Competition and Risk Taking Behaviour Of Islamic Banks

Dr. Nafis Alam
Associate Professor, Nottingham University Business School,
University of Nottingham Malaysia Campus,
Jalan Broga, 43500, Semenyih. Selangor. Malaysia.
Tel: +60-3-89248279   Fax: +60-3-89248019
nafis.alam@nottingham.edu.my

M. Kabir HASSAN
Professor of Finance
Department of Economics and Finance
University of New Orleans
New Orleans, LA 70148
Phone: 504-280-6163
Fax: 504-280-6397
Email: mhassan@uno.edu

Abstract

This paper studies and compares competition and risk-taking behaviours within the two banking systems consisting of 59 Islamic banks and 149 conventional banks from 10 emerging countries between 2006 and 2013. The level of competitiveness between the two types of banks is determined using Lerner index and estimations show that Islamic banks have lower market power than conventional banks. After controlling all the bank and country-specific variables, the results show that competition and risk are negatively related for conventional banks and inversely related for Islamic banks which undoubtedly emphasize that inherent difference between risk-competition relationships among these two distinct bank types. However, the results also give a clear evidence of a significant and positive risk-competition relationship for all banks. Overall, the results provide evidence in favour of traditional view where higher monopoly market power associated with less competition reduces the banks' risk-taking behaviour.

Introduction

One of the interesting issues to look at in the banking literature is the contrast of risk-taking behaviour of different banks and the factors that cause the banks to adopt different structures of risk. According to Saurina, Jimenez & Lopez (2007), "excessive competition among banks could threaten the solvency of particular institutions and, at an aggregate level, hamper the stability of the entire banking system", meaning bank failures always come together with an increased competition in banking market. Hence, the effect of competition in banking-sector is one of the key determinants that impact on bank risk-taking. Nevertheless, existence theory and empirical evidence on this subject produced mixed and contradictory results.

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The traditional view from the previous economic and finance literatures hold that there is a positive relationship between the risks that banks take and the competition that the banks face (Hellmann, Murdock & Stiglitz 2000; Repullo 2004; Forssback & Shehzad 2011). It means that the incentive of banks to take on more risk is increased as competition increases. This relationship is based on this "competition-fragility view", which is also called "charter value hypothesis" or "franchise value paradigm" (Allen & Gale 2004). Charter or franchise value can be stated as the value of a bank being able to continue its business in the future (Saurina, Jimenez & Lopez 2007). Thus, the competition-fragility view assumes that banks in excessive competition banking systems are less concentrated and have less market power which will erode the charter values of the banks. Banks have less market power to extract the monopoly benefits from the charter values which will eventually lead them to take on more risks with riskier policies such as lowering the level of capital or acquire more credit risk in the loan portfolio, in order to maintain its former profits (Keeley 1990). This traditional competition-fragility view also assumes that bank competition occurs only in deposit market and contracting problems like moral hazard effects in which private information and borrowers' actions depend on the interest rates charged by banks do not occur under this view (Boyd, De Nicolo & Al Jalal 2006).

Contrary to this view, a recent literature based on BDN model which is also known as "competition-stability view" by (Boyd & De Nicolo 2005; Boyd, De Nicolo & Al Jalal 2009) suggested that the risk taking behavior of banks and competition within the sector have a negative correlation. This correlation is based on the existence of contracting problem; that the moral hazard problem occurs within BDN model. The model is founded on the study and comparison of both deposit and loan market competition concurrently which is different from the traditional view which only analyzing on the deposit market competition. The model suggests that reduced competition in banking-sector can lead to higher interest rates being passed onto the business loans.

According to this competition-stability view, the offset between stability in banking sector and the competition implied by the deposit market competition based on "competition-fragility view" could be eliminated by the loan market competition since the recent view incorporates both approaches. This recent view basically provides the only incentives to the banks to maintain the traditional asset side policies from the economy rents earned from the depositors. A "risk-shifting paradigm" proposed by this recent model indicates more competition in loan and deposit markets could promote the stability of the banking market by lowering the borrowers' default risk over the long run. A positive correlation between banks' overall default risk and banking concentration shown in empirical evidence hints that more competition in banking sector should be correlated with lesser bank risk-taking behaviour and thus create a greater bank stability

provided by (De Nicolo et al. 2004; Boyd & De Nicolo 2005; Boyd, De Nicolo & Al Jalal 2006 and Boyd, De Nicolo & Al Jalal 2009).

The empirical literature presented mixed findings on the impact of competition on bank risk-taking. Marcus (1984) and Keeley (1990) found that the "charter value hypothesis" is supported by early evidence on US data where they presented a positive correlation between the bank risk-taking behavior and the level of competition. Recent studies however revealed a different result. For instance, a negative relationship between the competition and bank risk-taking is shown by Boyd, De Nicolo & Al Jalal (2009). Also, a more recent study from Martinez-Miera & Repullo (2010) extended the BDN model by allowing for the imperfectly correlated loan defaults and identify that in a low competition market, increased in interest rates will boost the default risk of firms which borrowed funds from the banks. However, there is also a margin effect at the same time where the banks generate more revenues from those non-defaulted borrowers who pay the increased interest rates. This MMR model shows a "U-shaped" association between the competition and bank risk-taking; which implies that as the number of banks grow in the market, the probability of banks to default will be first declined and then increased at some certain point. Berger, Klapper & Turk-Ariss (2009) also showed a non-monotonic outcome between competition and bank risk-taking. However, the risk measures being used will determine whether there is a positive or negative effect; either the banks' asset risk or banks' overall default risk.

Despite the reality that Islamic banks grow rapidly in today's economy, there are little systematic and regular analysis and studies on the topic of the impacts competition have on bank-risk taking in Islamic banks. Majority of the previous studies only focused on the comparison of banking performance, such as the comparison of cost-profit efficiency and financial stability in dual-banking systems, for example studies provided by (El-Gamal & Inanoglu 2005; Chihak & Hesse 2008 and Alam 2012). Although studies conducted by Weill (2011) or Sahut, Mili & Krir (2011) focused on the comparison of market power between Islamic and conventional banks; but these studies did not cover any comparative association between competition and risk-taking behavior among Islamic and conventional banks. Hence, it is not surprising that the effects that competition has on bank-risk taking behavior in Islamic banking concepts are in a grey zone with unexplored questions. This topic still remains ambiguous in theory and empirically under investigations even though there are relatively large amounts of literatures in conventional banks. The comparison of the effects of competition on bank risk-taking behaviors between these two banking systems; to existing theory, has never been done.

Literature Review

There are different measures of bank competition used by the existing studies and these studies mainly focus only on the deposit market competition. For instance, early evidence tested on U.S. data using Tobin's q to measure the bank market power is done by Marcus (1984) and Keeley (1990). Keeley (1990) used "Tobin's q as an indirect measure of the degree of bank competition in which the Tobin's q is the ratio of a bank's equity market valuation to its book value." The author also utilized two proxies as the measure of bank riskiness; funding costs of certificates of deposits and banks' solvency ratio which is the capital's market value divided by asset's capital value. The author showed that Tobin's q is eroded by liberalization measures where other factors like macroeconomic variables and bank features were under control.

Besides Marcus (1984) and Keeley (1990), there are also other studies using U.S. data as the sample. Demsetz, Saidenberg & Strahan (1996) used U.S. data and showed that banks in U.S. have the largest solvency ratios and lower level of asset risk when they have greater market power. At the same time, Brewer & Saidenberg (1996) used publicly traded U.S saving as the sample and discovered a negative relationship after testing the association between the franchise value and risk, where the volatility of the stock price is used as the dependent bank risk variable. In order to verify and reinstate the traditional view, Saurina, Jimenez & Lopez (2007) also tested the correlation between the "loan market power and portfolio risk" by using the data from Spanish banks. The measure of loan market power used by the authors in their study is a Lerner index established from the bank-specific interest rates. The author used non-performing loans as the bank risk variables and the explanatory variables include GDP, size of the banks, loan ratio as well as ROA. A negative association is found between the loan market power and bank credit risk, stating that financial stability is promoted when the credit risks decrease with an increase in the loan market power, supporting the franchise value paradigm. Still, the result did not consider the overall bank risk as it only examined the loan portfolio risk.

Although the former studies focused only within one country, there are quite a few studies that emphasizes on the effects of competition on bank risk-taking in cross-country setting. Using 69 countries' banking data for more than 20 year period, Beck, Demirguc-Kunt & Levine (2006) used four regulatory variables namely: capital regulatory index, banking freedom, economic freedom and KKZ composite when conducting the research and the authors observed a positive association between concentration and restriction on bank activities and they showed that systemic banking crisis are less likely to occur in countries where the countries have a more concentrated national banking sector and thus, the banks in those countries are more stable. Additionally, Levy-Yeyati & Micco (2007) used H-statistic as the measure of banking competition in eight Latin American countries and found that increased in competition will increase the bank risk-taking. Their research used solvency ratio as the measure of bank risk and explanatory variables include ROA

and equity to total assets ratio. In general, there is large number of literature supporting the traditional franchise value paradigm.

Forssback & Shehzad (2011) selected a sample of 800 banks across the globe in the years from 1995 to 2001 to test the effects of competition on bank risk-taking. The authors used Lerner index to measure the bank level competition for each loan and deposit market. The authors took into account of the effects of both deposits insurance and charter value in their study and their results strongly supporting the traditional competition-fragility view, where greater market power associated with limited banking competition reduce the risk-taking behaviour which is caused by the existence of deposit insurance.

With a sample of using bank-level data from 23 developed countries, Berger, Klapper & Turk-Ariss (2009) used HHI index as the measure of country-wide concentration for both deposit and loan market competition. The study found a significant non-monotonic association between bank competition and bank risk-taking behaviour. However, a positive or negative relationship will need to depend on the risk proxy used. The results suggested by the authors are consistent with the traditional franchise value paradigm where banks with higher market power engage in less riskier activities. The findings also reinforce the competition-stability view where banks with greater market power increase the loan risk in the countries.

The studies regarding the effects of competition on the bank risk-taking behaviour has always been focused on the conventional banks and not the Islamic banks. Even though there are some of the empirical studies comparing the market power between Islamic banks and their conventional competitors, those studies did not focus on how competition impacts bank risk-taking in dual-banking system. Prior studies concentrated mostly on the performance comparison such as banking efficiency, financial stability as well as the financial ratios comparison in the banking sector (El-Gamal & Inanoglu 2005; Cihak & Hesse 2008; Olson & Zoubi 2008; Weill 2011; Sahut, Mili & Krir 2011 and Alam 2012).

A recent study by Weill (2011) focused on the analysis of market power in both conventional and Islamic banks. Weill used a cross –country sample of 17 countries from Middle East and South East Asian to examine if Islamic banks had higher market power than conventional banks over the period of 2000 to 2007. The result showed that Islamic banks have lower market power than the conventional banks resulting from the nature of Islamic banking concept which forbids the banks to charge interests and limit their ability to charge on high prices on their financial products. Sahut, Mili & Krir (2011) conducted a study on the factor of competitiveness of Islamic and conventional banks in MENA region and the effect of competition on banks' profitability. Their study used PR-H statistic of Panzar & Ross (1987) and Lerner index to measure the competition of dual-

banking systems and found that conventional banks are less competitive than Islamic banks. Moreover, Islamic banks also tend to have higher market power over the conventional banks.

Methodology

There are several well established tools in measuring the bank competitiveness in the banking literature, for instance, Panzar-Rose (1987) H-statistics which often known as PR-H statistic, the Lerner index by Lerner (1934), the concentration ratio (CR) as well as the Herfindahl-Hirschman index (HHI index). For this study, the Lerner index will be used to reveal the level of market power when assessing monopoly pricing power. Lerner index has an advantage against Panzar-Rose H-statistic where the index is not a long-run equilibrium measure of competition and can be computed at each point of time (Berger, Klapper & Turk-Ariss, 2009; Sahut, Mili & Krir 2011).
In this study, Lerner index is computed to determine the market power of each bank in the sample. Several recent studies have used Lerner index in measuring the bank competition, for instance, studies by (Saurina, Jimenez & Lopez 2007; Berger, Klapper & Turk-Ariss 2009; Weill 2011; Sahut, Mili & Krir 2011; Forssback & Shehzad 2011 and Ireta 2012). It is defined as the difference between price and marginal cost, divided by price. To calculate the Lerner index, a translog cost function will be first estimated by constrained linear regression, imposing symmetry and linear homogeneity restrictions (Forssback & Shehzad 2011). The cost function is shown as follows:

$$\ln TC_{it} = \alpha_0 + \alpha_1 \ln Y + \frac{1}{2}\alpha_2 (\ln Y^2) + \sum_{j=1}^{3} \beta_j \ln w_{jit} + \sum_{j=1}^{3}\sum_{k=1}^{3} \beta_{jk} \ln w_{jit} \ln w_{kit}$$

$$+ \sum_{j=1}^{3} \gamma_j \ln Y \ln w_j + \varepsilon_{it} \qquad (1)$$

where TC denotes total costs, Y denotes one output (total assets),
        w_{jk} (w_1, w_2 and w_3) indicate three input prices (i.e. price of labour, price of physical capital and price of borrowed funds).

The estimated coefficients derived from the cost function are then used to calculate the marginal cost (MC). The derivative of the logarithm of total cost with respect to the logarithm of output is calculated using the cost function in Equation (1). Thus, the estimation of marginal cost is based on the cost function presentation. The translog cost function is estimated with one output (total assets) and three input prices (price of labour, price of physical capital and price of borrowed funds) as already mentioned above. Marginal cost is then given by:

$$MC_{it} = \frac{TC_{it}}{y_{it}} \left[\alpha_1 + \alpha_2 \ln y_{it} + \sum_{j=1}^{3} \gamma_j \ln w_{jit} \right] \qquad (2)$$

Finally, once the marginal cost is estimated and price of output is calculated, Lerner index for each bank and year can be calculated in order to obtain a direct measure of bank competition (Berger, Klapper & Turk-Ariss 2009; Weill 2011; Sahut, Mili & Krir 2011; Forssback & Shehzad 2011 and Ireta 2012). The Lerner index indicates the proportion by which price above marginal cost, and is calculated as:

$$Lerner\ index_{it} = \frac{P_{TAit} - MC_{TAit}}{P_{TAit}} \qquad (3)$$

where P_{TAit} is the price of banking outputs for bank i at time t, MC_{it} is the marginal costs for bank i at time t.

The resulting *Lerner index_{it}* is averaged over time under the study for each bank i. It takes values between 0 and 1. When price equal to marginal cost; the Lerner index tends towards zero and the banks are said in a purely competitive market and no pricing power. When the index is high and tends towards one, reflecting there is a high mark-up of price above marginal cost; hence, the banks have a monopoly power and the market power is increased. Generally, Lerner index = 0 indicates perfect competition in a market; whereas Lerner index = 1 indicates monopoly in a market. As stated by Forssback & Shehzad (2011), Lerner index is an "opposite measure of competition where a high Lerner index implies lower competition."

Data and Sample

Once the Lerner index of each bank in each year is computed, the next step is examining the effects competitiveness have on banks' risk-taking behavior. Given the consideration of both theoretical and empirical literature mentioned above, this paper uses the framework to evaluate the correlation between competition and risk by basing on the works proposed by (Saurina, Jimenez & Lopez 2007; Berger, Klapper & Turk-Ariss 2009; Forssback & Shehzad 2011 and Alam 2014).

The sample used in this study consists of banks in 10 countries which is mainly located in Gulf Cooperation Council (GCC) and South East Asia (SEA): Bahrain, Bangladesh, Indonesia, KSA, Kuwait, Malaysia, Pakistan, Qatar, Turkey and UAE. The number of observation for Islamic banks is 472, while number of observations for conventional banks is 1192; hence, the total number of observations for all banks is 1664. These countries are chosen as the sample in this study because of both Islamic banks and

conventional banks coexisted during the period 2006-2013. According to World Bank & International Monetary Fund, these 10 countries especially Indonesia, KSA, Malaysia, Qatar, Turkey, UAE (refer as QISMUT) together with Bahrain hold two-thirds of Islamic banking assets in the world. Banking data has been taken from Bankscope database over the period 2006-2013. Additionally, a number of bank-specific and country-specific macroeconomic variables as well as regulatory variables are used to examine the risk-competition relationship.

The risk proxy used as the dependent variable in the main regression in Equation (4) is loan-loss reserve (LLR). A number of prior studies have used loan-loss reserve as the proxy of asset risk, such as studies by (Shaffer 1998; Dick 2006; Forssback & Shehzad 2011 and Alam 2012). Higher loan-loss reserve indicates that banks have greater risk in the future.

Bank-specific variables include size of the bank which is measured as the natural log of total assets (TA), the ratio of equity over total assets (the capitalization ratio) (ETA), the return on average assets (ROAA), the ratio of net loans to total assets (NLTA), the ratio of cost to income (CI).

Country-specific variables are included in the main regression to take account of broad banking system differences across the countries in the sample. The average annual growth rate of gross domestic product per capita (ΔGDP) is a variable that is used to control for each country's economic performance. Another country-specific variable is average annual growth rate of consumer price index (CPI). Similar to GDP per capita, consumer price index is often the most frequently used statistics for identifying a country's inflation or deflation. The demands for the financial products depend on the level of economic activity in each country and thus, it is also important to control for consumer price index variable when analysing the risk-competition relationship.

Regulatory variables such as supervisory power (SPOWER), capital requirements (CAPRQ), private monitoring (PRMONIT) and restrictions on bank activities (ACTR) taken from World Bank database as referred in (Jayaratne & Strahan 1998; Barth, Caprio & Levine 2001; Repullo 2004; Dick 2006 and Alam 2014), are included in the main regression due to the reasons that these variables may impact on bank risk-taking behaviour.

$$LLR_{ij} = \alpha + \beta_1 LI_j + \beta_2 TA_{ij} + \beta_3 NLTA_{ij} + \beta_4 ETA_{ij} + \beta_5 ROAA_{ij} + \beta_6 CL_{ij} + \beta_7 SPOWER_j + \beta_8 CAPRQ_j + \beta_9 PRMONIT_j + \beta_{10} ACTRS_j + \beta_{11} \Delta GDP_j + \beta_{12} CPI_j + \beta_{13} Year_j \quad ......(4)$$

Table 1 – The distribution of Islamic and conventional banks by country.

Country	All Banks	Conventional banks	Islamic banks

Bahrain	19	8	11
Bangladesh	28	25	3
Indonesia	37	34	3
KSA	12	9	3
Kuwait	9	6	3
Malaysia	28	13	15
Pakistan	21	16	5
Qatar	9	6	3
Turkey	24	20	4
UAE	21	12	9
All	208	149	59

As shown in Table 1, the comparison of total numbers of both Islamic and conventional banks tells that Islamic banks dominate the banking systems in countries like Bahrain and Malaysia. The banking systems of other countries however, can be seen as developing one.

In order to express the significance of Islamic banking in the banking industry for each country in the sample, the allocation of total assets of either banking concepts is presented in Table 2.

Table 2 - Distribution of total assets between conventional and Islamic banks.

	2006		2009		2011		2013	
	Million (USD)	%	Million (USD)	%	Million (USD)	%	Million (USD)	%
Conventional banks	1197910	90.21	1855779	86.25	2356262	85.90	2784361	85.04
Islamic banks	130061	9.79	295866	13.75	386738	14.10	489765	14.96
Total	1327972		2151646		2742999		3274126	

Source: Bankscope database and author's own calculations.

Table 3 displays the descriptive statistics of banks by country. It is noted that in terms of total assets, conventional banks express an overall total asset of USD 13635.943 million,

while Islamic banks, in general, show total assets of USD 5483.304 million. Islamic banks in KSA have the largest size in total assets (USD 20574.24 million), followed by Kuwait (USD 17375 million) and Qatar (USD 9399.81million). On the other hand, conventional banks in KSA also has the largest share of total assets (USD 33439.4 million), followed by Malaysia (USD 28393.45 million) and UAE (USD 22956.1 million).

In terms of profitability ROAA, conventional banks made larger profits than Islamic banks in total (1.508 against 0.736) which show a contrasting result found by Olson & Zoubi (2008). Islamic banks in Qatar have a higher profitability (3.938), whereas Islamic banks in KSA, Kuwait and Turkey have a similar economic efficiency to conventional banks. Conventional banks are more profitable than Islamic banks might due to the reasons that conventional banks have higher net financing and better asset quality, while Islamic banks offer financial products to clients based on profit and loss sharing contracts. It is not surprised that conventional banks earn more profits than Islamic banks since conventional banks accept interest as one of their major sources of revenues and do not share losses with clients (Cihak & Hesse 2008 and Perry & Rehman 2011).

Islamic banks express equity to total assets (ETA) significantly higher than conventional banks (16.398 against 14.948 for conventional banks). This is in line with the various conducts practiced by both types of banks where Islamic banks engage more in equity dealings. Also, in terms of cost to income ratio, Islamic banks show a higher cost to income ratio than conventional banks (53.028 versus 49.706 for conventional banks), indicating Islamic banks are less efficient in controlling cost and increasing profits compared to conventional banks. However the study conducted by El-Gamal & Inanoglu (2005) proves otherwise, where the authors discovered insignificant difference in efficiency between the two types of banks. In terms of net loans to total assets, conventional banks have higher ratio for net loans to total assets than Islamic banks in total (56.496 against 49.401 for Islamic banks).

Table 3 – Descriptive statistics of individual variables of banks by country.

		Islamic banks					Conventional banks				
		TA	ETA	ROAA	CI	NLTA	TA	ETA	ROAA	CI	NLTA
Bahrain	Mean	1532.929	30.000	0.573	63.131	28.618	11195.293	12.656	0.807	45.487	44.002
	Std. dev	1228.343	25.407	7.381	94.652	24.500	11030.713	5.397	1.411	19.712	14.940
Bangladesh	Mean	713.756	-12.136	-2.126	55.385	73.423	1759.323	7.563	1.131	48.318	65.004
	Std. dev	577.037	30.702	6.375	39.291	7.543	1678.796	3.937	1.904	35.352	10.604
Indonesia	Mean	3998.317	6.260	0.886	56.312	63.646	6346.023	24.152	1.085	56.969	55.605
	Std. dev	9593.824	2.673	0.569	24.236	25.557	12274.020	170.398	4.664	27.731	19.512
KSA	Mean	**20574.238**	26.006	**2.090**	46.203	54.442	**33439.393**	13.313	**2.273**	35.624	57.162
	Std. dev	24168.306	24.918	1.777	28.688	26.046	20292.632	2.950	1.636	11.181	6.946
Kuwait	Mean	**17375.027**	14.952	**0.945**	49.897	58.859	18699.792	12.206	**1.424**	29.788	60.691
	Std. dev	19331.536	2.681	1.846	13.019	8.520	14081.600	3.053	1.655	7.197	7.009
Malaysia	Mean	3725.584	11.099	0.169	43.877	47.829	**28393.452**	7.530	1.105	42.520	56.848
	Std. dev	3574.046	16.455	2.757	25.232	22.055	25127.364	1.969	0.488	10.084	12.738
Pakistan	Mean	725.488	21.025	-0.746	105.007	40.781	4400.811	9.947	0.652	69.908	46.640
	Std. dev	733.780	21.806	2.735	77.772	12.968	3780.212	6.654	1.994	59.423	10.430
Qatar	Mean	**9399.808**	25.522	**3.938**	21.303	56.725	17830.320	17.296	**2.127**	32.597	51.673
	Std. dev	6061.767	16.796	1.859	7.568	14.526	25605.468	13.963	0.981	17.264	19.635
Turkey	Mean	6953.892	11.433	**2.099**	46.302	66.399	22365.469	18.954	**2.948**	55.814	54.422
	Std. dev	3474.056	3.006	0.900	9.482	17.001	30228.716	19.169	4.886	24.845	20.593
UAE	Mean	7376.446	15.256	1.310	43.524	55.349	**22956.070**	15.238	2.294	34.579	65.660
	Std. dev	8341.061	14.557	4.394	49.190	26.884	24818.632	4.692	1.255	11.548	12.347
Total	Mean	5483.304	**16.398**	0.736	**53.028**	**49.401**	13635.943	**14.948**	1.508	**49.706**	**56.496**
	Std. dev	9647.801	21.214	4.423	56.234	24.867	20825.459	81.942	3.208	32.077	16.488

The cost function in Equation (1) is calculated for each bank in each year in order to allow the coefficients of the translog cost function to change over time. Table 4 presents the evolution of Lerner index between 2006 and 2013 for both Islamic and conventional banks.

Table 4 – Bank-wise Lerner index.

	Conventional banks	Islamic banks
2006	0.31160	0.32255
2007	0.36879	0.08476
2008	0.49440	0.12992
2009	0.40579	0.29306
2010	0.20682	0.14579
2011	0.22893	0.11259
2012	0.21385	0.03015
2013	0.23832	0.24465

Source: Bankscope database and author's own calculations

As illustrated in Table 4, it is noted that conventional banks indicate more market power than Islamic banks because of the higher Lerner index presented after considered the entire sample. During the period 2006-2008, the Lerner index for conventional banks increased, indicating a minor reduction in competition in conventional banking industry. This occurrence was followed by a reduction in the Lerner index during 2009-2010, indicating an increase in competition. During 2011-2013, the value of the Lerner index for conventional banks increased again, which show a decrease in competitive conditions. The evolution of Lerner index for conventional banks appears logical as the year 2007 was said to be the beginning period of the financial crisis, and conventional banks suffered major losses during this sub-prime mortgage crisis. Hence, causing a few conventional banks to go bankrupt and competition during this period has decreased and market power increased (Sahut, Mili & Krir 2011).

The Lerner index for Islamic banks however, did not show a clear-cut trend over the period. During the period 2006-2008, the Lerner index for Islamic banks decreased from 0.32255 to 0.12992, indicating an increase in competition. The result makes sense since the competition for conventional banks decreased during this period because of the financial crisis and Islamic banks was preferred as an alternative financial service at that time. Islamic banks did not suffer major losses during financial crisis mainly due to their financing methods in which interest and all forms of speculation are prohibited and thus, boosting the competition for Islamic banks during

this period (Perry & Reyman 2011). This occurrence was followed by an increase in the value of Lerner index during 2009, showing a slight decrease in competition. During 2010-2011, the Lerner index for Islamic banks again reduced in values, suggesting a minor increase in competitive conditions. In 2013, the value of the Lerner index increased again, which show a decrease in competition.

Table 5 – Relationship between bank risk-taking and independent variables with loan-loss reserve as dependent variable

Variables	All Banks	Conventional Banks	Islamic Banks
LERNERINDEX (LI)	0.008	-0.032	0.003
TA	0.006*	0.004*	0.008*
ETA	0.002	0.004	-0.063*
ROAA	-0.276*	0.043	-0.668*
CI	0.015*	0.042*	-0.001
NLTA	-0.122*	-0.181*	-0.072*
ΔGDP	0.021	-0.082	0.032
CPI	0.140*	0.148*	0.035
SPOWER	0.000	-0.001	-0.003
CAPRQ	0.003	0.001	0.000
PRIMON	-0.009	-0.004	0.008
ACTR	-0.011*	-0.010*	-0.001
OBSERVATION	1664	1192	472
R-SQUARED	0.100	0.151	0.209

Note: * indicates significance at the 5 percent level.

For the bank-specific variables, it can be observed from Table 5 that for the full sample (all banks), the relationship between Lerner index as a measure of bank competition and bank risk-taking is positive. This is in line with the results found by (Saurina, Jimenez & Lopez 2007 and Forssback & Shehzad 2011). The same relationship was true for Islamic banks, but it is found that there is a negative correlation between competition and risk-taking behavior for conventional banks. However, the results for all three samples are not significant. In the case of TA, there is a positive and significant result on both Islamic and conventional banks. The results show that large banks from both types seem to take on more risks and have higher loan-loss

reserve, since large banks are harder to control and thus, engage in more risky activities. This finding is supported by the "too-big-to-fail" view from (Boyd & Runkle 1993 and Mishkin 1999) where bigger banks dare to take on more risks since they will not fail easily. ETA however, shows a negative and significant result for Islamic banks, but a positive and insignificant result for conventional banks. Banks with higher equity on hand tends to have more prudent risk-taking behavior and thus, have lower loan-loss reserve as stated by (Saurina, Jimenez & Lopez 2007 and Berger, Klapper & Turk-Ariss 2009). This is true for Islamic banks where the banks hold more equity due to the practice of profit and loss sharing contracts and high risks can be offset by higher equity capital.

With respect to ROAA, it can be observed that for the full sample (all banks), there is a negative correlation between the return on average assets and loan-loss reserve. Banks with higher ROAA have a tendency to take on less risk. The same relationship was true for Islamic banks, but conventional banks show a contrasting insignificant result. The negative relationship for Islamic banks could be because larger return on assets usually indicates larger profits for the banks and banks tend to take on lesser risky activities to further increase their profits (Olson & Zoubi 2008). Table 9 also shows that the CI is significantly positive related to loan-loss reserve for conventional banks, but shows an insignificant negative relationship for Islamic banks. As an efficiency measure, a negative relationship between cost to income ratio and banks' loan-loss reserve indicate that efficient banks have a good organization and usually have less risk-taking behaviors. Hence, the result indicates that efficient conventional banks take on less risk as they are more efficient in controlling costs than Islamic banks. The last bank-specific variable is NLTA, is significant negatively related to risk for both Islamic and conventional banks, implying that the growth of loans is closely related to the level of loan-loss reserve (Alam 2012).

For country-specific variables, it can be seen that the ΔGDP has a negative effect on conventional banks and positive effect on Islamic banks, but the relationship between ΔGDP and loan-loss reserve are not significant (Saurina, Jimenez & Lopez 2007). CPI however, is positively associated to the overall banking sector risks. CPI has a positive effect on both Islamic and conventional banks, although the findings only express significance in conventional banks. This finding indicates that the banking system will engage in more risks if there is an increase in price level of consumer goods and services in an economic.

For the regulatory variables, it can be stated that SPOWER has a negative correlation on both types of banks, but a positive association on full sample (all banks). These results are supported by studies conducted by Allen & Gale (2000) and Levine (2003). However, the relationships for all three samples are not significant. With respect to CAPRQ and PRIMON, the results show statistically insignificant. A positive correlation is between CAPRQ and loan-loss reserve for all three samples. PRIMON however, expresses a positive association for Islamic banks only, while a negative association for conventional banks and all banks. The insignificant results for both

CAPRQ and PRIMON are not in line with the findings by Repullo (2004) and Konishi & Yasuda (2004) which suggested that capital requirements and private monitoring takes on as a huge significant role in banks' risk-taking behavior. In the case of last regulatory variable, ACTR shows a negative and significant relationship between loan-loss reserve for conventional banks while a positive and insignificant relationship for Islamic banks. These results imply that if restrictions are imposed by regulators on bank activities; conventional banks will tend to undertake less risky undertakings since higher activity restrictions result in lower loan-loss reserve and this is in line with the findings of Claessens & Laeven (2004).

Robustness Check

To further deal with the rationality of the results generated in Table 5, an alternative dependent variable is used to test for the bank competition and risk-taking behaviour of bank. The alternative dependent bank risk variable used is non-performing loans, which has also been widely used in banking literature (Salas & Saurina 2003; Saurina, Jimenez & Lopez 2007 and Berger, Klapper & Turk-Ariss 2009), while other independent variables remain the same. Higher non-performing loans also indicate that banks have higher credit risks. Table 6 shows the relationship between bank-risk taking and independent variables using non-performing loans as dependent variable.

Table 6 – Relationship between bank risk-taking and independent variables with non-performing loan as dependent variable.

Variables	All Banks	Conventional Banks	Islamic Banks
LERNERINDEX (LI)	0.864*	-0.597	0.526
TA	0.785*	0.855*	0.562*
ETA	-0.189*	-0.088*	-2.587*
ROAA	-5.209*	-5.252*	-2.081
CI	-0.538*	-0.225*	-0.339*
NLTA	-0.853*	-2.160*	0.411
ΔGDP	0.635	-2.646*	2.399
CPI	0.073	1.590	-3.792*
SPOWER	0.125*	-0.006	0.215*
CAPRQ	-0.034	-0.032	0.039
PRIMON	0.155	0.308*	-0.413
ACTR	-0.140*	-0.027	-0.513*
OBSERVATION	1664	1192	472
R-SQUARED	0.668	0.763	0.583

Note: * indicates significance at the 5 percent level.

Table 6 shows that for the bank-specific variables, Lerner index has a positive association between non-performing loans for the full sample (all banks) and Islamic banks (Saurina, Jimenez & Lopez 2007). However, the table shows a negative result for conventional banks and this is in line with Boyd & De Nicolo (2005) and Boyd, De Nicolo & Al Jalal (2006). These results are in accordance with the results estimated in Table 5. The only difference is the result is positively significant for the full sample (all banks). In the case of TA, there is a positive and statistically significant relationship for both Islamic and conventional banks. This is true as banks with larger size always come to have higher credit risks, since large banks have many debtors which in turn increase the risks that these debtors not making payments on time and thus increase the non-performing loans of banks (Boyd & Runkle 1993 and Mishkin 1999). ETA also shows a negative and significant result for both Islamic and conventional banks. It can be interpreted that the higher loan risks received by banks will be offset by higher equity capital engaged by banks. Banks holding more equity capital allow them to mitigate loan risks as they are backed by this equity capital as stated by Berger, Klapper & Turk-Ariss (2009).

With respect to ROAA, it is observed that a negative and significant result for conventional bank, but a negative and insignificant result for Islamic banks. The negative relationship between ROAA and risk-taking of banks indicates that higher margin and profits earned by banks can lower the non-performing loans of banks, ultimately, reducing banks' risk-taking behaviors (Olson & Zoubi 2008). Table 6 shows that CI has a statistically significant and negative impact on both Islamic and conventional banks. This is in contrast with the results estimated in Table 5. The table also shows that NLTA has a negative and significant result for conventional banks, but a positive and insignificant result for Islamic banks. The growth of loans again is closely linked to the level of non-performing loans.

For country-specific variables, it can be seen that the ΔGDP has a statically significant negative impact on conventional banks, but a positive and insignificant impact on Islamic banks. Banks conduct and take on more risks when the growth rate of GDP per capita within an economy slows down. CPI on the other hand, has an insignificant positive impact on all banks and conventional banks, but significant negative impact on Islamic banks. These results are not in accordance with the results estimated in Table 5.

For the regulatory variables, SPOWER shows a positive effect on both full sample (all banks) and Islamic banks and the results are statistically significant. These findings are not in accordance with the results estimated in Table 9 where SPOWER shows insignificant results for all three samples. CAPRQ again shows insignificant results for all three samples and not in line with Repullo (2004). Another regulatory variable PRIMON shows a positive and significant result on conventional banks which is supported by the findings found by Delis et al. (2009) and Konishi & Yasuda (2004). The better monitoring in banks can lower the banks' risk-taking behaviors. However, this result contrasting the result reported in Table 5. In the case of ACTR, it

is shown that ACTR has a negative and significant result on all banks and Islamic banks, but show a contrasting result on conventional banks. Banks will tend to take on less risky acts if there are restrictions on banking activities imposed by regulators (Claessens & Laeven 2004).

Although the results from robustness check show differences compared to the results in Table 5, it can still be concluded that the results are indeed robust on the risk-competition relationship when a negative correlation for conventional banks and positive correlation for all banks as well as Islamic banks is presented.

Conclusion and Implications

The study found that Islamic banks have lower market power compared to conventional banks as supported by Weill (2011) and different from the findings by (Kuran 2004 and Sahut, Mili & Krir 2011). When examining the risk-competition relationship, results suggest that bank competition have a negative correlation for conventional banks, whereas, a positive association for all banks and Islamic banks, but the relationships are not significant for all three samples. It is also clear that both Islamic and conventional banks with larger size tend to take on more risks since the total assets have a significant positive relationship between loan-loss reserves for both bank types. Islamic banking however, with their religious based system allow them to hold more equity and more profitable than conventional banks and thus, have lower loan-loss reserve. Conventional banks, on the other hand, are more efficient in controlling costs than Islamic banks and hence, have lower loan-loss reserve.

This paper will contribute to policy makers like central banks, and other international agencies operating in countries where dual-banking systems coexist. This study will enable researchers and relevant organizations to understand the market power of each type of banks and how the varying degrees of market power could impact banks' risk-taking behaviour of the two types of banks. The findings from this research will be of high use for government policy for countries with highly dual-banking environment in implementing policy such as licensing of new Islamic and conventional banks as the results provide particular implications that the policymakers could employ for the management and regulation of the banks.

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