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Market Concentration of Malaysia's Islamic Banking Industry

(Penumpuan Pasaran Industri Perbankan Islam di Malaysia)

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ABSTRACT

The aim of this paper is to evaluate the nature and changes of market concentration in the Malaysia's Islamic banking due to the restructuring of Islamic banking industry within the liberalization wave in the banking market. A total of 17 Islamic banks operating over the period of 2000-2010 had been considered. The structural approach framework was used to evaluate the nature and changes of market concentration in the Islamic banking industry in Malaysia. Under this approach, various market concentration indexes has been calculated from year to year basis as proposed by the industrial organizational field. Findings herein supported the structure-conduct-performance (SCP) paradigm where different concentration ratios have decreased over the study's period where this is reflected in the greater degree of competition in the Malaysia's Islamic banking industry. This study found an evidence that structural changes in the Islamic banking market has changed the market structure of the respective market from moderately concentrated to low concentrated market; whereby supporting the existence of competitive environment in the Malaysian Islamic banking market. Present study contributed to new knowledge in banking market concentration particularly for Islamic banking industry in the emerging economies such as Malaysia. Many past studies studying this issue had extensively examined the conventional banking system, but only several studies were on Islamic banking market. Hence, this study may enrich the existing literature on this issue, particularly for the Islamic banking industry. Policy recommendation from the findings; first, Malaysian Islamic banking industry needs a contestable market environment as to enable them to achieve better profit and efficient operation. Second, concentration ratios from this study can be used to identify the optimal number of banking firms in the Islamic banking industry.

Keywords: Competition; concentration measures; Islamic banking industry; market structure

ABSTRAK

Tujuan kajian ini adalah untuk menilai keadaan dan perubahan penumpuan pasaran dalam sistem perbankan Islam di Malaysia kesan daripada penstrukturan industri perbankan Islam dalam gelombang liberalisasi pasaran perbankan. Sebanyak 17 bank Islam yang beroperasi telah dipilih bagi tempoh 2000 hingga 2010. Kerangka pendekatan struktural telah digunakan untuk menilai keadaan dan perubahan dalam sistem perbankan Islam di Malaysia. Berdasarkan pendekatan ini, pelbagai indeks penumpuan akan dihitung bagi setiap tahun seperti yang diutarakan dalam bidang organisasi industri. Dapatan kajian menyokong paradigma struktur-gelagat-prestasi (SCP) yang menunjukkan penurunan dalam indeks penumpuan yang dihitung sepanjang tempoh kajian. Dapatan ini menunjukkan berlakunya peningkatan darjah persaingan dalam industri perbankan Islam di Malaysia. Kajian ini juga membuktikan perubahan struktur dalam pasaran perbankan Islam telah mengubah struktur pasaran industri berkenaan daripada pasaran yang mempunyai darjah penumpuan sederhana kepada penumpuan rendah. Ini menyokong kewujudan persekitaran persaingan dalam pasaran perbankan Islam di Malaysia. Kajian ini juga menyumbang kepada pengetahuan baru dalam isu penumpuan pasaran perbankan terutamanya bagi industri perbankan Islam khususnya bagi negara ekonomi baru muncul seperti Malaysia. Kebanyakan kajian lepas berkenaan isu ini lebih tertumpu kepada sistem perbankan konvensional, hanya sedikit kajian yang dilakukan berkaitan dengan industri perbankan Islam. Seterusnya, saranan polisi daripada dapatan kajian adalah seperti berikut; pertama, industri perbankan Islam di Malaysia memerlukan persekitaran pasaran contestable untuk membolehkannya mencapai keuntungan dan beroperasi secara efisien. Kedua, indeks penumpuan yang diperoleh dalam kajian ini boleh digunakan untuk menentukan bilangan firma perbankan yang optimal dalam industri perbankan Islam.

Kata kunci: Persaingan; ukuran penumpuan; industri perbankan Islam; struktur pasaran

ININTRODUCTION

The regulation of the Islamic banking system has contributed to the structural changes in the Islamic banking industry; which is operated side by side with the conventional banking system. The structural changes which can be observed from the number of banking institutions and their ownership highly impacted the banking market's structure particularly in terms of market concentration. During the early stage, the Islamic banking industry in Malaysia was monopolized by Bank Islam Malaysia Berhad (BIMB) for almost ten years, from 1983 to 1993. However, the regulation has resulted an increase in the participation of domestic and international players in the Islamic banking system in Malaysia. Hence, the Islamic banking sector was opened to greater competition due to the entry of new domestic Islamic banks and more liberal entry of the foreign Islamic banks.

The development of Islamic banking system is not achieved overnight. It began in 1963 with the establishment of Tabung Haji. After 20 years, the first Islamic bank, BIMB, commenced its operation as a sole provider of Islamic banking products and services. After that, with a new player, products and services, the Islamic banking industry had experienced double digit growth for the last few years (see Table A1 in Appendix). The Islamic banking share of total banking assets in 2010 was at 20.7%, slightly greater than the target, 20% (Bank Negara Malaysia [BNM] 2011). The development in technology also helped the Islamic banks to offer their products and services effectively to the customers. An increase in the number of self-service terminal and alternative delivery channels give an opportunity to the banks to provide better services to their customers. For instance, the number of banks with internet services had increased from 3 banks in 2000 to 26 banks in 2010. Further, the use of debit, credit and charge cards also has grown by 124% from 17.2 million to 38.4 million between 2004 and 2010. This has increased the number of bankable customers. By implication, the banks with sophisticated delivery channels may gain market power in which then affect the level of concentration and competition in the banking market.

Besides facing competition from conventional banking system, the Islamic banking sector is also competing internationally in order to be recognized as the hub of Islamic finance. Hence, Bank Negara Malaysia has taken active steps in order to develop an innovative and competitive Islamic banking market through regulation and upgrading of the existing domestic Islamic banking institutions. Those strategies have changed the structure of the Islamic banking sector particularly in terms of the number, ownership and scope of banking operation of the institutions. Subsequent changes in the structural feature had changed the level of concentration and competition in the Islamic banking market due to the entry of new firms and changes in the scope of banking operation.

Henceforth, this paper attempts to evaluate the impact of structural changes driven by the enhancement of Islamic banking regulation specifically on the level of competition in the Islamic banking sector. The level of competition leads to the Islamic banking players to concentrate only on the several products and markets. The measures of concentration are many. Ferguson and Ferguson (1994) and Lipczynski (2005) argue that the seller concentration or market concentration measure must be able to capture the implications of both the number of firms and their relative sizes in order to assess the competitive nature in the markets or industries. Also, there is no single concentration measure that can capture everything that happened within the industry; and single measure of concentration is not the best due to the complexity of business environment (Kwoka 1985; Curry & George 1983); and there is no perfect measure of concentration where the measures used in any given situation depend on the availability of data and the question being examined (Waldman & Jensen 1998). Therefore, in our paper we deviate from previous studies, in the sense that we not only use two well-known measures of concentration, namely concentration ratio and Herfindahl-Hirshman index. Furthermore, there is no such study has been done on the Islamic banking system, and knowledge on the actual level of concentration in the market is important because it will give significant impact on bank's efficiency and welfare of the society.

This study would benefit and provide useful insight to policy makers and bank managers regards to Islamic banking market structure as they can create and implement suitable policies that may help to develop strong and healthy banking market. Restructuring and upgrading of the Islamic banking industry has given the industries players the room to operate full-fledged Islamic banks with new scope of operation. Prior to this, Islamic banks can make their own decision of operation which is separated from their conventional counterparts. This may change the behaviour of the banks in the industry which depends on the level of concentration in the market. For instance, bank in the highly concentrated market has the market power to set higher price for their products and services compared to the bank in the lower concentrated market. In addition, liberalization process also has increased the participation of international players in the Islamic banking industry. Those changes have made an impact on level of concentration and competitive behaviour among the banks in the industry. Thus, knowledge on the actual level of concentration in the market is important because it will give significant impact on bank's efficiency and welfare of the society.

The remaining discussion of this paper will be organized as follows. The following section presents the development of Islamic banking industry in Malaysia. Section 3 presents the relevant literature that utilised concentration measures to analyse competition nature in the banking industry. Section 4 provides data and

methodology used in this study. Section 5 discusses the findings on market concentration in Malaysian Islamic banking sector. Finally, this paper concludes in Section 6.

DEVELOPMENT AND STRUCTURAL CHANGE IN ISLAMIC BANKING INDUSTRY

Malaysia has emerged as the first country that implements dual banking system in which Islamic banking system is operated side by side with conventional banking system. According to Ahmad Mokhtar, Abdullah and Alhabshi (2008), the Malaysian model has been recognised by many Islamic countries as the model of the future and many countries have shown their interests by adopting the Malaysian system in their respective countries. Islamic banking activities in Malaysia were conducted by either Islamic banks that exclusively carrying out Islamic banking or through Islamic banking windows or subsidiaries which were setup by conventional banks. The implementation of Islamic banking system can be considered as one of the major developments in the Malaysian banking system in which had changed the landscape of Malaysian banking system.

The history of the Islamic banking in Malaysia began by the establishment of Tabung Haji (the Pilgrims Management and Fund Board) in 1963 by the government. The experience of managing Tabung Haji has given the government the idea to introduce a well-coordinated and systematic Islamic financial system. The development of the Islamic banking system in Malaysia can be categorised into three phases (Ahmad Mokhtar et al. 2008). The first phase is known as the period of familiarisation in which the first Islamic bank, Bank Islam Malaysia Berhad (BIMB) was established in July 1983 under the Islamic Banking Act 1983. In this period, BIMB was awarded the monopoly status in order to protect the bank from having competition from other conventional banks where their experiences are far richer than BIMB. Further, the aim in the second phase (1993-2003) of the development in Islamic banking system was to create a conducive-competitive environment among the banks as well as to create awareness among the public especially the Muslims on the benefits of Islamic banking system. In order to increase the number of players in the Islamic banking system, BNM had introduced *Skim Perbankan Tanpa Faedah* (SPTF) or interest free banking scheme in March 1993. Then, effective 1 December 1998, SPTF was then revisited and replaced with the *Skim Perbankan Islam* (SPI) or Islamic Banking Scheme (IBS). Further, the development of the Islamic banking system in this phase continued with the establishment of the second full-fledged Islamic bank, Bank Muammalat Malaysia Berhad (BMMB) in October 1999. The development in the second phase resulted in the significant increase of banking institutions that offer Islamic banking services and further dropped the monopoly status of BIMB. Further, the development in the third phase focused on the institutional development of the existing domestic Islamic banking division and the liberalization process of Islamic banking industry. Under the Financial Sector Master Plan (2001), new licenses had been given to qualified domestic industry players to operate full-fledged Islamic banks in order to stimulate competition among them in the Islamic banking system. Additionally, the liberalization process in this phase has contribute to the emergence of new foreign full-fledged Islamic banks such as Kuwait Finance House (Malaysia) Berhad, Asian Finance Bank Berhad and Al Rajhi Banking and Investment Corporation (Malaysia) Berhad.

Historically, the development in the Malaysian Islamic banking industry has contribute to the structural changes in the industry. The restructuring and upgrading of the Islamic banking system from Islamic banking unit to Islamic banking division, then to Islamic banking subsidiaries, and now as full-fledged Islamic bank has changed the structural landscape of Islamic banking industry in terms of the number of institutions and their scope of operations. In the meantime, liberalization process has also contribute to the influx of de novo foreign banks into the sector. These changes have given a significant implication to bank market concentration in this industry. For instance, upgrading the Islamic banking industry through the issuance of licenses to the domestic players to operate full-fledged Islamic bank has increased the market power of those institutions which operated as Islamic subsidiaries before. Transformation to full- fledged Islamic banks has changed the scope of operations of those banks which subsequently changed their market power. The changes in market power whether it is an increase or decrease can be analysed using banking market concentration indicators. As stated by Canoy, Vaan Dijk and Lemen et al. (2001), firms with market power may operate within the capacity limit of best-practice technologies in comparison to a firm with monopoly power that charges higher prices and produces less than optimal amounts of goods and services. Hence, industrial organization theory postulates that bank's market power positively relates to horizontal concentration.

Restructuring and upgrading of the Islamic banking system under the Financial Sector Master Plan (2001) within the liberalization wave has increased the participation of domestic and international players in the Islamic banking system in Malaysia. It is expected that an increase in the number of Islamic banks together with their networks (see Table A2 in Appendix) had contributed to the dramatic changes in the Malaysian Islamic banking industry particularly in terms of institutional and market concentration. The number of Islamic banks had rapidly increased from only 2 banks during 2000- 2004 to 17 banks in 2010 due to the upgrading of the domestic Islamic banking institutions and the entry of de novo foreign banks into the Malaysian Islamic banking market. As we can see, the increasing

number of institutions is also supported by improvement in their services via the increased number of offices and ATM networks during 2000-2010. It is expected that the increase in the number of institution together with the scope of banking operation may provide a significant implication towards competition and concentration in the Islamic banking market.

LITERATURE REVIEW

THEORETICAL CONTROVERSIAL OF CONCENTRATION

The issue of bank market concentration deserves a particular attention among the researchers. This has resulted in numerous bank concentration theories in the literature. The proponents of banking concentration emphasize the benefits of highly concentrated banking market. The benefits are: First, the increasing concentration in the banking market may help the banking firms to improve their efficiency level (Demergick-Kunt & Levine 2000); Second, less concentrated banking market with many small banks is more disposed to banking crises as compared to the concentrated banking sector with few large banks (Allen & Gale 2004); Third, the banking system with fewer large banks is less fragile as compared to the banking system with many small banks because large banks are able to diversified better than small banks (Beck, Demirguck-Kunt & Levine 2003); Fourth, banking firms in highly concentrated market are able to gain higher profit and therefore lower bank fragility (Beck et al. 2003); and, Fifth, it is easier to monitor a few large banks as compared to many small banks, therefore the probability of bank failure is lesser in more concentrated banking system (Beck et al. 2003).

In contrast, the critics of banking concentration have also listed the disadvantages of banking sector concentration. First, increase in banking concentration will lead to decrease in credit supply in the banking market (Berger 1995). Second, higher market concentration is associated with lower social economic welfare due to pricing behaviour of the banking firms which charge higher prices for financial services. Third, banking firms in a more concentrated banking market are more fragile, synonymous with the concept of "too big to fail" because they proposed that large banks are more difficult to be monitored as compared to many small banks (Boyd & Runkle 1993). Fourth, the degree of competition in highly concentrated market is lesser; therefore will adversely affect economic development (Smith 1998).

RELATIONSHIP BETWEEN MARKET CONCENTRATION AND COMPETITION

The analysis of the competitive environment in the markets can be identified by using the elements in the market structure such as size distribution of the firms and the number of firms in an industry. Hence, the number and size distribution of the firms in a particular market may affect the competitive environment of the respective market. For instance, an industry consisting of, for example eight equal-sized firms will be different from an industry with one dominant, and seven smaller firms. The literature on the measurement of competition which assesses the competitive behaviour of the banking firms in the banking market can be divided into two main streams; structural and non-structural approaches. The issue of competition has been widely researched in the industrial organization literature from 1980s onwards until now. The structural approach to measure competition is based on the structure-conduct-performance (SCP) paradigm and the efficient structure hypothesis (ES), as well as the number of formal approaches with roots in the industrial organizational theory such as contestable theory (Bikker & Haaf 2002a; Bikker & Haaf 2002b).

Theoretically, the SCP paradigm is based on the assumption that concentration will weaken competition by fostering collusive behaviour among the firms in the market, hence also known as 'collusion hypotheses'. Thus, the SCP paradigm expects a negative relationship between concentration and competition. The SCP paradigm is also known as 'Structural Model' because the arguments in this paradigm are based on the market structure of the banking firms where firms in highly concentrated market tend to collude and earn higher profit (Al-Muharrami, Matthews & Khabari 2006). Meanwhile, the efficiency hypothesis proposed by Demsetz (1973) stands on the argument that firms with superior efficiency may face competition from its rival and gain market power. Whereas, contestability theory suggests that bank with market power or bank that operates in concentrated banking industry may behave competitively as to deter entry of the potential entrants (Baumol 1982). Thus, the two latter theories expect a positive relationship between concentration and competition with the existence of other factors such as efficiency and condition of entry and exit in the market. Gilbert (1984) concluded that many studies in the banking sector had found a negative relationship between market concentration and competition where high concentration tends to reduce competitiveness in this sector.

So far, many recent studies on market concentration have focused on conventional banking industry and these studies were conducted by Rinkeviciute and Martinkute-Kauliene (2014) and Davcev and Hourvouliades (2013) on Republic of Macedonian banking industry, Bod'a (2014) on Slovak's banking industry, Staroselskoja (2011) on Lithuanian banking industry, Stavarek and Repkova (2011) on Czech's banking industry, Tushaj (2010) on Albanian banking industry, Sharma and Bal (2010) on Indian banking industry, Gajurel (2010) on Nepalese banking industry, Rezitis (2010) on Greek banking industry, Turk Ariss (2010) on 13 countries, Chan et al. (2007) on New Zealand and Australian

banking industry, Casu and Giradone (2006) on 15 European Union countries; and Deltuvaite, Vaskelaitis and Pranchkeviciute (2007) on Lithuanian banking industry. Meanwhile, limited studies have been conducted on this issue for Islamic banking industry. These studies were conducted by Turk Ariss (2010) on 13 countries, Abdul Majid and Sufian (2007a) on Malaysian banking industry and Al-Muharrami et al. (2006) on Arab Gulf Cooperation Council's countries.

In structural model, concentration ratios take a central position in order to describe the market structure and continually investigate the linkages between concentration and competition in particular industry. Many previous studies in the banking industry used only two measures of concentration, namely concentration ratio of *k* largest firms (CR_k) and Herfindahl Hirschman index (HHI) (Rezitis, 2010; Gajurel, 2010; Turk Ariss, 2010; Tushaj, 2010 and many others). The three-bank (CR_3) and five-bank (CR_5) concentration ratios were extensively employed in Turk Ariss (2009 & 2010), Abdul Majid and Sufian (2007a and 2007b), Bikker and Haaf (2002a & 2002b), Casu and Giradone (2006), Deltuvaite et al. (2007) and Al-Muharrami (2009); two-bank (CR_2) concentration ratio was used by Al-Muharrami (2009) and Abdul Majid and Sufian (2007a; 2007b), four-bank (CR_4) concentration ratio was employed by Rezitis (2010); one-bank (CR_1) was reported in Sharma and Bal (2010); and ten-bank (CR_{10}) concentration ratio was employed in Stavarek and Repkova (2011), Sharma and Bal (2010) and Bikker and Haaf (2002a). Almost all those studies also used HHI as a measure of concentration. However, among the previous studies, only the study conducted by Sharma and Bal (2010) used eight types of concentration measures, namely CR_k (CR_1, CR_3, CR_5 and CR_{10}), HHI, Comprehensive Industrial Concentration Index (CCI), Entropy and Gini index in investigating the relationship between concentration and competition in Indian conventional banking industry. So far no study on market concentration has been done for the Islamic banking industry by using various measures of concentration as covered in this study.

Many of the previous studies had used total assets to measure concentration indexes such as Sharma and Bal (2010), Bikker and Haaf (2002b), Casu and Giradone (2006) and Abbasoglu, Aysan and Gunes (2007). Meanwhile, total deposits had been used by Al-Muharrami et. al. (2006), Turk Ariss (2010), Abdul Majid and Sufian (2007a; 2007b); and total loans had been used by Turk Ariss (2010). The measures of industrial concentration may provide the information regarding the number and size distribution of firms in order to analyse the nature of competition in the industry concerned. According to neo classical theory, the greater the number of firms and the more uniform they are in size, the greater the degree of competition likely to be present in the industry (Ferguson & Ferguson 1994).

By using eight types of concentration ratios on total assets, Sharma and Bal (2010) concluded that market concentration in the Indian banking industry had decreased due to liberalization process in which was reflected in the increasing degree of competition in this sector. Many studies on conventional banking sector support the SCP paradigm which indicates the adverse relationship between concentration and competition as found by Deltuvaite et al. (2007) in Lithuanian banking sector, Bikker and Haaf (2002b) for 23 industrialized countries, and Stavarek and Repkova (2011) in Czech banking sector. Many studies concluded that the decreasing trend in concentration ratio reflects the change in the market structure of the banking industry; in which also implies the increasing trend in the level of competition in those markets (Gajurel 2010; Abdul Majid and Sufian 2007a).

However, findings from previous studies on market concentration are mixed; some studies found the banking market for particular countries are highly concentrated due to merger and consolidation process such as in Greece (Rezitis, 2010), New Zealand (Chan, Scuhmacher & Tripe 2007), Malaysia (Abdul Majid & Sufian 2007b); European Union countries (Casu & Giradone 2006); the existence of large banks as found by Bikker and Haaf (2002b), Al-Muharrami and Matthews (2009) and recently by Bod'a (2014). Whereas, study on banking market concentration in Islamic banking industry showed that Islamic banking sector is highly concentrated (Turk Ariss 2010; Abdul Majid & Sufian 2007a; Al-Muharrami & Matthews 2009).

DATA AND METHODOLOGY

The Islamic banking industry in Malaysia has experienced structural changes due to the upgrading of the system from window based operation, to subsidiary and then to full-fledged Islamic banks and liberalization process. Under the upgrading process, the domestic banking institutions that operate Islamic banking activities have been given new licenses to transform their operation from Islamic banking windows to subsidiaries or full-fledged Islamic banks. Meanwhile, under the liberalization process, foreign players are given the opportunity to offer Islamic banking products and services in the Malaysian banking industry. Hence, due to data limitation, we decided to include only those domestic banks involved in the upgrading process and foreign banks mentioned in this study.

As at the end of 2010, there were 17 banks in the Malaysian Islamic banking industry[1]. Many of those banks have experienced a transformation from operating Islamic banking windows, to subsidiaries or full-fledged Islamic banks. The domestic banks included in this study are only the anchor banks and we had dropped the targeted banks due to unavailability of data for those banks. Hence,

we have used data of those banks for the year 2000-2010; however the number of banks varied over the years due to internalization process in this sector. The bank level data in this study was taken from Bank Scope published by Bureau Van Dijk (BVD) database and supplemented by the published balance sheet and income statement provided in the individual bank's annual reports. The selection of those banks as a sample is appropriate based on the definition of relevant market. The banking market in this study is accurately defined because the selected banking institutions supply the products and services that are close substitutes.

Since the purpose of study is to evaluate nine types of concentration measures, hence absolute and relative measures will be calculated based on the weighting scheme as shown in Table 1. The weighting scheme of a number of concentration ratios discussed in this study is based on Marfels as stated by Bikker and Haaf (2002a), Deltuvaite et al.(2007), and Sharma and Bal (2010). They are as follows:

1. Weights of unity are attached to the shares of the number of bank ranked in descending order ($w_i = 1, \forall_i \leq k$) and zero weight for the remaining banks in the industry ($w_i = 0, \forall_i > k$). An example is the k bank concentration ratio (CR_k).
2. Banks' market shares are used as their own weight ($w_i = s_i, \forall_i$) greater weights are attached to larger banks. This index takes into account all banking firms in the industry without considering the size of banks, i.e. whether the banks are small or large. An example is the Herfindhal-Hirshman index (HHI). This index is well known in both theory and practice.
3. The ranking of the individual banks is used as weight ($w_i = i, \forall_i$) where bank can be ranked in descending or ascending order. As HHI, all banks are included in the calculation of these indexes. Examples are Rosenbluth index and the Hall-Tideman index.
4. Each market share is weighted by the negative of its logarithm ($w_i = -\log s_i, \forall_i$). A smaller absolute weight is attached to larger market shares. An example is Entropy index.

FINDINGS

Table 2 and 3 show the trends in various concentration measures during 2000-2010 for 17 Islamic banks in Malaysian Islamic banking sector.

ABSOLUTE MEASURE OF CONCENTRATION

Absolute measure of concentration emphasized on the number of firms and the market share that the firms have

TABLE 1. Features of concentration measure

Concentration Measure	Concentration Formula	Ratio Range	Typical Features
Concentration ratio of n bank	$CR_n = \sum_{i=1}^{n} s_i$	$0 < CR_n = 1$	Only takes large banks into account
HHI	$HHI = \sum_{i=1}^{N} s_i^2$	$1/n = HHI = 1$	Considers all banks; sensitive to entry of new banks
Entropy	$E_H = -\sum_{i=1}^{N} s_i ln s_i$	$0 = E_H = \log n$	Based on expected information content of a distribution
Relative Entropy	$R = E_H / \ln N$	$0 < R = 1$	Based on expected information content of a distribution
Hannan and Kay (HK) index	$HK(\alpha) = \sum_{i=1}^{N} s_i^{\alpha}$	$1/s_i = HK = n$	Sensitive to size distribution; $\alpha < 1$ stresses the influence of small banks and $\alpha > 1$ stresses the influence of large banks
Comprehensive Industrial Concentration Index (CCI)	$CCI = s_1 + \sum_{i=2}^{N} s_i^2 + (1 - s_i)$	$0 < CCI = 1$	Addresses relative dispersion and absolute magnitude.
Gini Index	$G = 1 - 2\int_0^1 L(X)d(X)$	$0 < G = 1$	Accounts all banks in the market, shows inequality in the distribution.
Variance of the Logarithms (VL)	$VL = \left(\frac{1}{N}\right) \sum_{i=1}^{N} [log_e(s_i) - \bar{s}]^2$		Shows inequality in the distribution.
Numbers Equivalents (NE) NE for HK NE Entropy	$NE\ HK(\alpha) = \left(\sum_{i=1}^{N} s_i\right)^{2/(1-\alpha)}$ $NE\ Entropy = e^{E_H}$		An inverse measure of concentration, show N equal-sized of firms in an industry.

Sources: Sharma and Bal (2010), Deltuvaite et al. (2007), Bikker and Haaf (2002a)

TABLE 2. Trends in absolute measure of concentration in Islamic banking industry

Year/Measures	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
No. of Banks	12	13	13	13	13	14	17	17	17	17	17
CR											
CR_2 (%)	0.51	0.49	0.48	0.48	0.44	0.42	0.33	0.30	0.28	0.29	0.33
CR_3 (%)	0.65	0.64	0.62	0.61	0.56	0.53	0.45	0.40	0.39	0.42	0.45
CR_4 (%)	0.75	0.74	0.71	0.72	0.66	0.62	0.54	0.50	0.48	0.53	0.55
CR_5 (%)	0.84	0.82	0.80	0.78	0.72	0.70	0.62	0.57	0.56	0.6	0.62
CR_8 (%)	0.97	0.93	0.90	0.90	0.84	0.85	0.80	0.71	0.73	0.76	0.78
HHI	1800	1700	1600	1600	1400	1300	1000	900	900	900	1000
Entropy	1.95	2.05	2.06	2.12	2.20	2.25	2.49	2.61	2.61	2.57	2.53
RE	0.76	0.80	0.80	0.83	0.86	0.85	0.88	0.92	0.92	0.91	0.89
CCI	0.10	0.08	0.08	0.07	0.06	0.06	0.04	0.03	0.03	0.03	0.03
HK(1.5)	0.40	0.39	0.38	0.37	0.36	0.35	0.30	0.28	0.28	0.29	0.30
HK(2)	0.18	0.17	0.16	0.16	0.14	0.13	0.10	0.09	0.09	0.09	0.10
HK(2.5)	0.09	0.08	0.07	0.07	0.06	0.05	0.04	0.03	0.03	0.03	0.03
NE											
HK (1.5)	6	7	7	7	8	8	11	12	12	12	11
HK(2)	5	6	6	6	7	8	10	11	11	11	10
HK (2.5)	5	6	6	6	7	7	9	11	11	10	9
Entropy	7	8	8	8	9	10	12	14	14	13	13

Notes: CR = concentration ratio, HHI = Herfindahl Hirshman index, RE = relative entropy, HK = Hannah and Kay index, NE = number of equivalent.
Source: Calculated by authors

in the particular market as shown in Table 2. Generally, a declining trend of CR_k on total assets indicates the evidence of growing competition in the Islamic banking industry due to increased number of banks, particularly the influx of foreign banks post-2004. Many researches have proposed a benchmark in classifying industry's market structure through the adoption of concentration ratio for four-largest (CR_4) banks (Bisant & Fatimah 2008; Muslim, Evertina & Narchayo 2008 & Gwin 2001). However, the classification given by Gwin (2001) is more detailed and useful in interpreting the market structure of an industry[2]. Following Gwin (2001), the market structure of Islamic banking sector can be classified as strong oligopoly due to the domination of total asset by the four largest banks, which exceeded 60 percent during 2000-2005. During this period, the domestic banking institutions were in the upgrading process. However, the structure of banking market had changed to monopolistic competition (CR_4<60%) for the period 2006 onwards due to internalization. The decreasing trend of CR_k as shown in Figure I also indicates the reduction in market power of the banking institution; whereby supporting the presence of competitive environment in the Islamic banking market particularly during the last five years.

The HHI[3] of total assets also shows a decreasing trend during the study period as shown in Figure 2. During 2000-2006 the Islamic banking market was considered as moderately concentrated market where the HHI exceeds 1000 and less than 1800. Hence, according to Gwin (2001), this market can be characterized as monopolistic competition or weak oligopoly. After 2006, the market was un-concentrated; hence evidencing monopolistic competition or effective competition structure (Gwin 2001).

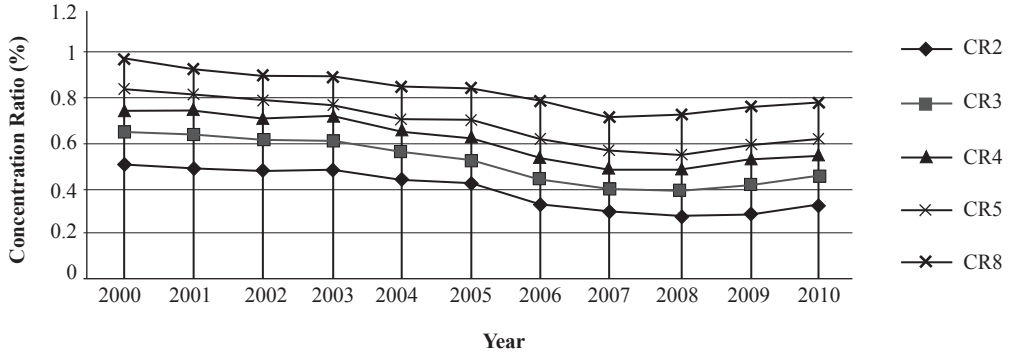

FIGURE 1. Concentration Ratio of Islamic Banks

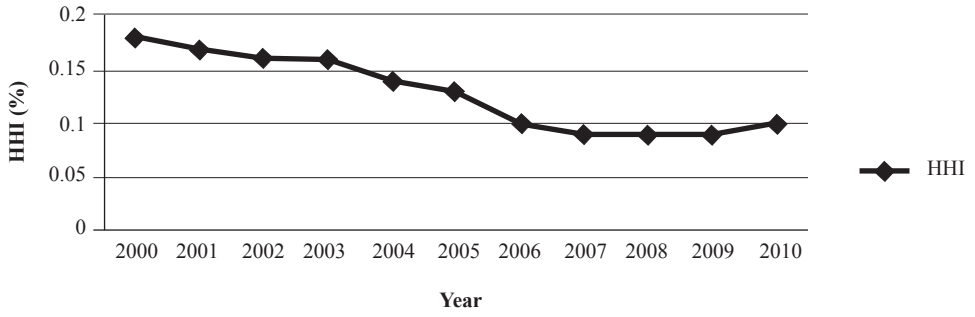

FIGURE 2. HHI of Islamic Banks

Besides, according to Nawrocki and Carter (2010), the entropy measure has been accepted in the economics literature as a measure of competition. The higher the entropy value, the higher the degree of competitiveness. The entropy value has been increasing over time (see Figure 3), hence indicating an increasing competition in the Malaysian Islamic banking market. The changes in relative entropy overtime which is close to one also shows the competitiveness of this industry. The CCI value which is close to zero over time also indicates an increasing level of competition in the Malaysian Islamic banking market.

Hannah and Kay (HK) indexes also showed the decreasing trend over the study period and the value of these indexes become smaller with large α which indicated that the level of concentration is decreasing over time; in which implied increasing level of competition in the Islamic banking market. Number of equivalent for HK index, HHI and Entropy indexes which showed an increasing number of banking institutions (equal-sized) also indicated the increasing level of competition among those institutions particularly after 2005, as shown in Figure 4.

RELATIVE MEASURE OF CONCENTRATION

Relative concentration measures focus on the disparities in the size of the firms operating in the industry. Theoretically, the more unequal the size distribution of the firms, the more concentrated the market; which implies lesser competitive environment in the particular market.

Variance of the logarithms of firm size (VL) is more accurate as a measure of dispersion or inequality in the firm's size distribution. The value of VL was getting smaller during 2000-2010 which implies a lower degree of inequality in firm's size distribution (see Table 3). This finding indicates the existence of competitive behaviour among the Islamic banks over time. Following the benchmark proposed by Marginean and Toma (2011), the

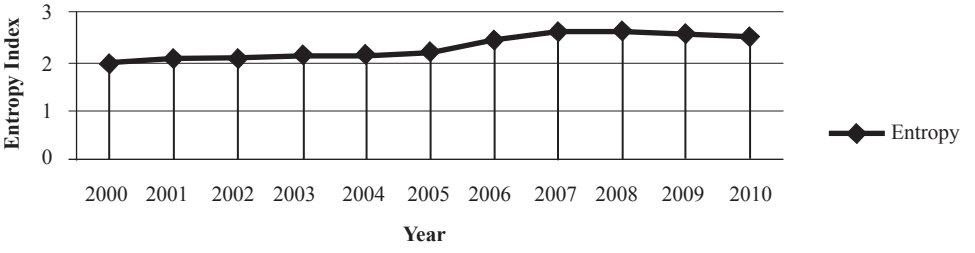

FIGURE 3. Entropy Index of Islamic Banks

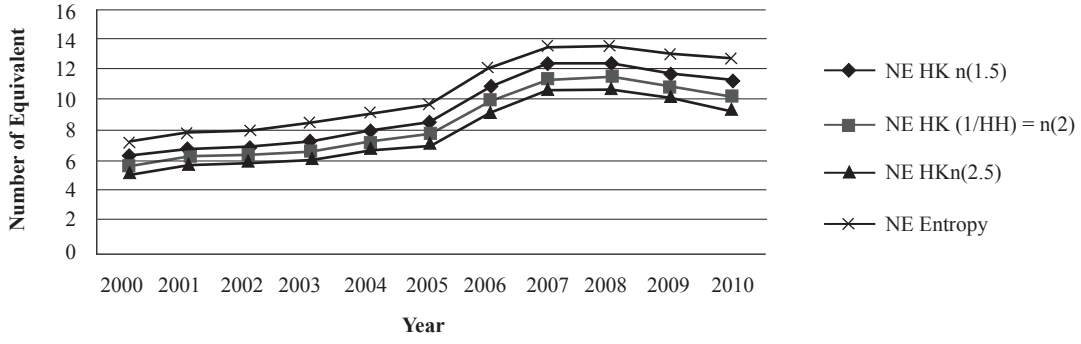

FIGURE 4: Number of Equivalent of Islamic Banks

TABLE 3. Trends in relative measure of concentration in Islamic banking industry

Year/Measures	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
VL	2.22	1.76	1.85	1.29	0.81	1.25	1.34	0.53	0.52	0.62	0.66
Gini	0.45	0.51	0.48	0.48	0.36	0.45	0.43	0.35	0.35	0.38	0.41

Source: Calculated by authors

trend of Gini values of the Malaysian Islamic banking industry had changed from medium concentrated market (2000-2006) to low concentrated market (2007-2009). This finding shows reduction in inequality among Islamic banks operating in Malaysian banking market. This finding indicates that Islamic banks in the Islamic banking market are operating in competitive market structure.

CONCLUSION

Generally, there are two sources of increasing concentration in the banking industry, namely internal growth and external growth, which are able to transform the banking landscape (Stiroh & Poole 2000). Internal growth refers to the expansion of existing subsidiaries, while external growth is related to merger and acquisition processes that are taking place in the banking industry and other related factors such as liberalization process. The changes in concentration in Malaysian banking industry are contributed by both internal and external growths through the upgrading of the Islamic banking institution from Islamic windows (subsidiaries), to full-fledged Islamic banks and on-going liberalization process[4]. The creation of full-fledged Islamic banks has given the opportunity to the operators of those institutions to run their businesses free from their conventional counterparts. This opportunity has increased the market power of those institutions in making business decision which might increase their profitability.

Theoretically, an increase in market power will lead to increase in market concentration. Nonetheless, although concentration measures show a declining trend, the Islamic banking market is moderately concentrated particularly in the earlier period (2000). However, on-going liberalization process has encouraged an influx of de novo foreign banks into Malaysian Islamic banking market in 2004 onwards. Internal growth has increased the market power of the domestic banking institutions, while external growth has increased foreign participation in the Malaysian Islamic banking sector. Hence, the net effect of internal and external growth is the reduction in market concentration measures that had been calculated using both absolute and relative measure of concentration.

These findings give several important policy implications. Firstly, both concentration and competition are important. Thus, the Islamic banking industry needs a contestable market environment as to propel them towards earning higher profit and more efficient operation. Second, the level of competition in the Islamic banking industry should be intensified with sufficient number of banking firms. We may use the concentration index to identify the optimal number of banking firms.

This study finds strong evidence in the changes of the market structure of Islamic banking industry in Malaysia from moderately concentrated market (Abdul Majid & Sufian 2007a) to low concentrated market. This result also indicates greater degree of competition in the Malaysian Islamic banking sector. Hence, findings of this study have contributed to new knowledge on banking market concentration particularly for Islamic banking industry in the emerging economies like Malaysia.

ENDNOTES

1. The banks are Affin Islamic Bank Berhad, Al-Rajhi Banking and Investment Corporation (Malaysia) Berhad, Alliance Islamic Bank Berhad, AmIslamic Bank Berhad, Asian Finance Bank Berhad, Bank Islam Malaysia Berhad, Bank Muamalat Malaysia Berhad, CIMB Islamic Bank Berhad, HSBC Amanah Malaysia Berhad, Hong Leong Islamic Bank Berhad, Kuwait Finance House (Malaysia) Berhad, Maybank Islamic Berhad, OCBC Al-Amin Bank Berhad, Public Islamic Bank Berhad, RHB Islamic Bank Berhad, Standard Chartered Saadiq Berhad and EONCAP Islamic Bank Berhad.
2. The benchmark proposed by Gwin (2001) is as follows: $CR_4 = 0$, the market is considered as perfect competition; $0 < CR_4 < 40$, the market is considered as monopolistic competition or effective competition; $40 < CR_4 < 60$, weak oligopoly or monopolistic competition; $CR_4 > 60$, strong oligopoly or dominant company with competitive edge; and $CR_4 > 90$, the market is considered as monopoly.
3. Department of Justice has provides the benchmark in interpreting the HHI. The HHI that less of 1000 represents a relatively un-concentrated market, the HHI between 1000 and 1800 represents a moderately concentrated market and HHI greater than 1800 are considered as highly concentrated market.
4. Islamic windows are departments within conventional banks set up, operating and maintaining Islamic banking operations as entities separate from their conventional banking operations (Kamaruddin, Safa & Mohd, 2008).

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APPENDIX

TABLE A1. Key financial indicator of Malaysian Islamic banking sector

Financial Indicator	RM million				
	2007	2008	2009	2010	2011_p
Total Assets	203,868.8 (15.5)	250,988.1 (17.4)	303,244.1 (19.6)	351,195.0 (20.7)	434,853.3 (22.4)
Total Financing	121,988.9 (17.3)	150,499.0 (18.9)	186,864.3 (21.6)	222,214.3 (22.7)	268,250.5 (24.3)
Total Deposit	154,763 (16.8)	194,385.5 (18.8)	235,938.1 (20.7)	277,549.8 (22.6)	340,249.4 (24.4)

Notes: Number in parentheses show percentage of total assets, total financing and total deposits of entire banking system.
p Preliminary
Source: Financial Stability and System Report, 2011.

TABLE A2. Key data on Malaysian Islamic banking system, 2000-2010

Year	Number of Institutions	Office Network[1]	ATM Network
2000	2	122	130
2001	2	122	178
2002	2	128	185
2003	2	132	212
2004	2	136	280
2005	6	766	308
2006	10	1,167	369
2007	11	1,271	413
2008	17	2,039	n.a
2009	17	2,087	n.a
2010	17	2,102	n.a

Notes: [1] Includes Islamic banks branches that are shared with conventional bank branches.
n.a – not available.
Source: Financial Stability and Payment System Report (Various issues).