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Technical Aspect in Islamic and Conventional Banking Comparison: Evidence from Malaysia

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ABSTRACT

The objective of this study is to evaluate the technology difference between Islamic and conventional banks. . To make an appropriate comparative study of Islamic and conventional banks performance, we use an unbalanced panel data of both Malaysian Islamic and conventional banks that spans the period from 1996 to 2010. The results show that there is some difference in the technical aspects of Islamic and conventional banks. In addition, domestic Islamic subsidiary banks use different technology from full-fledged Islamic banks and conventional banks.

Key Words: Technical Aspect; Islamic bank; Conventional Bank; Banking Sector; Malaysia.

INTRODUCTION

The stability and development of an economy is dependent upon the performance of Financial Sector of that country (Zaidi, 2005). Banking sector play a crucial role for country‘s financial development, specially for economical development in developing countries. Increasing globalization and the growing attraction of Islamic finance worldwide, has led to direct competition between Islamic and conventional banks although Islamic banking has had a relatively short history. Islamic banking is a large feature of the financial sectors mainly in Muslim countries, and financial sector growth and efficiency are important for economic development and stability (Al-Jarrah and Molyneux 2005; Brissimis et al 2009). It is fact that Islamic banks operate under such different rules from conventional banks makes comparisons of performance between the two banking types difficult. However, many researchers have attempted to measure and compare the productivity and efficiency of Islamic banks with conventional banks using either traditional financial ratio analysis or frontier analysis methods such as data envelopment analysis (DEA) and stochastic frontier analysis (SFA). Financial ratios are the easiest and popular method in assessing the performance of banks that use by some researchers. Among the studies that employ financial ratios to measure banks' efficiency are Samad and Hassan, 1999; Iqbal, 2001; Hassan and Bashir, 2003; Rosly and Abu Bakar, 2003; Haron, 2004; Samad, 2004; Olson and Zoubi, 2008. As far as banks are complex organizations, financial ratios cannot capture the complete picture of performance of bank over the breadth of its activities, and there is no criterion for selecting an appropriate ratio for all interested parties (Ho and Zhu, 2004) or in the context of Islamic banking where they don’t have optimization objective (Abdul-Majid et.al, 2010). Therefore, most studies focused on frontier analysis methods that include two different approaches namely the parametric and non-parametric methods. The most commonly used parametric approach is the Stochastic Frontier Approach (SFA) that is also known as the econometric frontier approach specifies a functional form for cost, profit or production relationship among inputs, outputs, and environmental factors while allowing for random error. Among the studies that employ SFA to measure banks' efficiency are Abd. Karim (2001), Abdul-Majid and Hassan (2011), Abdul-Majid, et.al.(2003;2010;2011a;2011b), Amir (2004), Suhaimi (2005), Mohamad, et.al. 2008, Fries and Taci (2005), Carvallo and Kasman (2005), Beccalli (2004), Kwan (2003), Hassan and Tufte (2001) and DeYoung and Hassan (1998). On the other hand, for the non-parametric approach, the DEA constructs the frontier of the observed input-output ratios by linear programming techniques. It estimates efficiency under the assumption of constant returns to scale and variable returns to scale. The studies that employ DEA include Bader et al. (2008), Suffian (2006 and 2007), Batchelor and Wadud (2004), Gishkori and Ullah (2013), Sturm and Williams (2004), Mukherjee et.al (2001), Burki and Niazi (2003), Qayyum and Ahmed (2006), Ray and Miller (2001) and Wheelock and Wilson (1999). Although numerous papers examine the performance and efficiency of banking systems between

Islamic and conventional banks across countries, their results are unsatisfactory because the significance of the technology difference between the two types of banking is often ignored. It might be argued that they use common technology in banking industry and operate in parallel. Hence, looking at both types of banks with different rules, history and experience and assume a common technology could lead to poor results. Therefore, answer to this question that technology under Islamic banks operation is same as conventional banks operation is crucial to the development of appropriate policies to improve banks efficiency. As far as Malaysia is second country in ranking by their remarkable and memorable policies in the sector of Islamic banking, it is important to look at the technical gap before comparing the performance and efficiency of Islamic banks and conventional banks. Moreover, Malaysian banking sector has undergone major structural change such as government reforms to improve the bank infrastructure and allow for increased competition (Aziz, 2006). As much as, competitive conditions are likely to affect bank performance and efficiency (Berger and Mester, 2003), the importance of technology differences on competitive conditions and banks efficiency is obvious. Therefore, comparison the efficiency of Islamic banks and conventional banks without testing the significance of the technology differences in performance could lead us to wrong results. As far as there is very less evidence of any substantial research done to study the technical aspect between Islamic banking system as compared to conventional banking system, this paper takes a different stand by examining the technology difference between Islamic banks and conventional banks during 1996 and 2010 time period. Using data for 50 Malaysian banks that included 14 Islamic and 36 conventional banks, we assess the technical gap between the conventional and Islamic banking systems. This paper is organized as follows. Section 2 discusses the methodology; the data and sample are described in section 3, section 4 presents the results and analysis and finally section 5 provides some concluding remarks.

METHODOLOGY

According to most of the banks studies that have adopted a cost function approach (e.g., Ferrier and Lovell 1990; Mester 1993; Kwan and Eisenbeis 1996; Dietsch and Lozano-Vivas 2000; Isik and Hassan 2002; Abdul-Majid, et al. 2005; 2011a; Carvallo and Kasman 2005; Mokhtar, et al. 2006), we will adopt this approach for comparison technical aspect between Islamic and conventional Malaysia banks. The model is represented in following equation (1):

$$\mathrm{LnC} = \beta_0 + \sum_{i=1}^{3}\beta_i \mathrm{LnW_i} + \sum_{j=1}^{2}\alpha_j \mathrm{LnY_j} + \frac{1}{2}\sum_{i=1}^{3}\sum_{j=1}^{3}\beta_{ij}\mathrm{LnW_i LnW_j} + \frac{1}{2}\sum_{i=1}^{2}\sum_{j=1}^{2}\alpha_{ij}\mathrm{LnY_i LnY_j} + \sum_{i=1}^{2}\sum_{j=1}^{3}\gamma_{ij}\mathrm{LnY_i LnW_j} + \epsilon \quad (1)$$

Where the input prices vector is **W**= [W_L,W_K,W_D] and the output vector is **Y**=[LOAN,OTHEAST], while $\varepsilon=u+v$ stands for a composed error term that accounts for both inefficiency (u) and statistical noise (v). It is assumed that u follows the half-normal distribution, v is distributed as a normal random variable, and $corr(u,r)=0$. Homogeneity of degree one in prices requires:

$$\sum_{i=1}^{3}\beta_i = 1;\ \sum_{i=1}^{3}\beta_{ij} = 0, \forall_j;\ \sum_{i=1}^{3}\gamma_{ij} = 0, \forall_i \quad (2)$$

whereas equality of cross-partial derivatives entails:

$$\alpha_{ij} = \alpha_{ji};\ \beta_{ij} = \beta_{ji} \quad (3)$$

Both set of restrictions are imposed to equation (1). Given the above model specification that assumes all banks are utilizing the same technology, the equation (4) can be consider a restricted version of a more general specification of the form

$$\mathrm{LnC} = \beta_0 + \delta_0 \mathrm{D} + \sum_{i=1}^{3}\beta_i \mathrm{LnW_i} + \sum_{i=1}^{3}\delta_i \mathrm{D\ Ln\ W_i} + \sum_{j=1}^{2}\alpha_j \mathrm{LnY_j} + \sum_{j=1}^{2}\delta_j \mathrm{D\ LnY_j} + \frac{1}{2}\sum_{i=1}^{3}\sum_{j=1}^{3}\beta_{ij}\mathrm{LnW_i LnW_j} + \frac{1}{2}\sum_{i=1}^{3}\sum_{j=1}^{3}\delta_{ij}\mathrm{D\ LnW_i LnW_j} + \frac{1}{2}\sum_{i=1}^{2}\sum_{j=1}^{2}\alpha_{ij}\mathrm{LnY_i LnY_j} + \frac{1}{2}\sum_{i=1}^{2}\sum_{j=1}^{2}\delta_{ij}\mathrm{D\ LnY_i LnY_j} + \sum_{i=1}^{2}\sum_{j=1}^{3}\gamma_{ij}\mathrm{LnY_i LnW_j} + \sum_{i=1}^{2}\sum_{j=1}^{3}\delta_{ij}\mathrm{D\ LnY_i LnW_j} + \epsilon \quad (4)$$

Where D is dummy variable.

DATA

As in most recent studies, we adopt the intermediation approach that views banks as the intermediator of financial services and assumes that banks collect deposits, using labor and capital, then intermediate those sources of funds into loans and other earning assets. Accordingly, three inputs and two output variables are chosen. In this line, the input vectors include (W1) is the interest expense over the total deposit, (W2) is non-interest expense over fixed assets, and (W3) is personal expense over total assets, while, (Y1) total loans, and (Y2) other earning asset are the output vectors. We use consistent data for 435 banks from 1996 to 2010. It consists of 12 Islamic bank subsidiaries, 2 full-fledged Islamic banks and 36 conventional banks. Data is obtained from Bank Scope database, Malaysian Banking Directory, various editions, published by the Bank Negara Malaysia. Table 1 shows descriptive statistics of inputs and outputs used in this study, including mean, standard deviation, minimum and maximum. Table 1 illustrates the disparity of the operations of various commercial and Islamic banks during 1996 and 2010 time period. While some banks were large there were very small banks as well. It is obvious that on average, Islamic banks are moderately smaller than conventional banks. This disparity of the scale of operation may play an important role in the determination of the performance. However, this study does not explicitly account for the scale effect on performance.

RESULTS AND DISCUSSION

Table 2 illustrates the results of cost efficiency function that include two regressions without and with conventional bank dummy variable. The first specification includes only the model parameters while the second specification we add conventional bank dummy variable. It is apparent that the coefficients for all parameters except capital price are significant and positive for both panels without and with conventional bank dummy variable. The results also reveal that the conventional bank dummy variable that serves as a proxy for technology difference is statistically insignificant.

However, to provide clear evidence, we estimate the equation (4) that conventional bank dummy variable is added to each parameter in the Model. The result shows that the coefficients of the most dummy variables in the Model are significant that may support the lack of technology similarities between the Islamic and conventional banks in Malaysia (Table 3). To deepen our analysis, we need to calculate F-test to support the findings.

Table 4 provides the results of technical aspect comparison for different types of Islamic and conventional banking in Malaysia such as domestic conventional banks, foreign conventional banks, full-fledged Islamic banks, domestic conventional subsidiaries banks and foreign conventional subsidiaries banks, foreign Islamic subsidiaries banks and domestic Islamic subsidiaries banks. Our first idea is to test technology difference between Islamic and conventional banks. Thus, we chose dummy Variable for all types of conventional banks (that included domestic conventional banks, foreign conventional banks, domestic conventional subsidiaries banks and foreign conventional subsidiaries banks) versus all types of Islamic banks (that included full-fledged Islamic banks, domestic Islamic subsidiaries banks and foreign Islamic subsidiaries banks). The result of F-test shows that the F-value is 35.76 which is greater than critical value of the F-distribution, suggesting technology difference between Malaysian conventional banks and Islamic banks (Group 1). To get robust understanding of technology difference among different types of Islamic and conventional banking, we also test each group of banks versus other banks. For example; the F-test of domestic Islamic subsidiaries banks shows that the F-value is 42.33 that is bigger than critical value of the F-distribution reflecting technology difference between Malaysian domestic Islamic subsidiaries banks and rest of Islamic and conventional banks (Group 7). By contrast with using dummy variables for the domestic conventional banks, foreign conventional banks, full-fledged Islamic banks, domestic conventional subsidiaries banks and foreign conventional subsidiaries banks our results don't support technology difference among these groups of banks with rest of banks (Groups 2-6). In addition, the F-test for foreign Islamic subsidiaries banks didn't calculated because the data for this type of banks is far smaller than other groups (Group 8).

This finding is very interesting as it is different with common believe as well as many previous studies that came up with the hypothesis of same technology for both Islamic and conventional banking system. However, we should asses this result carefully. In order to make comparison more reliable, dummy variable will be used to check the significance of technology

differences within conventional banks and Islamic banks. For this purpose, comparison Malaysian domestic conventional banks (that included domestic conventional banks and domestic conventional subsidiaries banks) with foreign conventional banks (that included foreign conventional banks and foreign conventional subsidiaries banks) presented in Table 5. The result of F-test indicates that the F-value is 2.79 that is smaller than critical value of the F-distribution, rejecting technology difference between Malaysian domestic conventional banks and foreign conventional banks. This result doesn't support Bhattacharyya et.al (1997) who found that foreign ownership everywhere in developing countries is entitled with better technologies. On the other hand, the comparison full-fledged Islamic banks with other Islamic banks (that included domestic Islamic subsidiaries and foreign Islamic subsidiaries banks) during the covered period show that the inclusion of the Islamic dummy variable (for full-fledged Islamic banks) in our model can be rejected technology difference within Islamic banking system in Malaysia (Table 5).

CONCLUSION

Applying panel data method, the paper provides an insight into the comparison between Malaysian Islamic and conventional banks in terms of technical aspect over the period 1996 to 2010. The results indicate that the technology difference between Islamic and conventional banks is significant. We find that Malaysian conventional banks have operated differing technology compared to the Malaysian Islamic banks. The results also provide evidence that domestic Islamic subsidiary banks use differing technology compares to the rest of Islamic and conventional banks in Malaysia. In view of the technology difference within Malaysian conventional banks (domestic conventional banks versus foreign conventional banks) the result doesn't support technology difference for them. Within the context of the Malaysian Islamic banks, result also has showed that there is no technology difference between full-fledged Islamic banks and other Islamic banks (that included domestic Islamic subsidiary and foreign Islamic subsidiary banks). The results suggest that the difference between Malaysian Islamic and conventional banks in technology maybe is a consequence of the constraints. Indeed the differing technology perhaps due to higher experience, larger market share, different rules, regulations and procedures that conventional banks have. However, this finding can enrich the perspective on the debate about the effect of technology difference on the comparison efficiency in the banking industry.

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Appendix: List of Scheduled Banks Include In the Study

Islamic Banks		Conventional Banks
Full Islamic	Islamic banking subsidiaries	(Domestic ,Foreign, IBS)
Bank Muamalat	Affin Islamic Bank Berhad	The Pacific Bank Bhd
Bank Islamic Malaysia Berhad (BIMB)	AmIslamic Bank Berhad	Malayan Banking Berhad
	CIMB Islamic Bank Berhad	KongMing/Eon Bank Bhd
	EONCAP Islamic Bank Berhad	The Oriental Bank Bhd
	Hong Leong Islamic Bank Berhad	Bank Bumiputra (M) Bhd
	RHB Islamic Bank Berhad	BoC/Bumiputra Commerce Bank Bhd
	Maybank Islamic Berhad	PerwHabib/PerwAffin/Affin Bank
	Public Islamic Bank Berhad	BankBuruh/BSN Commercial Bank
	HSBC Amanah Malaysia Berhad	HockHuaSabah/International Bank M'sia Bhd
	Standard Chartered Saadiq Berhad	MsiaFrench/MultiPurp/Alliance Bank
	OCBC Al-Amin Bank Berhad	Arab M'sian Bank/AmBank
	Alliance Islamic Bank Berhad	United Overseas Bank Ltd
		ABN-AMRO Bank Berhad
		Overseas Union Bank Ltd
		Hock Hua Bank Bhd
		Public Bank Bhd
		Wah Tat Bank Bhd
		Hong Leong Bank Bhd
		DCB/RHB
		Bank Utama
		Bank of Tokyo Mitsubishi
		Ban Hin Lee Bank
		Southern Bank Bhd
		ChaseManh/J.P. Morgan Chase Bank
		Bangkok Bank Ltd
		Bank of Nova Scotia
		Deutsche Bank
		HSBC (M) Bhd
		Overseas Chinese Banking Corporation
		Standard Chartered Bank
		Bank of America Malaysia Berhad
		Bank of China (Malaysia) Berhad
		Citibank Berhad
		Kuwait Finance House (Malaysia) Berhad

Al Rajhi Banking & Investment Corporation (Malaysia) Berhad
Asian Finance Bank Berhad

TABLE1: Descriptive Statistics of Main Variables

	Conventional Banks				Islamic Banks			
Variable	Mean	Std. Deviation	Min	Max	Mean	Std. Deviation	Min	Max
Loans	11976.8	17258.5	26.3	127848.4	6124.9	5817.1	6.2	33410.1
Other Assets	7314.1	9597.1	201.3	61669.7	4743.9	4061.8	106.5	24624.1
Labor	20526.1	27596.3	504.8	197135.3	11039.3	8609.9	131.5	44157.5
Capital	156.2	215.2	0.70	1188.9	27.7	38.8	0.17	166.2
Deposits	17317.3	23471.8	190.1	172016.9	11215.1	12796.1	432.9	99840.1

N=348 (Conventional Banks) N=87 (Islamic Banks)

TABLE 2: Panel Estimation Results of Cost Efficiency Function (Malaysian Banks)

	Without Dummy Variable		With Dummy Variable	
	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-2.168	-2.973*	-2.166	-2.966*
LnLOAN	1.261	12.761*	1.261	12.740*
LnLOAN^2	0.042	7.068*	0.042	7.059*
LnOTHAST	0.025	0.161	0.025	0.158
LnOTHAST^2	0.102	13.077*	0.102	13.051*
LnLAB	-0.130	-1.006	0.174	0.951
LnLAB^2	0.089	19.670*	0.098	6.694*
LnINT	0.174	0.951	-0.129	-0.992
LnINT^2	0.098	6.702*	0.089	19.607*
LnCAP	0.128	1.147	0.127	1.137
LnCAP^2	0.005	0.862	0.005	0.850
LnPC LnPI	-0.007	-0.350	-0.007	-0.354
LnPL LnPC	-0.012	-1.056	-0.012	-1.057
LnPL LnPI	-0.236	-13.113*	-0.236	-13.098*
LnY1 LnPC	-0.051	-4.844*	-0.050	-4.664*
LnY1 LnPI	0.107	12.491*	0.107	12.453*
LnY1 LnPL	-0.026	-1.864***	-0.026	-1.864***
LnY1 LnY2	-0.145	-10.060*	-0.145	-10.045*
LnY2 LnPC	0.028	2.007**	0.028	1.969**
LnY2 LnPI	-0.115	-5.150*	-0.115	-5.145*

LnY2 LnPL	0.078	3.158*	0.078	3.149*
CONDUM			0.003	0.094

Notes: * ,** and *** denote significance at 1% , 5% and 10% levels, respectively.
LOAN= Loan; OTHAST= Other Asset; LAB= Labor cost; INT= Interest rate expense; CAP= Capital cost; PC= Price of Capital; PI= Price of Interest rate; PL = Price of Labor; Y1= Loan; Y2= Other Asset;
CONDUM= conventional banks dummy that include all types of conventional banks such as conventional domestic banks, conventional IBS domestic banks, conventional foreign banks and conventional IBS foreign banks.

TABLE 3: Panel Estimation Results of Equation (4)

	Coefficient	t-statistic		Coefficient	t-statistic
LnLOAN	0.93	4.72*	D LnLOAN	-0.24	-0.93
LnLOAN^2	0.02	2.13*	D LnLOAN^2	0.06	4.07*
LnOTHAST	-0.74	-2.33*	D LnOTHAST	1.17	3.11*
LnOTHAST^2	0.07	2.42*	D LnOTHAST^2	0.05	1.91*
LnLAB	-0.43	-3.89*	D LnLAB	1.27	4.49*
LnLAB^2	0.01	2.32*	D LnLAB^2	0.08	9.89*
LnINT	0.37	1.50	D LnINT	0.30	0.80
LnINT^2	0.07	3.41*	D LnINT^2	0.01	0.29
LnCAP	0.01	0.06	D LnCAP	-0.02	-0.08
LnCAP^2	0.01	2.39*	D LnCAP^2	-0.02	-2.10*
LnPC LnPI	-0.05	-2.32	D LnPCPI	-0.01	-0.35
LnPL LnPC	0.00	0.69	D LnPLPC	0.04	1.35
LnPL LnPI	-0.20	-12.90*	D LnPLPI	0.09	1.52
LnY1 LnPC	-0.04	-2.60*	D LnY1PC	0.03	1.63***
LnY1 LnPI	0.11	9.06*	D LnY1PI	-0.12	-4.59*
LnY1 LnPL	-0.04	-3.42*	D LnY1PL	0.00	0.27
LnY1 LnY2	-0.07	-1.75*	D LnY1Y2	-0.15	-3.39*
LnY2 LnPC	0.01	0.93	D LnY2PC	-0.00	-0.03
LnY2 LnPI	-0.17	-6.01*	D LnY2PI	0.18	4.53*
LnY2 LnPL	0.03	1.34	D LnY2PL	0.00	0.23
Constant	1.76	1.54	CONVDM	0.46	0.29

Notes: * ,** and *** denote significance at 1% , 5% and 10% levels, respectively.
LOAN= Loan; OTHAST= Other Asset; LAB= Labor cost; INT= Interest rate expense; CAP= Capital cost; PC= Price of Capital; PI= Price of Interest rate; PL = Price of Labor; Y1= Loan; Y2= Other Asset; D=Dummy variable

CONDUM= conventional banks dummy that include all types of conventional banks such as domestic banks, conventional IBS domestic banks, conventional foreign banks and conventional IBS foreign banks.

TABLE 4: Comparison the Technology Difference for Diverse Groups of Islamic and Conventional Banks in Malaysia

		Coefficient (t-statistic)	F-test value(Prob)
1	Conventional Banks vs Islamic Banks	0.468 (0.299)	35.76 (0.00)*
2	Domestic Conventional Banks vs Other Banks	-1.080 (-0.069)	0.721 (0.81)
3	Foreign Conventional Banks	6.326 (1.478)	7.034 (0.00)
4	Full-fledged Islamic Banks vs Other Banks	5.143 (0.040)	0.382 (0.99)
5	Domestic Conventional subsidiaries Banks vs Other Banks	-1.117 (-0.112)	10.97 (0.00)
6	Foreign Conventional subsidiaries Banks vs Other Banks	-6.821 (-0.035)	0.221 (0. 99)
7	Domestic Islamic subsidiaries Banks vs Other Banks	8.761 (1.824)**	42.33 (0.00)*
8	Foreign Islamic subsidiaries Banks vs Other Banks	0.205 (2.318)*	-------

Note: Under Wald statistically test, the null hypothesis (H_0:β_1=β_2=…=0) will be rejected if the F value is greater than the critical value of the F-distribution for some desired false rejection probability (0.05).
* ,** and *** denote significance at 1% , 5% and 10% levels, respectively.

TABLE 5: Comparison the Results for Malaysian conventional banking system and Malaysian Islamic banking system

	Coefficient (t-statistic)	F-test value(Prob)
Conventional Domestic Banks vs Foreign Conventional Banks	-3.326 (-1.157)	2.792 (0.00)
Full-Fledged Islamic Banks vs Domestic Islamic Subsidiaries and Foreign Islamic Subsidiaries Banks	-8.080 (-0.076)	0.715 (0.788)

Note: Under Wald statistically test, the null hypothesis (H_0:β_1=β_2=…=0) will be rejected if the F value is greater than the critical value of the F-distribution for some desired false rejection probability (0.05).