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Competition and banks' financial performance in dual banking: Evidence from efficiency-adjusted market power

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Abstract

Purpose — This paper examines banking competition's effect on Malaysia's financial performance from 2008–2020. This study investigates the relationship between banks' market competition and financial performance by examining banks' profits and risks. Further, this current study examines whether the association differs for Islamic banks.

Methods — The research studies Malaysia as a sample country and employs a data span from 2008-2020. In order to address omitted variable bias, simultaneity and endogeneity are avoided using a two-step GMM model.

Findings — Our results recommend that more competition inspires the banking sector to invest in risky ventures to offset the losses in revenues. Moreover, banking today is still based on basic banking operations like granting loans (or financing in Islamic banks), collecting deposits, and managing payment systems.

Implication — Since our findings show a negative effect of competition on the bank's financial performance, we suggest that competition lowers banks' profits and results in greater risk. It is suggested that regulators and policymakers develop the financial infrastructure in terms of controlled competition in banking and encourage banks to diversify their operations efficiently. We find no significant difference in the association between conventional and Islamic banking.

Originality — This research is the first to examine the effect of bank competition on the financial performance of a developed dual banking system using the efficiency-adjusted Lerner index.

Keywords — Competition, performance, efficiency-adjusted lerner index, GMM

Introduction

Banking competition refers to extra competition that could simultaneously prompt additional innovation in the products offered, making the banking system more fragile. This competition could lead to a decline in the bank profits, and the dissolution can lead the banks to face more challenges to keep up the benefits. Looking for more dangerous speculations and policies will prompt further credit disappointments and unsteadiness. Therefore, restricted competition will lead banks to make secure venture choices and assure the establishment of a sound banking system.

The debate on the impact of competition on the performance of banks started during the 1980s but is still inconclusive. This discussion has made the financial business and the policymakers indifferent. The contentions of the analysts are threefold. The arguments are that the banking

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competition first prompts hazard taking, increasing fragility in the banking sector (Besanko & Thakor, 1993; Repullo, 2004; Soedarmono, Machrouh, & Tarazi, 2013). Second, increased competition leads to less hazard taking and competition-stability (Kick & Prieto, 2015; Matutes & Vives, 1996; Schaeck & Cihak, 2014), thirdly a reversed U-shaped nonlinear relationship (Martínez-Miera & Repullo, 2010). Despite solid evidence, all these three contentions are supported; nonetheless, despite everything, the conversation needs indisputable contentions.

Few researchers have studied the differing effect of competition on bank profitability and stability (Kabir & Worthington, 2017; Khattak, Alaeddin, & Abojeib, 2021; Naceur & Omran, 2011; Rizvi, Narayan, Sakti, & Syarifuddin, 2020; Tan, Chi, Lau, & Gozgor, 2020). These studies have employed either the traditional Lerner index or market concentration as a competition proxy. Traditional Lerner is a superior proxy compared to the competition, but it also has received some criticism. As per Khattak, et al. (2021) and Koetter, Kolari, & Spierdijk, (2012), the traditional Lerner index assumes cost and price efficiency, which is very unlikely. It is also essential to control for inefficiency as it is an important factor in the relationship between marginal cost and price, which consequently impacts the Lerner index. Hence, to address the traditional approach's problems, we employ an efficiency-adjusted Lerner index to represent market competition in this study.

Based on this current research objective, the ideal methodology is to investigate the relationship in a dual banking framework. While most studies have aimed at advanced economies, this examination investigates the association in a double financial framework, considering Malaysia as an example. Malaysia is an ideal nation to investigate the relationship in a double financial framework. Taking a glimpse at the present market structure of Malaysia, where a significant share of Islamic banks is in operation, working alongside Islamic windows and the subsidiaries of the foreign and conventional banks, it is difficult to anticipate the idea of the association. Also, Malaysia aims to raise Islamic banks' Islamic financial share in the banking sector, which will escalate market competition. Along these lines, it is essential to study the dual banking system of Malaysia in terms of the effect of banking competition on banks' profitability.

Malaysia has seen colossal development in Islamic banking in the previous scarcely eras. The development began with Bank Islam Malaysia Berhad in 1983, and the area presently contains 16 Islamic banks. Bank Islam was the leading Islamic bank until 1993 when the Malaysian government presented the 'Islamic Banking Scheme' where customary Banks could begin offering Islamic monetary administrations. This scheme expanded the competition with Islamic financial windows coming into the image. The bank Muamalat Malaysia Berhad entered the competition in 1999 after the Asian emergencies. From then forward, competition in Malaysian banking has expanded with the presentation of recently settled Islamic Banking auxiliaries. The competition seemed challenging when new banks began activities in Malaysia. From that point forward, the development of the Islamic financial part in Malaysia has been momentous. Islamic banking has been assuming a massive part in the Malaysian financial market throughout the long term. The proportion of Islamic financial resources for absolute financial resources was recorded at 21.6% in 2016 (Ernst & Young, 2016). Roused by this rapid development, Malaysia intends to accomplish a 40% Market share for Islamic banking with insufficient financial resources by 2020. This condition will additionally build market competition. On the off chance that the Malaysian financial area is following the 'competition-delicacy' contention, the expansion in Islamic financial offer probably will not bring great outcomes, and it may confront rising dangers to the money-related framework. This examination offers further research on the relationship between various bank types in a dual banking system.

Considering the above disagreements, examining this association in an established dual banking system is worth examining. This exploration utilizes board information displaying to test the legitimacy of this association. This dataset spans from 2007 to 2017. The observational outcomes appear that competition in the financial segment exposes the banks to take more risk, resulting in lower profitability. The outcomes affirm a negative association between the competition and banks' profitability. Competition can be additionally explained by the way that with an expansion in the competition (or decrease in competition), the profits of banks increase (or decrease). The banks are compelled to search for further options of investment that appear to

be more hazardous to repay the decrease in benefits or increment in misfortunes as of the passage of new rivals in the market.

Many advocates advocate the negative association between banks' profitability and competition. Keeley (1990) asserted that the expansion in competition contracts banks' charter values. A negative tradeoff between profitability and competition exists that decreases the banks' charter values and profits. The decrease in profits due to competition drives the banking sector to loosen up its screening and monitoring standards for borrowers, resulting in a decay in the overall quality, especially in credits. Marquez (2002) asserted that increased competition scatters the borrowers' information, prompting higher financing expenses and giving more advantages to inferior quality borrowers. Matutes and Vives (1996, 2000) held that increased market power decreases the likelihood of banks' default. Caminal and Matutes (2002) contended that extreme competition would loosen up the market loaning strategies, bringing additional loans, which may lead banks to participate in more dangerous activities that will increase the bank's risk and thus lower profits.

On the other hand, some findings support the positive relationship between competition and performance (Danisman & Demirel, 2018; González, Razia, Búa, & Sestayo, 2017; Khattak & Ali, 2021; Rizvi et al., 2020; Schaeck, Cihak, & Wolfe, 2009; Tan et al., 2020). Excessive market power in borrowing and lending results in increased rates for the borrowers, and more competition prompts a decrease in banks' profits. The higher competition will reduce the financing costs ansd drive the borrowers to put resources into certain activities, henceforth more secure banks. Mishkin (1999) asserts that governments compensate the concentrated business sectors that may bring moral danger and expose the banks to challenges that may make these businesses very fragile. For bank-specific market power, the Lerner Index as an intermediary is utilized by Prieto and Kick (2013), who suggested that market power decreases the chances of bank failure. However, we found that Boone Indicator reports fewer dangers of default with less market power (more competition). A more substantial level of market power is associated with increased salary unpredictability, greater bankruptcy dangers, and bank capital proportions (Clark, Radić, & Sharipova, 2018; Davis, Karim, & Noel, 2020; Khattak, Alaeddin, et al., 2021; Soedarmono et al., 2013). Noman, Gee, and Isa (2017) recently confirmed these findings and supported the competition-fragility view.

Tabak, Fazio, and Cajueiro (2012) report a nonlinear connection between competition and the conduct of danger acceptance since both high and low competition improves financial performance. They argued that normal competition experience brings more risk when contrasted with low and high competition. Investigating the Spanish financial framework, Jiménez et al. (2013) suggest that diminishing competition in the banking sector increases the risk in the banking sector. These results confirm the non-linearity and are aligned with the findings of Tabak et al. (2012). This association is in line with the findings of the MENA region studied by the González, Razia, Búa, and Sestayo (2017).

Methods

This research employs the Lerner Index to quantify competition in the banking sector and uses the ratio of return on assets as a bank's profitability indicator. We utilize the bank-level data spanning from 2007–2018 taken from the database of FitchConnect, and for the macro indicators, the Data is employed from (WDI) World Development Indicators. All the Malaysian commercial banks, including 15 Islamic and 27 conventional banks making up 42 banks, are included in this study.

Financial Performance

We employ banks' returns on assets and banks' return on equity as a bank's profitability measures. Banks' return on assets is estimated as net income divided by total assets (ROA), while Banks' return on equity is estimated as net income divided by total equity (ROE). The existing studies widely use ROA and ROE to proxy the firms' financial performance (Cho, Chung, & Young, 2019; Weber, 2017; Joo et al., 2011). It is pertinent to mention that a higher return on assets (ROA) and return on equity (ROE) imply a higher level of banks' profits. It is the number of standard

deviations that a bank's ROA has to decline lower than its predictable value before equity is exhausted and the bank does not remain solvent. This will allow us to compare conventional and Islamic bank groups. To proxy the bank's risk performance, we use Zscore. For this risk proxy, we followed existing studies (Cihak & Hesse, 2008; Demirgüç-Kunt & Detragiache, 2011; Laeven & Levine, 2009). The higher values of Z-score mean less risk and more stability. Following Khattak et al. (2021), we use a three-year rolling window to estimate the ROA standard deviation to capture the maximum sufficient variation in the Z-score. We use a natural logarithm to avoid skewness in the Z-score, Zscore is estimated as:

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

Competition Measure

Primarily, the traditional Lerner index entails two issues in estimation, i.e., efficiency might drive the market structure, and since the index assumes both cost and profit efficiency, it fails to reflect the market power of institutions. Therefore, the adjusted Lerner index by Koetter et al. (2012) is adopted for this study. Adjusted Lerner stated as follows:

$$ADL = \frac{J_{it}+K_{it}-M_{it}*Q_{it}}{J_{it}+K_{it}} \tag{2}$$

In this equation, ADL is the denotation of the adjusted Lerner index. *i* signifies a bank in a year *t*; J represents the bank's profit (net income), K includes the interest and non-interest costs, making it the bank's total cost, and M represents a marginal cost. Total output is represented by Q. Following Battese and Coelli (1995), we choose the Stochastic Frontier Analysis (SFA) model over the data envelopment analysis (DEA). The reason is that the SFA bifurcates the error component into two. In contrast, the DEA assumes inefficiency as the sole reason for all the deviations, ignoring the impact of random errors. We also include equity while modeling the efficiency-adjusted Lerner Index as it reflects different characteristics of the banking business. For Cost-efficiency frontier modeling, we modify the model as:

$$\begin{aligned} lnK_{it} = {} & \partial_0 + \partial_1 lnQ_{pit} + \frac{1}{2}\partial_2(lnQ_{it}^2) + \sum_{j=1}^{3}\delta_j\, lnZ_{jit} + \gamma_1 lnE_{it} + \\ & \frac{1}{2}\sum_{j=1}^{3}\sum_{j=1}^{3}\delta_{jk}\, lnZ_{jit}\, lnZ_{kit} + \sum_{j=1}^{3}\gamma_j lnQ_{pit} ln\, Z_j + \theta_1 T + \frac{1}{2}\theta_2 T^2 + \\ & \theta_3 T lnQ_{pit} + \sum_{j=1}^{3}\sigma_j T\, lnZ_{jit} + \varepsilon_j + \varphi_j \end{aligned} \tag{3}$$

Here, K represents total cost; Q represents output, and Z indicates different input prices i.e., price of deposits, labor price, and price of capital. T is time trend that takes care of technical change. p represents the ratio of revenue and total assets. We use two outputs, i.e., a total of securities and the total of all loans. We also assume that the error term comprises both ε_j and φ_j. ε shows the impact of random noise, whereas φ shows the inefficiency of the frontier.

This study standardizes all price factors (Z) and costs (K) which warrants the Linear homogeneity similar to the traditionally used Lerner estimations. By taking the derivative of K, M is modeled as given below:

$$M_{it} = \frac{K_{it}}{Q_{it}}(\partial_1 + \partial_2 lnQ_{pit} + \sum_{j=1}^{3}\gamma_j ln\, Z_{jit} + \theta_3 T) \tag{4}$$

Koetter et al. (2012) argue that profit inefficiencies are much more significant and important than cost inefficiencies, making it challenging to handle them significantly. Our main motive is to discover the level of banking competition concerning levels of efficiency, and having an erstwhile assumption of market competitiveness would be unrealistic. Thus, we use a substitute model of profit efficiency where we do not assume perfect competition in the banking sector. This profit efficiency model calculates the bank profitability level to its output factors. Profits before taxes (PBT) is used as another dependent variable, and the equation is as follows:

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

We have added another variable in the equation, i.e., negative profit indicator (NPI). The purpose of adding this variable is to tackle the natural logarithm issue of possible negative values of PBT. The NPI will take a value of 1 if the PBT is positive or equal to zero. On the other hand, if the PBT value is negative, the NPI will take a value precisely equivalent to the absolute value of PBT.

Control Variabels

This study employs country and industry-specific variables to analyze and control the country and industry characteristics. Controlling Equity Ratio (ETA) suggests that banks with high capital ratios are further prone to better performance because they have a higher capacity to use equity in their business operations. Following Liu, Molyneux, and Nguyen (2012) and Čihák and Hesse (2010) suggest that banks' risk will not be affected by their size in dual banking systems because large banks may opt for more risk and operate differently as per their sizes. The log of total assets (LnTA) controls the size of the banks. Furthermore, the level of bank lending is controlled by the gross loans to total assets (GLTA). Diversification (Diversification) is also controlled, which is estimated as the ratio of non-intermediation income to total income. We restrict the control variables with the most suitable proxies to keep the specification simple and resolve issues like multicollinearity by including bank-specific variables. We also control for the market structure to control for the change in market structure change over time. The measure of market structure is the Herfindahl Hirschman Index (HHI). Some Macroeconomic variables are included using the GDP growth rate (GDP growth) and Inflation rate (inflation). The variable named "Islamic" represents the Islamic bank in this research with a dummy variable equal to one for Islamic banks and 0 for the conventional bank. Including an Islamic bank dummy in the model has enabled us to examine the impact of Islamic and conventional banks to analyze any difference. We employ the global financial crisis as a dummy variable which takes a value of 1 for 2008-09 and 0 otherwise.

Model

The impact of bank competition on profitability is studied by examining the following model:

$$lnPR_{ijt} = \partial_0 + \partial_1 lnPR_{ijt-1} + \partial_2 lnLERN_{ijt} + \partial_3 BC_{ijt} + \partial_4 MC_{jt} + \partial_5 Islamic + \varepsilon \quad (6)$$

In the model mentioned above, *i* denotes bank, *j* is the country, whereas *t* symbolizes the year. $LnPR_{jt}$ indicates profitability measure, the ROA, ROE, and lnzscore, PR_{ijt-1} represents one-period lag for the banking profitability and risk measures, our inverse estimate of competition is *efficiency-adjusted Lerner Index*, denoted by $LERN_{ijt}$. To control for the effect of bank-specific variables BS_{it} is employed. Log of total assets (lnTA) is used to capture the size of the banks, equity ratio (ETA), the ratio of gross loans (GLTA), and diversification ratio are also controlled. Finally, MC_{jt} represents a vector of the country-level variables, GDP growth, HHI, and Inflation. Also, the global financial crisis (GDP, HHI, Infl) and ε_{it} indicate the error. To differentiate the association for the Islamic banks, equation (3) is modified with an interaction term of Islamic and competition measures.

$$lnPR_{ijt} = \partial_0 + \partial_1 lnPR_{ijt-1} + \partial_2 lnLERN_{ijt} + \partial_3 BC_{ijt} + \partial_4 MC_{jt} + \partial_5 Islamic + \partial_6 Islamic * LERN + \varepsilon \quad (7)$$

We use the lagged values of the explanatory variables as the instrumental variables to estimate through the first differenced Generalized System of Moments (GMM) by Arellano and Bond (1991), also called the initial GMM technique. Besides, the proxies are modified by differentiating and adding the instrumental variables from the lagged values of the explanatory variables. It is pertinent to mention that associated error terms are from weak instruments through lagged values. This research's first difference in GMM could lead to unreliable estimation results. These studies employ the GMM of Blundell and Bond (1998) and Arellano and Bover (1995) to prevent the given

issues. The GMM framework can provide more robust and unambiguous results and thus help to explore the relationship robustly. System GMM offers slight variances, gives accuracy in estimation, and makes it more effective (Blundell & Bond, 1998).

Using the bank-level data make this current study has a high chance of heteroscedasticity. Furthermore, if the data contains smaller T and larger N, the dependent variable is complex. This estimator becomes the most relevant and suitable where the model control variables correlate with the model's error terms. The two-step GMM method improves performance while resolving endogeneity, serial correlation, and heteroscedasticity issues.

Results and Discussion

This section presents descriptive statistics. Table 1 reports the summary statistics of the variables. The ROA is reported as 0.95 for the entire sample; for conventional banks, 1.05, whereas for Islamic banks, the ROA is 0.74. Also, it is observed that the return on equity is higher for conventional banks, reflecting a lower level of profitability in Islamic banks. By looking at the risk measure, the zscore reports less stability in Islamic banks compared to Malaysia's conventional banks. The mean value of the Lerner index, which is the measure of competition, reports a value of 0.27 for the Malaysian banking sector, which is portrayed as close to perfect competition. The mean value of the competition for Islamic and Conventional banks is 0.18 and 0.32, respectively. This shows that there is higher competition among Islamic banks. It is seen that the log of total assets (LNTA) is 8.91 in the case of conventional banks and 8.61 for Islamic banks. The ETA is 10.94 for the whole set of samples, 12.72 for traditional, and 7.22 for Islamic banks, indicating that conventional banks are well capitalized. For the ratio of gross loans for conventional banks and the degree of financing of Islamic banks, it seems that they have a greater financing ratio than the conventional banks in the country. It appears that conventional banks are better diversified. The HHI has a mean of 0.09 for the country-level market structure for the sampling period.

Table 1. Summary Statistics

Variable	ROA	ROE	Zscore	LERN	lnTA	ETA	GLTA	DIV	HHI	GDP growth	Inflation
Full Sample											
Obs	359	359	358	349	359	359	359	359	359	359	359
Mean	0.95	11.0598	46.0057	0.27	8.81	10.94	0.57	0.25	0.09	4.89	2.52
SD	0.64	7.07186	28.43036	0.14	1.41	6.96	0.19	0.18	0.01	2.11	1.19
Min	-5.54	-30.09	4.809657	-0.23	5.23	2.93	0.01	-1.23	0.08	-1.51	0.58
Max	2.98	36.99	215.3327	0.80	11.77	63.28	1.26	0.89	0.11	7.42	5.44
Conventional Banks											
Obs	243	243	242	242	243	243	243	243	243	243	243
Mean	1.05	11.0279	50.31912	0.32	8.91	12.72	0.52	0.30	0.09	4.86	2.53
SD	0.71	7.556588	31.73721	0.12	1.60	7.74	0.20	0.18	0.01	2.18	1.23
Min	-5.54	-30.09	4.809657	-0.23	5.23	4.17	0.01	-1.23	0.08	-1.51	0.58
Max	2.98	36.99	215.3327	0.80	11.77	63.28	0.78	0.89	0.11	7.42	5.44
Islamic Banks											
Obs	116	116	116	107	116	116	116	116	116	116	116
Mean	0.74	0.744655	37.00699	0.18	8.61	7.22	0.65	0.14	0.09	4.97	2.51
SD	0.40	0.400585	16.65888	0.12	0.86	1.99	0.14	0.10	0.01	1.96	1.10
Min	-1.66	-1.66	9.88146	-0.18	7.19	2.93	0.24	-0.02	0.08	-1.51	0.58
Max	1.72	1.72	80.86047	0.43	10.82	15.45	1.26	0.65	0.11	7.42	5.44

Table 2 shows the correlation analysis and reports a weak correlation between the variables that rejects the existence of multicollinearity. However, the ROA is positively correlated to total assets, equity ratio, HHI, and GDP growth rate and is negatively related to GLTA, Diversification ratio, and inflations.

Figure 1 shows the evolution of the level of competition in the banking sector from 2007-2018. Given that the Lerner index implies the inverse measure for the market competition, Figure

1 uses the values concluded after subtracting market power from 1 to get the level of market competition. The figure clearly shows banks' market competition change throughout the sampling period. The overall trend in the level of competition for Islamic banks remains steady and is upward. However, it is worth mentioning that during the financial crises of 2007-2009, the level of competition increased. In the case of conventional banks, the competition increased during the said period because banks were struggling to survive. Right after 2008, a decline in the competition among conventional banks was observed, probably due to customers' preferences for Islamic banks as an alternative. The further decline led to increased competition in Islamic banks (Perry & Rehman, 2011). During the crisis, Islamic banks did not encounter significant losses because of the prohibition of speculative activities and the inclusion of non-interest instruments (Alam, Hamid, & Tan, 2019). Finally, due to the financial crises, the competitive pressures in the industry increased, and competition among Islamic banks has risen.

Table 2. Correlation Analysis

	ROA	ROE	Zscore	LERN	lnTA	ETA	GLTA	DIV	HHI	GDP growth	inflation
ROA	1										
ROE	0.704***	1									
Zscore	0.229***	0.269***	1								
LERN	0.566***	0.471***	0.264***	1							
lnTA	0.114***	0.269***	0.177***	0.380***	1						
ETA	0.300***	-0.183***	0.0606**	0.175***	-0.318***	1					
GLTA	-0.0966***	0.107***	0.0126	0.0869***	0.181***	-0.383***	1				
DIV	-0.0188	-0.132***	-0.263***	-0.0809***	-0.0513*	0.137***	-0.250***	1			
HHI	0.101***	0.0377	0.0483*	0.308***	0.146***	0.0898***	-0.0697**	0.0205	1		
GDP growth	0.0665**	0.0887***	0.0259	-0.0800***	-0.0888***	-0.0346	0.0643**	-0.0243	-0.218***	1	
inflation	-0.0187	0.0218	-0.201***	-0.271***	-0.277***	-0.0146	0.0184	0.0138	-0.179***	0.0945***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

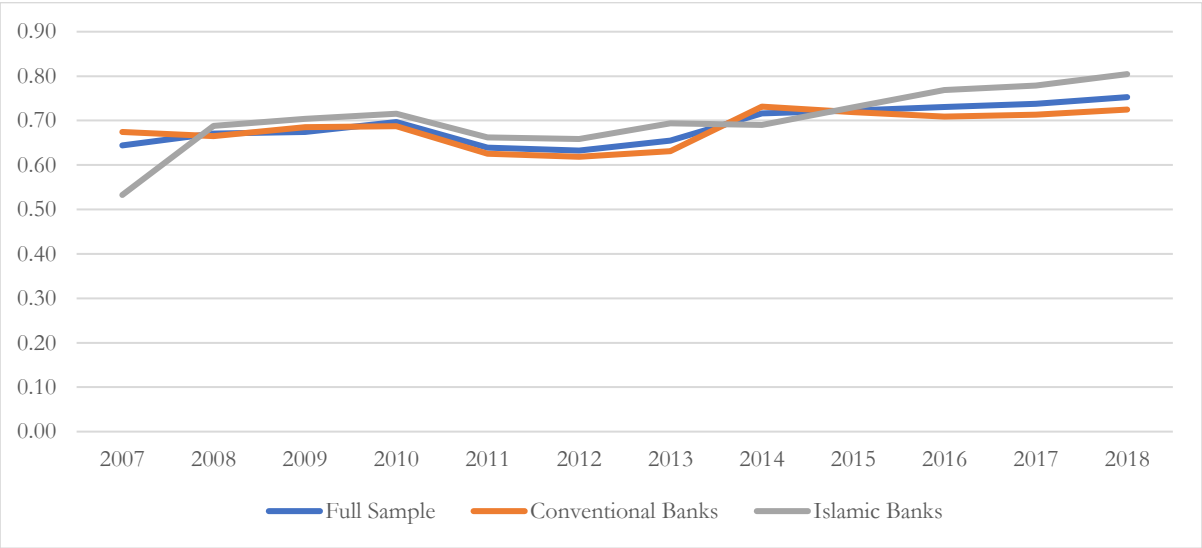

Figure 1. Competition in the Banking sector

This study employs the GMM technique in two stages of the method. The insignificant estimates for AR (1) and AR (2) signify the presence of a serial association, and the validity of instruments is validated by the trial of insignificant values of Hansen, suggesting the legitimacy of constraints of over-identification. Hansen values show that uncorrelated instruments are used in the analysis. Heteroscedasticity and endogeneity problems have been observed in the analysis, making it a suitable model.

Table 3 presents the impact of competition on banks' financial performance. Equation 6 estimates ROA, ROE, and score as the dependent variable. The regression results show that

competition, bank size (LNTA), equity ratio, loan ratio (GLTA), and inflation, describes a significant variation in banks' profitability. The findings appear consistent, and a significant positive association between the Lerner Index and the banks' profits (ROA and ROE) is found. By interpreting inversely, the results show strong evidence that competition negatively impacts banks' profits. For banks' risk measures, the findings also suggest that greater market power improves banks' stability, and increased bank competition deteriorates banks' stability. The findings are aligned with the "competition-fragility" viewpoint and verify the findings of Dima, Dincă, and Spulbăr (2014), Kabir and Worthington (2017), and Turk Ariss (2010). The research suggests that the increase in bank competition instigates higher risk-taking and investment in riskier portfolios to offset declining returns and margins and maintain market power. The signs and relationships are consistent for control variables in most regressions with various control variables combinations.

Table 3. Impact of Competition on bank's financial performance

	(1) ROA	(2) ROE	(3) Zscore
L.ROA	0.0533*		
	(0.097)		
Lerner	2.8022***	23.2216***	0.0912**
	(0.000)	(0.000)	(0.023)
lnTA	0.0748**	1.2001***	0.0415***
	(0.030)	(0.009)	(0.000)
ETA	0.0019	-0.2515***	0.0160***
	(0.704)	(0.000)	(0.000)
GLTA	0.1982**	2.6469**	0.2153***
	(0.043)	(0.029)	(0.000)
Divers	0.1518	1.4643	0.1584***
	(0.237)	(0.241)	(0.002)
HHI	-10.2197	-34.1956	-1.9957**
	(0.108)	(0.469)	(0.036)
GDP growth	0.0335*	0.4133**	0.0073
	(0.087)	(0.015)	(0.104)
Inflation	0.0467***	0.3830***	0.0078
	(0.000)	(0.008)	(0.122)
Islamic	0.1396**	2.5956***	0.0337
	(0.044)	(0.002)	(0.194)
Crisis	0.2467	2.5697*	0.0917**
	(0.160)	(0.056)	(0.016)
L.ROE		0.0925**	
		(0.017)	
L.lnzscore			0.8596***
			(0.000)
Constant	-0.1790	-8.0818	-0.0888
	(0.735)	(0.189)	(0.560)
Observations	311	311	311
instruments	27.0000	27.0000	33.0000
groups	38.0000	38.0000	38.0000
Arellano-Bond: AR(1)	0.2602	0.0836	0.0043
Arellano-Bond: AR(2)	0.1587	0.1313	0.2655
Sargan Test (p-Val)	0.6158	0.0010	0.0004
Hansen Test (p-Val)	0.2337	0.1519	0.1319

P-values are in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The most critical and relevant control variables is total assets. The total assets (LNTA) have a significant positive association indicating more risk-taking by the large banks that is not easy to manage; therefore, they invest in riskier investments. This claim is endorsed by Mishkin's "too big

to fail" statement, where they do not instantly fail even if more risks are taken. GLTA is found positive and significant in all regressions, implying that a fraction of bank risk is also disturbed by the loan growth. The Islamic dummy has a positive value, implying greater profitability for Islamic banks than the conventional counterparts.

Moreover, the HHI is only significant in model (3) with a negative coefficient. This value suggests that severe concentration in the market lowers the bank's stability. Income diversification is positively significant, which suggests that diversification enhances banks' stability and lowers banks' risk. The crisis is positive, suggesting that the Malaysian banking sector benefitted during the financial crisis. This might be because investments from other economies were moved to relatively lower-risk economies, which led to increased profitability and lower banks risk.

Table 4. Impact of competition on banks' financial performance (Islamic vs Conventional)

	(1) ROA	(2) ROE	(3) Zscore
L.ROA	0.0537*		
	(0.100)		
Lerner	2.9326***	22.8655***	0.1318**
	(0.000)	(0.000)	(0.014)
lnTA	0.0765**	1.2289***	0.0402***
	(0.029)	(0.008)	(0.000)
ETA	0.0023	-0.2430***	0.0156***
	(0.662)	(0.001)	(0.000)
GLTA	0.1719*	2.6247**	0.1941***
	(0.059)	(0.030)	(0.000)
Divers	0.1626	1.5811	0.1607***
	(0.169)	(0.212)	(0.001)
HHI	-10.9406**	-45.7743	-1.7438*
	(0.042)	(0.354)	(0.071)
GDP growth	0.0428**	0.4260**	0.0064
	(0.018)	(0.012)	(0.176)
inflation	0.0351***	0.4031***	0.0086
	(0.000)	(0.006)	(0.109)
Islamic	0.3091***	2.2082*	0.0798**
	(0.001)	(0.077)	(0.036)
Islamic # Lerner	-0.7458*	2.5318	-0.1759
	(0.051)	(0.656)	(0.134)
Crisis	0.3299**	2.7436**	0.0831**
	(0.043)	(0.046)	(0.040)
L.ROE		0.0950***	
		(0.007)	
L.lnzscore			0.8669***
			(0.000)
Constant	-0.2003	-7.5464	-0.1208
	(0.693)	(0.225)	(0.394)
Observations	311	311	311
instruments	28.0000	28.0000	34.0000
groups	38.0000	38.0000	38.0000
Arellano-Bond: AR(1)	0.2478	0.0806	0.0043
Arellano-Bond: AR(2)	0.1840	0.1309	0.2745
Sargan Test (p-Val)	0.5227	0.0011	0.0004
Hansen Test (p-Val)	0.2121	0.1616	0.1311

P-values are in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4 reports the possible difference in the effect of competition on banks' profits in Islamic banks. To investigate any possible impacts of bank type (whether Conventional or Islamic)

on the association, we use equation 7, where dummy interaction for Islamic banks is added in regression. The interaction term is only significant for ROA, which shows that the increased market power leads to lower return on assets, suggesting that competition might benefit Islamic banks to grow. This finding is inline with the competition-stability point of view (Boyd & De Nicolo, 2005; Kick & Prieto, 2015; Schaeck & Martin Čihák, 2007). The insignificant interaction term shows that the impact of Islamic banks is not different from conventional banks. It appears that competition is negatively impacting the profitability of Islamic banks as well. Hence, we suggest that competition lower banks' profits regardless of bank type.

Robustness Checks

In order to support further findings, the models are reestimated using difference GMM, and the findings are explained in Appendix A1 and A2 for sections 4.2 and 4.3, respectively. Once again, the diagnostics confirm that the estimated model is valid and out of serial-auto correlation issues and that the instruments are valid. The main results are in line with the earlier discoveries, which suggest that competition in the banking sector enhances a bank's financial performance in terms of profitability and stability. Furthermore, the results of the difference in the effect of competition for the Islamic banks are robust, too, suggesting that Islamic banks might face a different relationship than conventional banks supporting the competition-stability view. The results of robustness checks are given in Appendix A. This current research also perform robustness checks with the traditional Lerner index and give results that remain unchanged and are available upon request.

The general discovery from this research is that banks face extra risk exposure when an increase in banking rivalry is found in the market. Besides, Islamic Banks might face a different relationship than conventional banks in terms of return on assets. Since no change is found in the impact of competition on return on equity and Z-score, Islamic banks might follow traditional banking operations that have diminished the distinction between Islamic and Conventional Banks. A few advocates of Islamic banking that the main essence and the Islamic banking is the feature of Profit and Loss sharing; nonetheless, it is practically not found. It is believed that they invest in profit and loss-sharing instruments, and currently, banks offer most debt-based instruments. That is the prime concern with the Islamic banking sector and exposes them to conventional partners. Chong and Liu (2009) argue that Islamic banking offers little benefit with loss sharing that creates similarity of the Islamic banks to conventional banking rates and henceforth are not liberated from the premium. The Islamic financing methods are value put together and based on benefit and misfortune sharing, as Mudarabah and Musharakah make little commitment to the Islamic bank's speculation portfolios (Chong & Liu, 2009; Ibrahim & Rizvi, 2017; Khan, 2010).

Conclusion

This research explores the association between market competition and financial performance by looking into profits incurred and risks faced by the banks. The research uses Malaysia as a sample country and the data from 2007-2018. The reason for considering Malaysia specifically is that it has an established dual banking market. This research is expected to conclude deeper insights into the relationship in the dual banking system. The issues like omitted variable bias, simultaneity, and endogeneity are avoided using a two-step system GMM model. Using an efficiency-adjusted market power, this research shows that competition lowers the profits of the banks and exposes them to more risks, supporting the competition-fragility view.

While conducting this research, it was observed that conventional banks have a greater profitability ratio than Islamic banks. Furthermore, to better understand this association between conventional and Islamic banks, a dummy is included in the analysis to reflect Islamic Bank interaction. It is reported insignificant, implying no possible major difference in the association of different bank types, whether Islamic or conventional. The results support the "competition-fragility" viewpoint irrespective of the bank type. In the case of competition, currently, Islamic banks are more competitive than their conventional counterpart.

Overall, the results support that more competition promotes the banking sector to invest in risky ventures and compensate for the revenue losses, thereby declining profitability. This finding further reveals that banking these days still rely on basic banking operations like granting loans (or financing in Islamic banks), collecting deposits, and managing the payment systems. It is advised that regulators and policymakers improve the financial infrastructure in terms of controlled competition in banking sectors and influence banks to diversify their operations efficiently.

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Appendix

Table A1. Robustness check: Impact of Competition on financial performance

	(1) ROA	(2) ROE	(3) Zscore
L.ROA	0.0474		
	(0.381)		
Lerner	2.4768***	35.6657***	0.2172***
	(0.000)	(0.000)	(0.000)
lnTA	0.0188	0.2111	-0.0045
	(0.846)	(0.853)	(0.874)
ETA	0.0167	-0.0611	0.0527***
	(0.101)	(0.407)	(0.000)
GLTA	0.3573**	1.2087	0.1806*
	(0.017)	(0.673)	(0.085)
Divers	0.2794	-3.7976	0.0438
	(0.171)	(0.271)	(0.398)
HHI	-13.1967***	-145.5794**	-2.4830**
	(0.001)	(0.033)	(0.039)
GDP growth	0.0597***	0.5785**	0.0055
	(0.000)	(0.011)	(0.215)
inflation	0.0299**	0.4914**	0.0067
	(0.022)	(0.022)	(0.188)
Crisis	0.4576***	3.7934**	0.0297
	(0.002)	(0.011)	(0.425)
L.ROE		0.1321**	
		(0.022)	
L.lnzscore			0.1558
			(0.101)
Observations	273	273	273
instruments	23.0000	23.0000	22.0000
groups	38.0000	38.0000	38.0000
Arellano-Bond: AR(1)	0.2460	0.0774	0.2985
Arellano-Bond: AR(2)	0.3066	0.5971	0.8462
Sargan Test (p-Val)	0.3841	0.0004	0.0120
Hansen Test (p-Val)	0.0991	0.0906	0.1205

P-values are in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2. Robustness check: Impact of competition on banks financial performance (Islamic vs Conventional)

	(1) ROA	(2) ROE	(3) Zscore
L.ROA	-0.2467		
	(0.325)		
Lerner	2.5351***	29.8288***	0.1550**
	(0.000)	(0.000)	(0.029)
lnTA	0.1697	1.1394	0.0029
	(0.221)	(0.288)	(0.915)
ETA	0.0088	-0.0539	0.0531***
	(0.593)	(0.376)	(0.000)
GLTA	0.3210	2.6548	0.2066**
	(0.180)	(0.242)	(0.042)
Divers	0.1212	-2.2420	0.0693
	(0.651)	(0.467)	(0.250)
HHI	0.6937	-64.6009	-2.6144**
	(0.926)	(0.203)	(0.032)
GDP growth	0.0367	0.5491***	0.0065
	(0.232)	(0.006)	(0.154)
inflation	0.0126	0.2861	0.0061
	(0.561)	(0.186)	(0.222)
Islamic # Lerner	-0.9595*	-9.1684	0.1451
	(0.074)	(0.250)	(0.290)
Crisis	0.3804	3.8396***	0.0404
	(0.100)	(0.006)	(0.303)
L.ROE		0.1718***	
		(0.006)	
L.lnzscore			0.1590*
			(0.093)
Observations	273	273	273
instruments	15.0000	24.0000	23.0000
groups	38.0000	38.0000	38.0000
Arellano-Bond: AR(1)	0.6389	0.0601	0.2903
Arellano-Bond: AR(2)	0.1809	0.5389	0.8504
Sargan Test (p-Val)	0.2670	0.0001	0.0107
Hansen Test (p-Val)	0.1386	0.1000	0.1377

P-values are in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$