Cost, Revenue, and Profit Efficiency of Conventional versus Islamic Banks: Financial Ratios Approach

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Abstract: This paper explores the cost, revenue, and profit efficiencies of 43 Islamic and 37 conventional banks in 21 countries in Africa, Asia, and the Middle East using financial ratios for the period 1990–2005. Efficiency was measured based on different sizes and ages of banks and the regions of their location. The findings show no significant difference in efficiency scores between both banking streams. On average, the larger the size of total assets the higher the efficiency and, surprisingly, the revenue and profit efficiency scores for old banks are lower than for new banks. In respect of regional analysis, there is no significant difference in efficiency of banks in both banking systems.

I. Introduction

Academic research and documented evidence on Islamic banking and finance has increased steadily in recent years leading to a better understanding of the new form of banking that had its intellectual and religious origins 1400 years ago. This is perhaps due to the rapid growth of the Islamic banking industry,

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the institutions of which have grown worldwide at a remarkable pace during the last three decades. According to El Qorchi (2005) of the IMF, the number of institutions rose from one in 1975 to over 300 in 2005, in more than 75 countries. Total assets are estimated to be US$250 billion, and are thought to be growing at about 15% per year, three times the rate for conventional banks. However, the size of Islamic banking assets of US$250–300 billion needs to be put into perspective. The three top conventional banking groups in 2005 had large assets: UBS of Switzerland (US$1,533 billion); Citigroup of the USA (US$1,484 billion); and Mizuho Financial Group of Japan (US$1,296 billion). Bank of America, ranked as the tenth, has assets of US$1,110 billion, which is four times larger than the assets of all Islamic financial institutions. Nevertheless, the rapid growth rate confirms the growing importance of Islamic banking and finance in the global financial markets.

Bank efficiency is important for remaining competitive in a globalized industry. Though conventional and Islamic banks work on different principles, both are licensed to operate in a competitive regulatory environment. The long-term survival of banks in both streams depends on their ability to minimize cost and maximize revenues and profits, which also ensures the financial sector's efficient contribution to overall economic growth.

Standard banking theory assumes that banks earn profits by purchasing transactions deposits on the liabilities side at a low interest rate, then reselling those funds on the asset side of the balance sheet at a higher interest rate, due to competitive advantages from gathering information and underwriting risk (Santos, 2000). In other words, conventional banks make profits from the gap between the interest rate received from borrowers and the interest rate paid to depositors.

Islamic banking performs the same intermediary function but does not receive a pre-determined interest from borrowers and does not pay a predetermined interest to depositors: payment to depositors and from borrowers depends on the profits generated and the profit-share agreements with both parties. There are also fee-based banking services provided by Islamic banks with no pre-determined interest payments receipts in the transactions. Thus, Islamic banking is considered as a different banking structure as it replaces interest with a profit share that depends on the extent of the risk participation of the parties. The absence of pre-determined rewards is derived from Qur'ān based *Sharīʿah* principles.

Conventional banks enjoy several advantages over Islamic banks. For example, conventional banks have very long history and experience,

accept interest which is a major source of bank revenues, can enter the Islamic banking market (*e.g.*, Citibank, Bank of America, Deutsche Bank, HSBC, ABN AMRO, and UBS), do not share losses with clients and ask for guaranteed collaterals in most transactions, enjoy huge capital resources, are spread very widely, have much more developed technologies, and (especially in the areas of derivatives and structured finance) have benefited from sophisticated theoretical and empirical research. In light of the above advantages, it might be expected that conventional banks would be more efficient than Islamic banks.

However, some of the literature (*e.g.*, Hassan and Bashir, 2005; Sarker, 1999; Bashir, 1999; Samad and Hassan, 1999; and Hussein, 2004) suggests that Islamic banks are in fact more efficient than conventional banks, although the evidence is not conclusive. To provide further evidence on this pertinent issue, this paper documents the evidence on the comparative cost, revenue, and profit efficiency of conventional and Islamic banks in 21 countries.

The findings will, hopefully, provide some useful insights to stakeholders (*e.g.* regulators, investors, managers, borrowers, depositors) to enable better decisions, and to help banks in both streams to benchmark their performance. The financial ratios approach is used to measure and compare the cost, revenue, and profit efficiency of Islamic and conventional banks based on their size (big versus small), age (old versus new), and region (geographical location).

The rest of the paper is organized as follows: Section II gives a brief review of the literature; section III explains the data and methodology; section IV explains the findings and finally, section V concludes the paper.

II. Literature Review

Use of financial statement analysis for evaluation purposes actually dates back to the end of the nineteenth century (Horrigan, 1968). Bank managers, regulators and researchers have employed financial ratios for evaluating bank's performance and efficiency extensively (*e.g.*, Sabi, 1996; Samad and Hassan, 1999; Islam, 2003; Hassan and Bashir, 2005).

Halkos and Salamouris (2004) suggest that there are two main reasons for using ratios as a tool of analysis: (i) to allow comparison among different-sized banks; and (ii) to control for sector characteristics permitting the comparison of an individual bank's ratios with some benchmark for the sector. However, the use of financial ratios to measure bank performance has its shortcomings as it ignores the current market value of the bank and

does not represent economic value-maximizing behaviour (Kohers *et al.*, 2000). Additionally, these financial ratios do not consider the input price and the output mix.

A better measure of performance is cost, revenue and profit efficiency. *Cost efficiency*[1] gives a measure of how close a bank's cost is to what a best-practice bank's cost would be for producing the same bundle of output under the same conditions. *Revenue efficiency* indicates how well a bank is predicted to perform in terms of profit relative to other banks in the same period for producing the same set of outputs. *Profit efficiency* indicates how well a bank is predicted to perform in terms of profit relative to other banks in the same period for producing the same set of outputs.

Efficiency has been examined in a number of different contexts: (i) cross-country comparisons or country-specific conditions, (ii) efficiency of foreign-owned banks versus domestic-owned banks, (iii) the efficiency of banks based on their type (*e.g.* large or small, specialized or diversified, retail or wholesale banks), (iv) government ownership vis-à-vis private ownership, (v) new versus old bank efficiency, (vi) banks' performance after merger and acquisition, (vii) the performance and efficiency of banking industry following a financial crisis such as the Asian 1997 crisis, and (viii) the effect of deregulation and liberalization on banks' efficiency.

Evidence on this area can be classified into two groups. The first group includes studies that assess the performance of Islamic banks using traditional financial ratios (*e.g.* Samad, 1999; Bashir, 1999; and Hassan and Bashir, 2005). The second group of studies focus on banks' efficiency and utilize frontier analysis approaches such as Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) rather than traditional financial ratios.

Islamic banking efficiency has been studied to find out the viability of this 'new' banking system compared to conventional banking (*e.g.*, Hassan, 1999; Hassan and Bashir, 2005). Unlike conventional banking, research in Islamic banking lags far behind due to its relatively short history and the lack of data (Iqbal and Molyneux, 2005). Mostly, it relates to studies from emerging markets and less-developed countries. By contrast, the large majority of bank efficiency studies for conventional banks have been based on developed economies such as USA and to a smaller degree European banking industries and data (Berger and Humphrey, 1997; and Goddard *et al.*, 2001).

Despite these differences, the available evidence suggests that Islamic banks generally outperformed conventional banks and succeeded in exploiting their comparative advantages and showed higher efficiency than

their conventional counterparts (*e.g.,* Samad and Hassan, 1999; Sarker, 1999; Bashir, 1999; Yudistria, 2003; Al-Jarrah and Molyneux, 2003; Hussein, 2004). Most of those studies utilized returns on assets (*ROA*), returns on equity (*ROE*), Assets Utilisation (*AU*), Net Interest Margin (*NIM*) and other traditional financial indicators to assess Islamic banks' financial performance. Some evidence compares profitability (*e.g.,* Samad and Hassan, 1999). However, there are other studies that have utilised the frontier approaches (Al-Jarrah and Molyneux, 2003; Hussein, 2004; and Brown and Skully, 2005). However, there are only a few studies that address the overall cost, revenue, and profit efficiency of Islamic banks (*e.g.,* Yudistria, 2003; Hassan, 2005; Bader *et al.,* 2007).

Brown and Skully (2005) examined the efficiency of 36 Islamic banks across 19 countries. They found that average cost efficiencies based on *IAS* were 46.3%, 80.8%, and 89.7% in Africa, Asia, and the Middle East, respectively. However, based on IFR the results were 45.9%, 66.5%, and 66.5% in the same sequence. Their results also show that where Iran has the largest banking market, Saudi Arabia has the highest bank equity ratio. The highest net interest margin and the highest Returns on Adjusted Assets (*ROAA*) were in Bahrain and the highest Return on Adjusted Equity (*ROAE*) was in Gambia. The Bahamas possesses the most bank liquidity and the UAE enjoy the highest bank Islamic asset ratio. On a country basis, Iran was the most efficient as well as having large Islamic banks. At the regional level, Islamic banks from the Middle East were the most efficient, followed by Asia and Africa.

III. Data and Methodology

Our analysis investigates the differences in mean cost, revenue, and profit efficiency of the total sample, the conventional banks and Islamic banks based on the difference in size, age, and location. Cross-country data are compiled from the financial statements of 80 banks (37 conventional, and 43 Islamic) in 21 Organisation of Islamic Conference (*OIC*) countries.[2] The data collected for each year are available in the *BankScope* database over the period 1990–2005.[3]

The analysis is based on average results to compare efficiency between conventional and Islamic banks groups.[4] First, the overall average results for conventional, Islamic, and all banks were examined. Then the sample was reclassified into groups based on their size as measured by their total assets. The banks were again reclassified into groups based on their age as

measured by the date of establishment. Because the banks in the sample are from countries that differ in their levels of development, macroeconomic indicators, tax rates, and income distributions, the results were analysed based on the regions in which the banks are located.

Table 1: Definitions of Cost, Revenue, and Profit Financial Ratios[5]

Cost, Revenue, and Profit Financial Ratios	
Cost Efficiency Ratios	
Cost to Income Ratio (CTIR)	Measures the overheads or costs of running the bank as %age of income generated before provisions. The major cost element of this ratio is normally salaries.
Non Interest Expenses Ratio (NIER)	The ratio of non interest expenses or overheads plus provisions to the average value of assets
Revenue Efficiency Ratios	
Net Interest Margin (NIM)	Interest revenues from loans and security investments less interest expenses on deposits and other debt issues divided by a bank's total assets
Other Operating Income (OPIR)	OPIR can be calculated by dividing the other operating income by average value of assets
Profit Efficiency Ratios	
Return on Average Assets (ROAA)	Net income after taxes as a percentage of book value of average total assets
Return on Average Equity (ROAE)	Net income after taxes as a percentage of book value of average total equity capital

Financial ratios were utilised for assessing the performance of banks and other institutions. To analyze the cost, revenue, and profit efficiency of the sampled banks, a set of six critical financial ratios widely used to assess the performance and efficiency of banking institutions (*e.g.* Sabi, 1996; Samad, 1999; Islam, 2003; Halkos and Salamouris, 2004; Hassan and Bashir, 2005; Iqbal and Molyneux, 2005) were identified and used for analysis. Table 1 summarizes these ratios.

IV. Results

Table 2 summarizes the descriptive statistics and statistical significance tests for all, conventional and Islamic banks. *t-test* for equality of means provides evidence that there is no significant difference in the mean scores of *CTIR*

and *NIER* between conventional and Islamic banks. Hence, the claim that the cost efficiency of conventional banks is significantly higher than those of the Islamic banks cannot be accepted. In addition, the table below shows that there are no significant differences in *NIM* and *OPIR* ratios between the two banking streams.

There is no statistical difference in the mean values of *ROAA* and *ROAE*, indicating that there is no difference in the profit efficiency of conventional and Islamic banks. This is inconsistent with the assumption that the profit efficiency of conventional banks is significantly higher than that of Islamic banks. Overall, these results are inconsistent with some previous studies (*e.g.* Iqbal and Molyneux, 2005; Hassan and Bashir, 2005). Perhaps, the differences are due to different sample, period, countries, and number of banks in each study.

Table 2: Descriptive Statistics: Cost, Revenue, and Profit Efficiency of Conventional, Islamic, and All Banks

		Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
Category	**Statistics**	**CTIR**	**NIER**	**NIM**	**OPIR**	**ROAA**	**ROAE**
All Banks	N	80	80	80	80	80	80
	Mean	58.041	4.174	3.780	2.892	1.345	10.688
	Std. Deviation	20.170	3.313	2.517	3.447	1.699	16.604
	Maximum	105.486	19.550	15.360	16.156	9.907	69.197
	Minimum	24.093	0.745	−0.225	0.380	−3.049	−87.416
CBs	N	37	37	37	37	37	37
	Mean	58.165	4.097	3.919	2.449	1.274	9.614
	Std. Deviation	19.905	3.559	2.811	3.395	1.954	20.255
	Maximum	102.687	19.550	15.360	16.156	9.907	69.197
	Minimum	25.878	0.745	0.793	0.380	−3.049	−87.416
IBs	N	43	43	43	43	43	43
	Mean	57.935	4.240	3.660	3.272	1.405	11.611
	Std. Deviation	20.630	3.127	2.262	3.485	1.466	12.847
	Maximum	105.486	14.925	8.442	14.340	6.010	43.388
	Minimum	24.093	1.095	−0.225	0.423	−1.820	−22.918
t-test Sig. (2-tailed)*	Equal Variance Assumed	0.96	0.85	0.65	0.29	0.73	0.60
	E. V. not Assumed	0.96	0.85	0.65	0.29	0.74	0.61

Note: '*' indicates no significant differences between means of conventional versus Islamic banks at 5% level.

4.1. Efficiency of big versus small banks

The sampled banks were divided into large and small banks based on asset size and then the sample of large and small banks were reclassified into Islamic and conventional banks. In conventional banking literature, the size factor in banks' efficiency has been studied intensively (*e.g.*, Canhoto and Dermine, 2003; Kwan, 2006). However, to date, there is no documented evidence on comparative analysis of cost, revenue and profit efficiency of Islamic and conventional banks based on the bank size. In this respect, to the best of the authors' knowledge, this is the first study to compare the size effect in Islamic banks compared to conventional banks.[6]

Table 3: Descriptive Statistics: Cost, Revenue, and Profit Efficiency of Big versus Small Banks

Size	Statistics	Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
		CTIR	NIER	NIM	OPIR	ROAA	ROAE
Big	N	38	38	38	38	38	38
	Mean	54.327	3.604	3.518	2.472	1.379	11.909
	Std. Deviation	19.204	3.333	2.068	3.420	1.836	21.329
	Maximum	105.486	19.550	8.835	16.156	9.907	69.197
	Minimum	25.878	0.745	0.551	0.380	−3.049	−87.416
Small	N	42	42	42	42	42	42
	Mean	61.402	4.690	4.016	3.271	1.314	9.589
	Std. Deviation	20.657	3.248	2.869	3.468	1.587	10.865
	Maximum	102.687	14.925	15.360	14.340	6.010	43.388
	Minimum	24.093	1.095	−0.225	0.423	−1.820	−13.263
t-test Sig. (2-tailed)*	Equal Variance Assumed	0.12	0.14	0.38	0.30	0.87	0.54
	E. V. not Assumed	0.12	0.15	0.37	0.30	0.87	0.55

Note: '*' indicates no significant differences between means of big versus small banks at 5% level.

Table 3 reports the descriptive statistics and the t-tests of cost, revenue and profit ratios of big and small banks. The findings show no significant difference in the mean scores between big and small banks for all efficiency categories. Therefore, any claims that the cost, revenue, and profit efficiency of big banks are significantly better than those of small banks cannot be accepted.

This evidence suggests that the size of banks does not affect their cost, revenue and profit efficiency. These results are inconsistent with some previous studies (*e.g.,* Hassan and Bashir, 2005) that document the effect of size on efficiency. The table reveals that big banks are slightly more cost efficient than small banks. However, the *NIM* and *OPIR* ratios indicate that small banks are slightly more revenue efficient than big banks. The mean scores of *ROAA* and *ROAE* suggest that big banks are more profit efficient than small banks.

Table 4: Descriptive Statistics of Cost, Revenue, and Profit Efficiency of Conventional versus Islamic Banks Based on their Size

Size Category	Statistics	Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
		CTIR	NIER	NIM	OPIR	ROAA	ROAE
BCBs	N	18	18	18	18	18	18
	Mean	50.763	3.553	3.163	2.725	1.295	10.768
	Std. Deviation	17.854	4.420	2.143	4.527	2.426	28.567
	Maximum	88.311	19.550	8.835	16.156	9.907	69.197
	Minimum	25.878	0.745	0.793	0.380	−3.049	−87.416
BIBs	N	20	20	20	20	20	20
	Mean	57.534	3.649	3.837	2.245	1.454	12.936
	Std. Deviation	20.251	2.035	1.999	2.080	1.133	12.385
	Maximum	105.486	8.021	8.148	7.656	3.907	33.730
	Minimum	28.405	1.263	0.551	0.425	−0.272	−22.918
SCBs	N	19	19	19	19	19	19
	Mean	65.177	4.612	4.635	2.188	1.441	6.870
	Std. Deviation	19.612	2.510	3.218	1.884	1.441	6.870
	Maximum	102.687	12.345	15.360	8.935	5.855	20.722
	Minimum	40.753	1.434	1.198	0.690	0.605	-8.083
SIBs	N	23	23	23	23	23	23
	Mean	58.284	4.754	3.505	4.166	1.362	10.460
	Std. Deviation	21.403	3.807	2.502	4.202	1.729	13.402
	Maximum	93.473	14.925	8.442	14.340	6.010	43.388
	Minimum	24.093	1.095	−0.225	0.423	−1.820	−13.263
Oneway ANOVA Sig.*	Between Groups	0.19	0.55	0.32	0.20	0.99	0.88

Note: '*' indicates no significant differences between these banks at 5 % level.

Table 4 reports that there are no significant differences between cost, revenue, and profit efficiencies of banks with different assets size and specialization. Therefore, the evidence does not confirm that big (small) conventional banks are more cost, revenue and profit efficient compared to big (small) Islamic banks. However, there *are* slight differences between these groups.

4.2. Efficiency of old versus new banks

The documented literature compared the age factor in conventional banks (*e.g.* Fries and Taci, 2005) and, to date, there is no published evidence on a comprehensive analysis of this issue on banks in both streams. Table 5 reports on the average cost, revenue and profit efficiency of old, new and the sample of all banks. The findings reveal that there is significant difference in *NIER*, or cost efficiency, between old and new banks. It indicates that old banks are more cost efficient than new banks. The mean *NIER* score in old banks (3.467) is significantly lower than new banks (5.290), thus the claim, which suggests that the old banks are more cost efficient than new banks cannot be rejected.[7] This indicates that old banks are significantly better than new banks in minimizing their interest expenses. This could be due to attempts by the new banks to compete for the clients of old banks by offering higher interest rates.

Table 5: Descriptive Statistics of Average Cost, Revenue, and Profit Efficiency Scores of Old versus New Banks

Age Category	Statistics	Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
		CTIR	NIER	NIM	OPIR	ROAA	ROAE
Old	N	49	49	49	49	49	49
	Mean	55.775	3.467	3.277	2.384	1.363	13.130
	Std. Deviation	19.285	3.050	2.108	3.274	1.634	13.628
	Maximum	102.687	19.550	8.835	16.156	9.907	69.197
	Minimum	25.878	0.745	−0.225	0.380	−0.605	−22.918
New	N	31	31	31	31	31	31
	Mean	61.625	5.290	4.574	3.697	1.315	6.827
	Std. Deviation	21.321	3.452	2.981	3.612	1.825	20.093
	Maximum	105.486	14.925	15.360	14.340	6.010	33.730
	Minimum	24.093	1.221	−0.110	0.423	−3.049	−87.416
t-test Sig. (2-tailed)*	Equal Variance Assumed	0.21	0.02*	0.02*	0.10	0.90	0.10
	E. V. not Assumed	0.22	0.02*	0.04*	0.11	0.91	0.13

Note: '*' indicates that the mean difference is significant at the 5% level.

However, there are no significant differences between old and new banks in respect of the CTIR. Further, the *t-test* shows that there are no significant differences between old and new banks in respect of *OPIR, ROAA,* and *ROAE.* Moreover, Table 5 shows that there are slight differences between old and new banks. As old banks are better at minimizing costs, they generate slightly better profits than new banks. The new banks pay significantly higher interest to their clients and have slightly higher revenue efficiency.

Table 6 shows the average cost, revenue and profit efficiency of old and new conventional and Islamic banks. The findings show no significant differences between the cost efficiencies (*CTIR* and *NIER*) of old and new conventional and Islamic banks. The findings also disprove the claims that the mean cost efficiency of new conventional banks is significantly higher than those of cost efficiency of new Islamic banks. In contrast, the revenue efficiency (*NIM* ratio) in a new conventional bank is significantly higher than that in a new Islamic bank. However, the mean revenue (and profit) efficiency of old conventional banks is not significantly higher than those of revenue (and profit) efficiency of old Islamic banks.

Table 6: Descriptive Statistics: Average Cost, Revenue and Profit Efficiency Scores of Old and New Conventional and Islamic Banks

Age Category	Statistics	Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
		CTIR	NIER	NIM	OPIR	ROAA	ROAE
OCBs	N	27	27	27	27	27	27
	Mean	55.993	3.502	3.232	2.451	1.309	13.476
	Std. Deviation	21.015	3.630	2.067	3.746	1.867	13.537
	Maximum	102.687	19.550	8.835	16.156	9.907	69.197
	Minimum	25.878	0.745	0.793	0.380	−0.605	−8.083
OIBs	N	22	22	22	22	22	22
	Mean	55.506	3.425	3.331	2.302	1.430	12.705
	Std. Deviation	17.418	2.221	2.204	2.667	1.332	14.045
	Maximum	85.049	10.490	8.177	11.670	5.228	43.388
	Minimum	28.400	1.095	−0.225	0.425	−0.272	−22.918
NCBs	N	10	10	10	10	10	10
	Mean	64.027	5.703	5.774	2.445	1.181	-0.812
	Std. Deviation	16.017	2.942	3.746	2.360	2.277	30.759
	Maximum	88.910	12.345	15.360	8.935	5.855	17.512
	Minimum	46.253	2.672	2.377	0.760	−3.049	−87.416
NIBs	N	21	21	21	21	21	21
	Mean	60.480	5.094	4.003	4.290	1.379	10.465
	Std. Deviation	23.710	3.722	2.323	4.289	1.379	11.694
	Maximum	105.47	14.925	8.442	14.340	6.010	33.730
	Minimum	24.093	1.221	−0.110	0.423	−1.820	−13.263
Oneway ANOVA	Between Groups	0.62	0.11	0.04*	0.19	0.98	0.12

Note: '*' indicates that the mean difference is significant at the 5% level.

4.3. Regional efficiency analysis

Table 7 reports the findings on the impact of geographical region on the efficiency performance of conventional, Islamic, and all banks in three parts of the globe. As mentioned earlier, a number of previous studies have examined cost and profit efficiency in the context of multi-country common cost and profit frontiers (*e.g.,* Maudos *et al.,* 2002). However, only a few studies have examined revenue efficiency. In the literature, Al-Jarrah and Molyneux (2003), Al-Shammari (2003), and Brown and Skully (2005) assessed the performance of Islamic banks based on a cross-country comparison; however, unlike the results reported in this study, the above mentioned studies did not compare the cost, revenue, and profit efficiency of Islamic banks with their conventional counterparts. The average cost, revenue and profit efficiency ratios for all banks in Africa, Asia, and the Middle East and Turkey regions are compared in Table 7.

Table 7: Descriptive Statistics: Cost, Revenue and Profit Efficiency Scores of Banks in the Selected Regions

Region Category	Statistics	Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
		CTIR	NIER	NIM	OPIR	ROAA	ROAE
Africa	N	21	21	21	21	21	21
	Mean	61.782	5.550	4.173	4.675	1.181	12.635
	Std. Deviation	22.053	3.354	2.660	3.911	2.186	17.196
	Maximum	102.687	12.345	8.835	13.448	9.907	69.197
	Minimum	25.878	1.228	0.551	0.380	−1.820	−13.263
Asia	N	19	19	19	19	19	19
	Mean	59.111	3.457	3.618	1.409	0.644	4.646
	Std. Deviation	20.359	1.819	2.127	0.739	1.251	24.218
	Maximum	93.473	8.761	8,148	3.405	3.303	33.730
	Minimum	25.410	1.760	0.793	0.425	−3.049	−87.416
Middle East and Turkey	N	40	40	40	40	40	40
	Mean	55.570	3.791	3.650	2.660	1.763	12.535
	Std. Deviation	19.210	3.676	2.647	3.624	1.497	10.620
	Maximum	105.486	19.550	15.360	16.156	6.010	33.293
	Minimum	24.093	0.745	−0.225	0.423	−0.605	−22.918
Oneway ANOVA Sig.*	Between Groups	0.51	0.08	0.71	0.01*	0.052	0.19

Note: '*' indicates that the mean difference is significant at the 5 % level.

The findings in Table 7 show no significant differences in cost efficiency between banks in these regions (*p* values are 0.51 and 0.08). The multiple comparison tests (Turkey HSD Post Hoc Tests) show that there is significant difference in the mean scores of *OPIR* (revenue efficiency) between African and Asian banks, and in the *ROAA* ratio (profit efficiency) there is considerable difference between Asian banks and banks in the Middle East and Turkey as the (*p* = 0.052), which comes very close to the 5% significance level.

On average, banks in Africa scored the highest for cost efficiency (*CTIR*, *NIER*), revenue efficiency (*NIM*, *OPIR*) and profit efficiency (ROAE); whereas banks in the Middle East and Turkey reported the highest profit efficiency when measured by the *ROAA* ratio. Meanwhile, banks in the Middle East and Turkey reported the lowest cost efficiency (*CTIR*) and Asian banks reported the lowest cost efficiency (*NIER*), revenue efficiency (*NIM*, *OPIR*) and profit efficiency (*ROAA* and *ROAE*) ratios. Although the differences are not statistically significant, these results reveal that African banks rank at the top, Asian banks rank at the bottom, and banks in the Middle East and Turkey rank in the middle in respect of cost, revenue, and profit efficiency.

Table 8 provides a summary of the cost, revenue and profit efficiency ratios of conventional versus Islamic banks in Africa, Asia, and the Middle East and Turkey regions. The findings show no significant differences in cost, revenue and profit efficiencies between conventional and Islamic banks in the selected regions.

According to the multiple comparison tests, the *OPIR* ratio is very close to the 5% significance level because of the big difference between African Islamic and Asian conventional banks. On average, conventional banks in Africa had better cost (*CTIR*) and profit efficiency (*ROAA* and *ROAE*) than the Islamic banks. Meanwhile, African Islamic banks had lower cost efficiency (*NIER*) but higher revenue efficiency (*NIM*, *OPIR*) compared to Asian and Middle East Islamic banks, whereas Islamic banks in the Middle East and Turkey had the highest profit efficiency measured by *ROAA* compared to Islamic banks in Africa and Asia.

The conventional banks in the Middle East and Turkey were more cost (*CTIR* and *NIER*) and profit (using *ROAE*) efficient than their counterparts in Asia and Africa. While Asian Islamic banks scored the lowest mean of *NIER* ratios (better cost efficiency), Islamic banks in the Middle East and Turkey scored the lowest mean of *NIM* ratio (implying better revenue efficiency). Asian conventional banks had poor revenue (scored the lowest mean of *OPIR*) and profit (*ROAA* and *ROAE* ratios) efficiencies.

Table 8: Descriptive Statistics: Cost, Revenue and Profit Average Efficiency Scores of Conventional versus Islamic Banks in the Selected Regions

Region Category	Statistics	Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
		CTIR	NIER	NIM	OPIR	ROAA	ROAE
African CBs	N	10	10	10	10	10	10
	Mean	61.379	5.072	4.134	4.020	1.695	14.098
	Std. Deviation	25.082	3.191	2.854	4.095	2.968	20.475
	Maximum	102.687	12.345	8.835	13.448	9.907	69.197
	Minimum	25.878	1.228	1.198	0.380	−0.029	−1.754
African IBs	N	11	11	11	11	11	11
	Mean	62.148	5.986	4.208	5.270	0.713	11.306
	Std. Deviation	20.154	3.591	2.612	3.831	1.060	14.491
	Maximum	92.385	11.893	8.442	11.670	1.672	43.388
	Minimum	34.636	1.263	0.551	0.927	−1.820	−13.263
Asian CBs	N	9	9	9	9	9	9
	Mean	61.260	3.537	3.587	1.152	0.186	-2.745
	Std. Deviation	16.923	1.291	2.156	0.410	1.345	32.652
	Maximum	88.311	5.523	7.996	2.007	1.655	17.512
	Minimum	36.953	1.885	0.793	0.690	−3.049	−87.416
Asian IBs	N	10	10	10	10	10	10
	Mean	57.176	3.385	3.646	1.640	1.056	11.297
	Std. Deviation	23.784	2.264	2.216	0.904	1.059	11.026
	Maximum	93.473	8.761	8.148	3.405	3.303	33.730
	Minimum	25.410	1.760	1.720	0.425	−0.552	0.491
Middle East and Turkey CBs	N	18	18	18	18	18	18
	Mean	54.832	3.834	3.965	2.225	1.585	13.303
	Std. Deviation	18.662	4.455	3.186	3.613	1.317	6.165
	Maximum	98.278	19.550	15.360	16.156	5.855	25.545
	Minimum	32.178	0.745	1.130	0.457	−0.605	3.563
Middle East and Turkey IBs	N	22	22	22	22	22	22
	Mean	56.174	3.756	3.392	3.016	1.910	11.907
	Std. Deviation	20.064	3.004	2.155	3.677	1.645	13.334
	Maximum	105.486	14.925	8.177	14.340	6.010	33.293
	Minimum	24.093	1.095	−0.225	0.423	−0.590	−22.918
Oneway ANOVA Sig.*	Between Groups	0.91	0.37	0.95	0.053	0.09	0.23

Note: '*' indicates statistical significance at 5% level.

V. Conclusions

The findings reported in this paper are substantially different from the prior work in this area in four ways. First, the paper focuses in detail on the results for Islamic banks as compared to conventional banks. Most earlier studies examined one or the other. Second, the scope of this study is relatively wide as the sample includes 80 banks from 21 countries and covers all the data in *BankScope* over the period 1990-2005. Third, the current research investigates cost, revenue, and profit efficiency, whereas previous studies looked at only one or two of these facets. Not many studies have investigated these three efficiency concepts simultaneously and none compared conventional and Islamic banks. Fourth, this article has studied bank efficiency in terms of big versus small, old versus new, and locational differences in order to obtain extra insights.

Table 9 provides a summary of the mean scores of the six financial ratios for the 24 groups of banks that have been analysed in this paper. In most cases, the evidence suggests that there are no significant differences between the efficiency scores in these groups of banks. This is good news for the Islamic financial industry since it would seem that the banking transactions compliant with the *Sharīʿah* are not an impediment to efficiency compared to the more established conventional banks.

Nevertheless, the findings suggest that there is room for improvement in cost minimization and revenue and profit maximization in both banking systems. But there are only slight differences in the cost, revenue and profit efficiencies between these groups, and the differences are not consistent over time and across groups. In general, the results of cost, revenue and profit efficiencies of the total and sub-samples utilizing financial ratios are consistent with the DEA and SFA results reported in other studies (*e.g.* Bader *et al.*, 2007; Bader, 2007).

Overall, the results on the efficiency of conventional versus Islamic banks are generally consistent with the extant literature. Since bank efficiencies are greatly affected by internal and external factors that are always evolving, our conclusions are valid only for the selected sample and time period of study. Therefore those differences between our results and those documented in the literature may possibly be due to different sample, period, countries, and the number of banks in each study.

Table 9: Summary of Cost, Revenue, and Profit Average Efficiency Scores Using Financial Ratios

Banks	N	Cost Efficiency Ratios		Revenue Efficiency Ratios		Profit Efficiency Ratios	
Bank Category	N	CTIR	NIER	NIM	OPIR	ROAA	ROAE
All Banks	80	58.041	4.174	3.780	2.892	1.345	10.688
Conventional Banks (CBs)	37	58.165	4.097	3.919	2.449	1.274	9.614
Islamic Banks (IBs)	43	57.935	4.240	3.660	3.272	1.405	11.611
Big Banks	38	54.327	3.604	3.518	2.472	1.379	11.909
Small Banks	42	61.402	4.690	4.016	3.271	1.314	9.589
Big CBs	18	50.763	3.553	3.163	2.725	1.295	10.768
Big IBs	20	57.534	3.649	3.837	2.245	1.454	12.936
Small CBs	19	65.177	4.612	4.635	2.188	1.441	6.870
Small IBs	23	58.284	4.754	3.505	4.166	1.362	10.460
Old Banks	49	56.156	3.517	3.374	2.360	1.369	13.041
New Banks	31	61.184	5.268	4.456	3.778	1.304	6.765
Old CBs	27	55.993	3.502	3.232	2.451	1.309	13.476
Old IBs	22	56.347	3.535	3.541	2.254	1.439	12.531
New CBs	10	64.027	5.703	5.774	2.445	1.181	−0.812
New IBs	21	59.672	5.051	3.796	4.444	1.366	10.553
African Banks	21	61.782	5.550	4.173	4.675	1.181	12.635
Asian Banks	19	59.111	3.457	3.618	1.409	0.644	4.646
Middle East and Turkey Banks (ME & T)	40	55.570	3.791	3.650	2.660	1.763	12.535
African CBs	10	61.379	5.072	4.134	4.020	1.695	14.098
African IBs	11	62.148	5.986	4.208	5.270	0.713	11.306
Asian CBs	9	61.260	3.537	3.587	1.152	0.186	−2.745
Asian IBs	10	57.176	3.385	3.646	1.640	1.056	11.297
ME&T CBs	18	54.832	3.834	3.965	2.225	1.585	13.303
ME&T IBs	22	56.174	3.756	3.392	3.016	1.910	11.907

NOTES

1. Sources for definitions of efficiency concepts include Coelli *et al.* (1998), and Thanassoulis (2001).

2. More details on the selected sample are available upon request.

3. Not all banks have 16-years history, especially the new banks.

4. However, tables and figures for efficiency scores over time are available upon request.

5. The results in this paper were calculated by the authors based on *BankScope*'s database and definitions of these ratios.

6. In this, some studies (*e.g.*, Hassan and Bashir, 2005) considered the size factor by comparing the banks of the same size. However, this study addresses the issue on big and small banks by examining the cost, revenue, and profit efficiency in both banking streams.

7. Lower NIER means better cost efficiency in respect of interest expenses minimization.

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