The model is given as follows:

$$LnFINP_{it} = \gamma_0 + \gamma_1 FINP_{it-1} + \gamma_2 L\_IND_{it} + \gamma_3 BANK_{it} + \gamma_4 MI_t + \gamma_5 ISLAMI + \varepsilon_{it} \quad (6)$$

where ' i ' denotes bank and ' t ' denotes time. LnFINP is the financial performance of the banks in terms of ROA, ROE, and Zscore. $FINPit_{-1}$ is the one-time lag of the financial performance and risk, L_IND is the Lerner index which is the inverse estimate of the competition in the banking sector, BANK is a vector of bank-specific variables, MI is a vector for the country-specific variables, ε is the residual term. To address the relationship for Islamic banks, eq (6) is modified with the interaction term and is given below:

$$LnFINP_{it} = \gamma_0 + \gamma_1 FINP_{it-1} + \gamma_2 L\_IND_{it} + \gamma_3 BANK_{it} + \gamma_4 MI_t + \gamma_5 ISLAMI + \gamma_6 ISLAMI*L\_IND + \varepsilon_{it} \quad (7)$$

In the dynamic models such as (6) and (7), the traditional estimators are not appropriate due to the endogeneity issue. Accordingly, to estimate our models, this study employs a widely applied two-step system GMM proposed by Arellano & Bover (1995) and Blundell & Bond (1998).

IV. RESULTS AND DISCUSSIONS

This section presents descriptive statistics, correlation analysis, and the estimation results of our models. Table 1 shows the summary statistics of the dataset used in

the study. The mean for risk-adjusted returns on assets (RAR_A) for the overall banking market is 0.11, with a standard deviation of 0.20. it is seen that this is higher for conventional banks than Islamic banks. Risk-adjusted returns on equity (RAR_E) have a mean of 0.10 with a standard deviation of 0.20. and this is found to be not different for different banking models. For Zscore, the risk measure, it is found that conventional banks have better zscore than Islamic banks; however, conventional banks' zscore is more volatile than Islamic banks. Furthermore, both the Lerner indices show that conventional banks have greater market power than Islamic banks. This might be attributed to the fact that Islamic banks are relatively new in the sector and smaller in size than their conventional counterparts. Table 2 reports the pairwise correlations between the variable used in the analysis. It is worth noting that the correlation between two different Lerner indices is 0.21, which is also significant. We do not see any significantly higher correlation between the variables; thus, the presence of multicollinearity is taken care of.

Table 1.
Summary Statistics

Variable	RAR_A	RAR_E	zscore	Ad_Lerner	T_Lerner	Bank size	Equity ratio	Lending	diversification	Market Concentration	GDP_GR	Inf_R
Full Sample												
Mean	0.12	0.10	46.12	0.47	0.27	8.78	10.98	0.56	0.25	0.09	4.90	2.53
Std. Dev.	0.21	0.20	28.65	0.24	0.14	1.40	7.02	0.19	0.18	0.01	2.10	1.19
Min	-0.02	-0.02	4.81	-0.99	-0.23	5.23	2.93	0.01	-1.23	0.08	-1.51	0.58
Max	2.19	2.71	215.33	0.93	0.80	11.77	63.28	1.26	0.89	0.11	7.42	5.44
Conventional banks												
Mean	0.12	0.10	50.59	0.49	0.32	8.87	12.82	0.52	0.30	0.09	4.87	2.54
Std. Dev.	0.24	0.16	32.09	0.22	0.12	1.59	7.82	0.20	0.19	0.01	2.17	1.24
Min	-0.02	-0.02	4.81	-0.99	-0.23	5.23	4.17	0.01	-1.23	0.08	-1.51	0.58
Max	2.19	1.25	215.33	0.93	0.80	11.77	63.28	0.78	0.89	0.11	7.42	5.44
Islamic Banks												
Mean	0.10	0.10	37.01	0.43	0.18	8.61	7.22	0.65	0.14	0.09	4.97	2.51
Std. Dev.	0.12	0.27	16.66	0.27	0.12	0.86	1.99	0.14	0.10	0.01	1.96	1.10
Min	0.00	0.00	9.88	-0.53	-0.18	7.19	2.93	0.24	-0.02	0.08	-1.51	0.58
Max	0.61	2.71	80.86	0.91	0.43	10.82	15.45	1.26	0.65	0.11	7.42	5.44

Table 2.
Correlation Analysis

	RAR_A	RAR_E	Zscore	Ad_Lerner	T_Lerner	Bank size	Equity ratio	Lending	diversification	Market Concentration	GDP_GR	Inf_R
RAR_A	1											
RAR_E	0.190***	1										
Zscore	0.146*	0.0454	1									
Ad_Lerner	-0.0731	-0.0419	0.0185	1								
T_Lerner	0.139*	0.112*	0.190***	0.210***	1							
T_Assets	0.259***	0.167**	0.0540	-0.171**	0.256***	1						
Equity Ratio	-0.111	-0.139*	0.226***	0.359***	0.0988	-0.579***	1					
Lending Ratio	0.161**	0.0411	0.0325	-0.134*	-0.122*	0.424***	-0.369***	1				
Diversi	-0.0450	0.0384	0.0569	0.231***	0.221***	-0.151**	0.242***	-0.529***	1			
Market Structure	-0.0460	0.156**	-0.0115	0.104	0.318***	-0.0639	-0.0113	-0.197***	0.0923	1		
GDP_GR	0.102	0.0592	0.0102	-0.0351	-0.148**	0.0420	-0.00225	0.0755	-0.0322	-0.137*	1	
Inf_R	0.0958	0.201***	0.0548	-0.128*	-0.0684	0.000724	0.0426	0.0190	-0.0357	0.303***	0.435***	1

*$p < 10\%$, **$p < 5\%$, *** $p < 1\%$

4.1. Results with Adjusted Lerner Index

Tables 3 and 4 show the results of our main estimation models using the efficiency-adjusted Lerner index. In both Tables, we estimate three different models with different dependent variables. Model 1 is estimated with RAR_A, Model 2 is estimated with RAR_E, and model 3 is estimated with zscore as the dependent variable. In the estimation, we limit the number of instruments to avoid instrument proliferation. We also conduct the Hansen test for overidentifying restrictions and auto correlation tests of order 1 and 2 (AR1 and AR2) to verify the consistency of our estimates.

Table 3 presents the results of equation 6 estimated with adjusted Lerner index. The diagnostics tests validate the consistency of our estimates. The lagged dependent variables are significant, suggesting persistence in the dependent variables and justifying our choice of using a dynamic panel estimator. The coefficient for the EALI is found to be negative and significant, suggesting that market power reduces profitability. Extra market power reduces the RAR_A and RAR_E with no significant impact on risk. Put differently, an increase in competition results in higher RAR_A and RAR_E. These findings suggest that extra competition in the market brings higher returns.[2] These findings align with the 'competition-stability view' (Boyd & De Nicolo, 2005a; Caminal & Matutes, 2002; Fiordelisi et al., 2011; Ibrahim et al., 2019). This might suggest that banks lend at lower rates and relaxed lending conditions during competitive market conditions, making it easier for borrowers to pay back and reducing the banks' overall default risk (Saurina Salas et al., 2011).

Bank size and equity ratio are found to be positive and significant, suggesting that banks with bigger size and greater equity ratio can earn more profits and are more stable. The lending ratio is found to be negatively significant for RAR_A; however, it is positively significant for RAR_E and zscore. They suggest that banks with higher lending tend to have reduced the RAR_A and improved RAR_E and risk. The coefficient of banks' revenue diversification shows a negative impact on Risk-adjusted returns on assets and a positive effect on banks' zscore. This suggests that diversified banks have lower RAR_A and increased risk-tolerance levels. The Islamic banks' dummy is insignificant, indicating no significant difference in the RAR_A, RAR_E and Risk (Zscore) levels between Islamic banks and conventional banks.

2 A higher Lerner index implies greater market power and less market competition.

Table 3.
Competition-Performance Nexus with Adjusted-Lerner Index

	RAR_A	RAR_E	Zscore
L.RAR_A	0.1181*** (0.000)		
Ad_Lerner	-0.0889*** (0.000)	-0.1306*** (0.000)	-0.0349 (0.463)
T_Assets	0.0334*** (0.000)	0.0236*** (0.000)	0.0593*** (0.008)
Equity Ratio	0.0014* (0.057)	0.0019*** (0.008)	0.0276*** (0.000)
Lending Ratio	-0.0327* (0.086)	0.0463*** (0.003)	0.3439*** (0.000)
Diversi	-0.0776** (0.026)	0.0552 (0.132)	0.2000** (0.013)
Market Structure	3.7247** (0.021)	0.8737 (0.225)	-1.1383 (0.471)
GDP_GR	0.0039 (0.654)	-0.0019 (0.633)	0.0087 (0.181)
Inf_R	0.0107*** (0.000)	-0.0080* (0.098)	0.0108** (0.032)
Islamic bank	-0.0070 (0.560)	0.0023 (0.868)	-0.0087 (0.863)
GFC	-0.0298 (0.678)	-0.0501* (0.078)	0.0683 (0.208)
L.RAR_E		0.0558*** (0.000)	
L.lnzscore			0.5888*** (0.000)
Constant	-0.4947*** (0.000)	-0.1777*** (0.002)	0.4959* (0.076)
Observations	276	276	314
No. of instruments	27	26	28
No. of Groups	38	38	38
Arellano_Bond: AR(1)	0.0703	0.0832	0.0087
Arellano_Bond: AR(2)	0.4905	0.2780	0.3899
Hansen_Test (p-Val)	0.1236	0.2401	0.5188

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

Table 4 presents the results on any possible differences in the impact of competition on performance for Islamic banks. We do this by adding a dummy interaction term in the model (Islamic bank # Lerner). Once again, the diagnostic tests suggest that the instruments used in the estimation are valid, and there are no possible issues of serial autocorrelation, over-identification, and instrument proliferation. For brevity, we only focus on the interaction term here. The dummy interaction term is significant in the case of RAR_A, RAR_E, and Risk (Zscore), suggesting a possible difference in the relationship for Islamic banks. The interaction term coefficient is positively significant, suggesting that Islamic banks see a different relationship than conventional banks. The positive coefficient for the interaction term indicates that an increase in market power brings extra RAR_A and enhances banks' risk tolerance. Put differently, increased competition brings lower returns and increases the risk. This is in line with the 'competition-fragility view.' For Risk-adjusted returns on equity (RAR_E), the coefficient is negative, suggesting that Islamic banks with extra market power have lower returns on equity when adjusted for risks.

Table 4.
Competition-Performance Nexus for Islamic Banks with Adjusted-Lerner Index

	RAR_A	RAR_E	Zscore
L.RAR_A	0.1121*** (0.000)		
Ad_Lerner	-0.4871*** (0.000)	0.4926** (0.042)	-0.2737*** (0.000)
T_Assets	0.0387*** (0.000)	0.0138 (0.253)	0.0361*** (0.000)
Equity Ratio	0.0056*** (0.000)	-0.0033 (0.301)	0.0198*** (0.000)
Lending Ratio	0.0321 (0.107)	0.0425 (0.571)	0.2617*** (0.000)
Diversi	-0.0045 (0.890)	0.0226 (0.639)	0.2136*** (0.000)
Market Structure	6.7460*** (0.000)	-0.3824 (0.830)	-1.0471 (0.256)
GDP_GR	-0.0057** (0.024)	-0.0155*** (0.000)	0.0055 (0.175)
Inf_R	0.0258*** (0.000)	0.0149*** (0.004)	0.0011 (0.802)
Islamic bank	-0.1927*** (0.000)	0.2479** (0.016)	-0.0772* (0.059)
Islamic bank # Ad_Lerner	0.4217*** (0.000)	-0.5173** (0.033)	0.2647*** (0.000)
GFC	-0.0866*** (0.000)	-0.1718*** (0.000)	0.0856*** (0.010)
L.RAR_E		0.0889*** (0.000)	
L.lnzscore			0.8822*** (0.000)
Constant	-0.6841*** (0.000)	-0.2118 (0.205)	-0.1259 (0.336)
Observations	276	276	314
No. of instruments	36	27	34
No. of Groups	38	38	38
AR1	0.0701	0.0804	0.0036
AR2	0.5252	0.1595	0.3712
Hansen_T (p-Val)	0.3422	0.4575	0.1873

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

4.2. Results with TLI

Table 5 reports the results of our main estimation models derived from estimating equation (6). The coefficient for the lagged dependent variable is found to be significant in all models, justifying our choice of a dynamic panel estimator. The coefficient for the lerner index is positively significant, suggesting that greater stability comes with increased market power. Extra market power enhances the RAR_A and Risk-adjusted returns on equity (RAR_E). Also, it brings in extra stability with higher zscores. Putting differently, an increase in competition results in lower RAR_A, RAR_E, and zscores. These findings suggest that extra competition in the market brings lower returns and extra risk.[3] These findings are in line with the 'competition-fragility view' of Davis et al. (2020), Keeley (1990), Kouki & Al-Nasser (2017). This might suggest that during competitive market conditions, banks rely more on increased deposit rates and extra lending at lower lending rates and relaxed lending conditions that lead to extra costs and lower earnings (Fu et al., 2014).

Banks' total size, equity ratio, and banks' lending are found to be positively significant. The total assets seem to enhance the overall profitability, which suggests that bigger banks have higher returns. Banks with greater equity and

3 A higher Lerner index implies greater market power and less market competition.

higher lending are more stable. Banks with greater equity might be able to use their equity funding to issue loans, increasing their credit exposure; however, they still manage to accumulate extra profits through such lending, thus making them stable. Market concentration is positively and negatively significant for RAR_A and RAR_E respectively. This suggests that banks in concentrated markets have higher RAR_A and lower RAR_E. Once again, the Islamic banks' dummy is insignificant and is in line with earlier findings, suggesting no significant difference in the level of RAR_A, RAR_E, and Risk (Zscore) between Islamic banks and conventional banks.

Table 5.
Competition-performance nexus with TLI

	RAR_A	RAR_E	Zscore
L.RAR_A	0.1375*** (0.000)		
T_Lerner	0.1291*** (0.008)	0.0745** (0.044)	0.2749* (0.075)
T_Assets	0.0273*** (0.000)	0.0188*** (0.000)	0.0585 (0.122)
Equity Ratio	-0.0009 (0.586)	0.0005 (0.631)	0.0331*** (0.000)
Lending Ratio	-0.0364 (0.198)	0.0189 (0.457)	0.4385*** (0.004)
Diversi	-0.0535* (0.072)	0.0354 (0.115)	0.0591 (0.558)
Market Concentration	2.5214* (0.091)	-1.2042** (0.016)	-0.2642 (0.897)
GDP_GR	-0.0087 (0.329)	0.0015 (0.649)	-0.0061 (0.375)
Inf_R	0.0296*** (0.000)	0.0016 (0.652)	0.0204*** (0.000)
Islamic bank	-0.0039 (0.786)	0.0144 (0.364)	-0.0373 (0.728)
GFC	-0.0915 (0.226)	-0.0254 (0.206)	-0.0206 (0.707)
L.RAR_E		0.0469*** (0.000)	
L.lnzscore			0.1872** (0.018)
Constant	-0.3762*** (0.003)	-0.0523 (0.305)	1.8083*** (0.000)
Observations	269	269	306
No. of instruments	27	26	28
No. of Groups	37	37	37
AR1	0.0673	0.0871	0.1317
AR2	0.7651	0.2527	0.7036
Hansen_T (p-Val)	0.3357	0.3525	0.3575

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

Table 6 presents the results derived from estimating equation (7) to explore any possible differences in the impact of competition on the performance of Islamic banks. We explore this by adding a dummy interaction term in the model (Islamic bank # Lerner). Once again, the diagnostic tests suggest that the instruments used in the estimation are valid, and there are no possible issues of serial autocorrelation and over-identification or instrument proliferation. For brevity, we only focus on the interaction term here. The dummy interaction term is only significant in the case of RAR_A, suggesting a possible difference in the relationship for Islamic banks. The coefficient of the interaction term is negatively significant. For Islamic banks, increased market power brings lower RAR_A. In other words, Islamic banks within a competitive market will perform better and bring extra RAR_A. this is in

line with the 'competition-stability view' (Boyd & De Nicolo, 2005b; Caminal & Matutes, 2002; Fiordelisi et al., 2011). Increased competition leads banks to engage more in lending activities. For Islamic banks, such activities are financing and advancing at lower rates, making it easier for customers to pay back.

Furthermore, competition might enhance bank stability by bringing extra efficiency, product innovation, and financing portfolio diversification (Kabir & Worthington, 2017). Additionally, Islamic banking customers in Malaysia are relatively aware of the Islamic banking products and services in the rest of the Muslim-majority countries. Being a Muslim-majority country, the customers might feel obligated to the banks, which leads to fewer defaults and increased profits for the banks.[4]

Table 6.
Competition-Performance Nexus in Islamic Banks TLI

	RAR_A	RAR_E	Zscore
L.RAR_A	0.1392*** (0.000)		
T_Lerner	0.7219*** (0.000)	0.1172** (0.020)	0.1069** (0.034)
T_Assets	0.0099** (0.025)	0.0182*** (0.000)	0.0393*** (0.000)
Equity Ratio	-0.0021* (0.087)	0.0003 (0.776)	0.0150*** (0.000)
Lending Ratio	-0.0175 (0.577)	0.0211 (0.402)	0.2069*** (0.000)
Diversi	0.0556 (0.274)	0.0364* (0.097)	0.1625*** (0.001)
Market Concentration	1.7105*** (0.004)	-1.2259** (0.020)	-1.6037* (0.090)
GDP_GR	-0.0185*** (0.000)	0.0004 (0.905)	0.0068 (0.127)
Inf_R	0.0561*** (0.000)	0.0017 (0.651)	0.0063 (0.251)
Islamic bank	0.1595*** (0.000)	0.0336 (0.124)	0.0690** (0.039)
Islamic bank # Lerner	-0.4909*** (0.000)	-0.1133 (0.197)	-0.1761 (0.107)
GFC	-0.1837*** (0.000)	-0.0386* (0.068)	0.0843** (0.033)
L.RAR_E		0.0459*** (0.000)	
L.lnzscore			0.8881*** (0.000)
Constant	-0.3616*** (0.000)	-0.0501 (0.348)	-0.1917 (0.157)
Observations	269	269	306
No. of instruments	36.0000	27.0000	34.0000
No. of Groups	37.0000	37.0000	37.0000
AR1	0.0541	0.0871	0.0046
AR2	0.9178	0.2338	0.2663
Hansen_T (p-Val)	0.4725	0.3081	0.1997

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

The motivation and contribution of the study are to use a more robust and efficient measure of competition. While addressing the research objectives, we have noticed significant differences in the impact of using different measures of market power. We employ the EALI as well as the TLI. As discussed earlier, the

4 To add credence and robustness to our findings, we estimate the models with different econometric estimators. We estimate equation (6 & 7) with differenced GMM estimator and found the results to be consistent with our main findings. These results are given in the appendix.

TLI assumes complete profit and cost efficiency for a bank, which is very unlikely to prevail. Such assumptions should be carefully looked into. Considering the contrast between these findings, it is evident that market power needs to be carefully measured. The assumptions and motivation for employing any Lerner indices need extra attention. For the overall sample, the estimations with the EALI are supportive of the 'competition-stability view,' and on the other side, estimations with the TLI support the competition-fragility view.' Furthermore, for Islamic banks, the coefficient on the EALI suggests the 'competition fragility view,' and if measured with the TLI, it supports the 'competition-stability view.' These findings give evidence of contradiction in the impact of bank competition on the bank's performance (profit and risk). This might suggest that the problem might be with the assumption of complete profit and cost efficiency. Therefore, it is suggested that profit and cost efficiency should be considered when measuring competition using the Lerner index.

V. CONCLUSION AND RECOMMENDATIONS

Several studies have attempted to address the gap in the banking sector's competition-performance/stability/fragility nexus; however, the literature seems to be divided on the arguments over the measures of market power. Opponents of the TLI argue that it assumes full efficiency when it comes to profits and costs, which makes sense because it is very unlikely for a bank to attain complete profit and cost efficiency. Therefore, this research attempts to fill the gap in these arguments. We explore the competition-performance nexus in a dual-banking setting using both the traditional and efficiency-adjusted Lerner indices. For this, we take a sample of the Malaysian banking sector for 2008-2020. We explore the said nexus with both Lerner indices and further the study to examine if the nexus reveals any different findings for Islamic banks.

It is surprising to see how different the results are when competition is measured differently. For the adjusted market power, the results suggest that the competition-stability view is prevailing; however, the findings show that the competition-fragility view is prevailing when competition is measured traditionally. Moreover, the results on Islamic banks are also contradictory. For Islamic banks, when adjusted measure of competition is used, the results show support for the competition fragility view, and when measured traditionally, the evidence is supportive of the competition stability view.

Taking our que for a more efficient and robust measure of market power, the adjusted Lerner index, it is recommended to policymakers and regulators to encourage competition in the banking sector but not to the extent where the system starts getting hurt from competition from the Islamic banking sector. Such contradictions in the results reveal the importance of adjustments to the Lerner indices. It is evident that market power should be carefully measured, and the potential issues with the TLI should not be overlooked.

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APPENDIX

Table A1.
Robustness: Competition-Performance Nexus with Adjusted Lerner Index

	(1)	(2)	(5)
	RAR_A	**RAR_E**	**Zscore**
L.RAR_A	-0.2203*** (0.001)		
Ad_Lerner	-0.0884*** (0.007)	-0.1007*** (0.001)	-0.0612 (0.160)
T_Assets	-0.0285 (0.603)	0.0150 (0.502)	-0.0060 (0.816)
Equity Ratio	-0.0013 (0.547)	0.0001 (0.932)	0.0458*** (0.000)
Lending Ratio	-0.0167 (0.834)	0.0384 (0.323)	0.2155** (0.013)
Diversi	-0.0519 (0.297)	-0.0091 (0.832)	0.1228*** (0.000)
Market Structure	0.2008 (0.948)	0.3509 (0.628)	-2.5806* (0.092)
GDP_GR	0.0183** (0.043)	-0.0002 (0.956)	0.0093** (0.015)
Inf_R	-0.0002 (0.984)	-0.0058 (0.270)	0.0100*** (0.009)
GFC	0.0567 (0.449)	-0.0420 (0.129)	0.0736** (0.021)
L.RAR_E		0.0624*** (0.004)	
L.lnzscore			0.0863 (0.121)
Observations	238	238	276
No. of instruments	27.0000	22.0000	24.0000
No. of Groups	37.0000	37.0000	38.0000
AR1	0.0257	0.0862	0.1776
AR2	0.1064	0.3469	0.5374
Hansen_T (p-Val)	0.5820	0.5026	0.2605

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

Table A2.
Robustness: Competition-Performance Nexus in Islamic Banks with Adjusted Lerner Index

	(1)	(2)	(5)
	RAR_A	**RAR_E**	**Zscore**
L.RAR_A	0.1141*** (0.000)		
Ad_Lerner	-0.5185** (0.017)	0.0623 (0.386)	-0.3935*** (0.000)
T_Assets	0.0688 (0.184)	0.0017 (0.972)	0.1260 (0.159)
Equity Ratio	0.0059* (0.098)	-0.0016 (0.450)	0.0524*** (0.000)
Lending Ratio	0.1159* (0.065)	0.0469 (0.306)	0.3768*** (0.000)
Diversi	-0.0780 (0.251)	0.0682 (0.137)	0.8074*** (0.000)
Market Structure	9.5348*** (0.000)	0.3272 (0.796)	-3.7243** (0.025)
GDP_GR	-0.0158** (0.017)	0.0044 (0.444)	0.0145*** (0.004)
Inf_R	0.0137*** (0.008)	-0.0049 (0.273)	0.0095 (0.122)
Islamic bank # Ad_Lerner	0.4666** (0.039)	-0.1102* (0.069)	0.4859*** (0.000)
GFC	-0.1160*** (0.009)	0.0822** (0.025)	0.2600*** (0.001)
L.RAR_E		-0.4124*** (0.000)	
L.lnzscore			0.0904*** (0.000)

Table A2.
Robustness: Competition-Performance Nexus in Islamic Banks with Adjusted Lerner Index (Continued)

	(1)	(2)	(5)
	RAR_A	**RAR_E**	**Zscore**
Observations	238	238	276
No. of instruments	26.0000	22.0000	25.0000
No. of Groups	37.0000	37.0000	38.0000
AR1	0.0765	0.2306	0.2382
AR2	0.5355	0.0537	0.9878
Hansen_T (p-Val)	0.5735	0.2189	0.2078

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

Table A3.
Robustness: Competition-Performance Nexus with TLI

	(1)	(2)	(5)
	RAR_A	**RAR_E**	**Zscore**
L.RAR_A	0.0975* (0.082)		
T_Lerner	0.1734** (0.028)	0.0822** (0.013)	0.2266*** (0.004)
T_Assets	0.0300 (0.493)	0.0143 (0.498)	-0.0215 (0.426)
Equity Ratio	-0.0039* (0.067)	-0.0000 (1.000)	0.0645*** (0.000)
Lending Ratio	-0.1813** (0.040)	-0.0054 (0.916)	0.1069 (0.130)
Diversi	-0.0300 (0.703)	0.0091 (0.801)	0.0381 (0.391)
Market Structure	1.8686 (0.355)	-0.7344 (0.302)	-2.9484* (0.073)
GDP_GR	-0.0098 (0.341)	0.0036 (0.289)	0.0051 (0.243)
Inf_R	0.0338*** (0.000)	0.0022 (0.531)	0.0106*** (0.002)
GFC	-0.1116 (0.224)	-0.0209 (0.357)	0.0230 (0.513)
L.RAR_E		0.0682*** (0.000)	
L.lnzscore			-0.0613** (0.037)
Observations	232	232	269
No. of instruments	23.0000	23.0000	24.0000
No. of Groups	36.0000	36.0000	37.0000
AR1	0.0886	0.0835	0.5401
AR2	0.4726	0.5116	0.4663
Hansen_T (p-Val)	0.4350	0.6297	0.1740

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

Table A4.
Robustness- Competition-Performance Nexus in Islamic Banks with TLI

	(1)	(2)	(5)
	RAR_A	**RAR_E**	**Zscore**
L.RAR_A	0.0782*** (0.000)		
T_Lerner	0.5600*** (0.000)	0.1295 (0.389)	0.1528** (0.041)
T_Assets	0.0933*** (0.003)	0.0147 (0.532)	-0.0070 (0.792)
Equity Ratio	-0.0023 (0.253)	-0.0002 (0.926)	0.0543*** (0.000)
Lending Ratio	-0.0280 (0.551)	-0.0126 (0.845)	0.1892* (0.061)
Diversi	0.0222 (0.609)	0.0068 (0.839)	0.0646 (0.283)
Market Structure	5.2016*** (0.005)	-0.9285 (0.364)	-2.7149** (0.026)
GDP_GR	-0.0188*** (0.000)	0.0026 (0.493)	0.0066 (0.151)
Inf_R	0.0334*** (0.000)	0.0029 (0.538)	0.0060 (0.229)
Islamic bank # Lerner	-0.5199*** (0.001)	-0.0648 (0.709)	0.1664 (0.243)
GFC	-0.1283*** (0.000)	-0.0320 (0.210)	0.0352 (0.377)
L.RAR_E		0.0682*** (0.000)	
L.lnzscore			0.1197 (0.192)
Observations	232	232	269
No. of instruments	26.0000	23.0000	23.0000
No. of Groups	36.0000	36.0000	37.0000
AR1	0.0674	0.0838	0.4244
AR2	0.5197	0.5008	0.9937
Hansen_T (p-Val)	0.6210	0.5876	0.1765

Probability-values in parentheses. $^{*}p < 10\%$, $^{**}p < 5\%$, $^{***}p < 1\%$

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