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FINANCIAL DIFFERENCES AND SIMILARITIES OF ISLAMIC BANKS: A STUDY ON QISMUT COUNTRIES

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ABSTRACT

Six countries, namely Qatar, Indonesia, Saudi Arabia, Malaysia, UAE and Turkey (abbreviated as QISMUT) are considered to play an important role in the future international development of the Islamic finance. QISMUT countries have a majority Muslim population who prefers Islamic finance for their banking needs. QISMUT countries account for 38 million customers which is 67% of the global Islamic bank customer base.

The focus of this study is to define similar (or different) international banks using the financial data collected from Islamic banks operating in QISMUT countries between 2012 and 2014. In this context, 56 Islamic banks were categorized in the light of their financial ratios for the period between 2012 and 2014 using cluster analysis. There was also an attempt to identify these clusters using multidimensional scaling analysis. Positions of QISMUT Islamic banks in the multidimensional space were defined using multidimensional scaling analysis. Results showed that Islamic banks operating in QISMUT countries are similar in terms of their financial structure.

1. INTRODUCTION

Islamic banks have been making efforts to increase their productivity and to improve their performance in order to gain sustainability as a result of the recent globalization movement (Mghaieth and Mehdi, 2014). Recent global mortgage crisis brought Islamic finance forward as an alternative in terms of investment and banking (Smola and Mirakhor, 2010). Islamic banking has become an integral part of the global finance structure particularly with its immunity to the recent banking and financial crises (Aldohni, 2015).

Islamic banking has gained momentum and acknowledgement especially in the Middle-East and Southern Asia when compared to the rest of the world (Ariff, 2014). Islamic banking is widely preferred in these regions as the Muslim population is in the majority and the Islamic rules are internalized. These regions with their concentrated Muslim population are leading the Islamic finance. QISMUT is a composition of countries which will make its mark in the future of Islamic finance and banking in both regional and global terms.

Six rapid growth markets (QISMUT countries: Qatar, Indonesia, Saudi Arabia, Malaysia, UAE and Turkey) will play an important role in the globalization of Islamic banking industry. Having a wide pool of intellectual capital and funds, these countries may well be the drivers of a growth wave in current and new markets. Two third of the 38 million Islamic bank customers in the world reside in QISMUT countries. A Compound Annual Growth Rate (CAGR) of 19.7% is expected for the total assets of Islamic banks operating in QISMUT countries between 2013 and 2018 adding up to USD $1.6 trillion (2012: USD $567 billion) (Nazim, Bellens, 2014). It is estimated that total assets of the Islamic banks in QISMUT countries reached $662 billion by 2013. Global Islamic banking assets, on the other hand, are anticipated to reach $3.4 trillion by 2018 (Lackmann, 2014).

This study aims to investigate if the QISMUT Islamic banks which are anticipated to improve their profits in a global scale in the years to come have similarities in terms of their financials. QISMUT country classification is a rather new one. Previous research involves studies performed in order to include countries in this group such as research on the Middle-Eastern (including Gulf Cooperation Council countries) countries, North African (MEAN) countries, Gulf Cooperation Council (GCC) countries, and Organization of the Islamic Conference (OIC) countries. These classifications were made mainly through taking geographic, economic, and political aspects into consideration. As a new classification and expected to become the leader of Islamic banking in the close future, do QISMUT Islamic banks show similarities with respect to their lucrativeness, growth, risks, and DuPont ratios? Establishing these similarities will have notable implications for QISMUT classification in the future. This study is significant in this context.

This study uses 15 financial variables obtained from annual financial statements and statements of receipts published by Islamic banks operating in the QISMUT countries. It was attempted to identify the similarities and discrepancies between Islamic banks using variables such as Lucrativeness, Growth, Risks, and DuPont Ratios with Cluster Analysis and Multidimensional Scaling Analysis.

2. LITERATURE REVIEW

Literature includes Cluster Analysis and Multidimensional Scaling Analysis in the identification of similarities and discrepancies between various objects. Lucotte (2015), Knotek (2014), Sorensen and Gutierrez (2006) classified the banks operating in Eurozone using a Cluster Analysis. Lucotte (2015) also used Cluster Analysis in order to be able to classify banks operating in Eurozone in the aftermath of the recent global financial crisis. Knotek (2014) tested the similarities and discrepancies between banks operating in Eurozone using a Cluster Analysis. Sorensen and Gutierrez (2006) made use of Cluster Analysis techniques in order to identify the uniformity of the banks operating in Eurozone between 1998 and 2004. In their study, Western (Germany, France, Belgium and to some extent the Netherlands, Austria and Italy) and Central European countries were clustered with Spain, Portugal, and Greece. Irish and Finnish banks were clustered in a separate group however. The study concluded that there is a convergence between them and the banks operating in Western and Central Europe. Kowal, Yeleyko, and Kharkhalis (2014) analyzed the credit operations of foreign-invested banks operating in Ukraine using a hierarchic cluster analysis. Vagizova, Lurie, and Ivasiv (2014) grouped Russian banks using Cluster Analysis.

Dardac and Boitan (2009) made use of Cluster Analysis in order to examine the profitability and risk ratio of Romanian banks between 2004 and 2006. They have found similarities between banks in terms of risk and profitability. Grzegorz and Dawid (2009) investigated 48 Polish banks classifying them into several groups using Cluster Analysis for a period between 1999 and 2005. Molinero and Cinca (2001) used Multidimensional Scaling Analysis in order to measure the financial failure of banks. Their study investigated 66 Spanish banks for financial stability using Multidimensional Scaling Analysis.

This study has differences from the previous studies on Islamic banks in terms of its scope. Literature consists of studies based on a single country and multiple countries. Most commonly, among these countries are Middle-Eastern (including Gulf Cooperation Council countries) countries, North African (MEAN) countries, Gulf Cooperation Council (GCC) countries, and Organization of the Islamic Conference (OIC) countries. The literature still lacks studies based on QISMUT countries. The reason behind this is that the QISMUT country classification is a rather new one in terms of Islamic banking. This study contributes significantly to the literature.

3. METHODOLOGY AND DATA

This study attempts to identify the financial similarities and discrepancies between Islamic banks using Cluster Analysis and Multidimensional Scaling Analysis.

Cluster analysis is a multivariate statistics method which aims to sort observations set into a limited number of groups or clusters. This kind of a sorting takes place when the observations obtained from the same group are similar while they are different from the observations obtained from other groups (Neil, 2002). Cluster Analysis is a commonly used method among non-structural multivariate analysis methods. Methodology of cluster analysis consists of algorithms which arrange a given dataset into subsets (Izenman, 2008).

Cluster analysis makes use of hierarchical and non-hierarchical clustering method in order to sort units into appropriate groups (Hand et al., 2001). Hierarchical cluster analysis is a significant statistical method used in order to identify uniform clusters. This method makes use of differences of distances between objects during the formation of clusters. Results are then shown in a hierarchical tree diagram.

However, clustering method offers fast measurements, hierarchical methods are not convenient for the analyses of larger samples (Hair, 1998). K-Means technique will be explained as it is the technique used in this study.

3.1. Non-Hierarchical Clustering (K-Means) Method

Non-hierarchical clustering analysis is a method designed to cluster units when the number of clusters is fixed to K. This method includes two widely preferred techniques. One being the K-Means technique and the other is the probability technique. K-Means is one of the most commonly used non-hierarchical clustering techniques (Lin and Chen 2006). K-Means technique involves “d” number of variables of the dataset, “x”, and N number of feature vectors which are able to cluster and classify into K number of clusters (Burn and Goel, 2000). This method starts with the identification of K number of clusters. Each object in the dataset is allocated in a cluster (Rao and Srivinas, 2006).

A possible change in the results must be considered as they will depend on the K-means centers defined in the beginning. Algorithm selects a number of k-means centers in order to reach a better solution every time it runs. It attempts to find the smallest value of the objective function while running these selections (Liu and Yu, 2009).

When each $x_1,x_2,\ldots\ldots,x_n$ value is taken as observation vectors with a number of "d" variables and a point in the multidimensional N space and $a_{1n},\ldots\ldots,a_{kn}$ value was selected as the cluster center for each group observation;

$$W_n = \frac{1}{n} \sum_{i=1}^{n} min \ |x_i - a_{jh}|^2$$

Using this formula, observations are allocated to the closest cluster. When n is the number of data and p is the quality factor in the data matrix;

$$\begin{bmatrix} x_{11} & \cdots & x_{1f} & \cdots & x_{1p} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ x_{i1} & \cdots & x_{if} & \cdots & x_{ip} \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ x_{n1} & \cdots & x_{nf} & \cdots & x_{np} \end{bmatrix}$$

Disparity Matrix

$$\begin{bmatrix} 0 & & & & \\ d(2,1) & 0 & & & \\ d(3,1) & (3,2) & 0 & & \\ \vdots & \vdots & \vdots & & \\ d(n,1) & d(n,2) & \ldots & \ldots & 0 \end{bmatrix}$$

the distance between two data is d(i,j). When q=2 and d is Euclidean Distance, the similarity and disparity between data is then measured with;

$$d(i,j) = \sqrt{(x_{i1}-x_{j1})^2 + (x_{i1}-x_{j1})^2 + \ldots + (x_{i1}-x_{j1})^2},$$

Features:

$d(i,j) \geq 0$

$d(i,j) = 0$

$d(i,j) = d(j,i)$

$d(i,j) \leq d(i,h)+d(h,j)$

Cluster pattern recognition and image processing is widely used in many fields such as economics (particularly in market research), document classification on worldwide web, discovering similar peer groups, data mining, statistics, biology and machine learning (Han and Kamber, 2006).

3.2. Multidimensional Scaling Analysis

Multidimensional Scaling Analysis is a technique which visualizes the "similarity" features between objects with statistical calculations (Machado and Mata, 2013). Distances between objects are shown on a map-like structure (Machado and Mata, 2015). Multidimensional Scaling Analysis aims to graphically display the dataset combined of "n" units on "a" Euclidean space.

Multidimensional Scaling Analysis makes use of stress values in order to determine if the number of dimensions used in the graphical setup is acceptable. Table 1 shows the stress values and quality of compliance obtained from the Multidimensional Scaling Analysis.

Table 1: Stress Values and Quality of Compliance

Stress Values (Compliance)	*Quality of Compliance*
≥ 0,20	Poor Compliance
0,10 < 0,20	Medium Compliance
0,05 < 0,10	Good Compliance
0,025 < 0,05	Very Good Compliance
0,000 < 0,025	Perfect Compliance

Stress values closer to 0 constitute a favorable condition. Perfect or poor compliance is derived from stress values obtained in a range between 0.00 and 0.20. Multidimensional scaling analysis also applies R^2 values for the identification of the quality of compliance. R^2 values above a minimum of 0.60 are indicative of acceptable quality of compliance. Values even higher are indicative of close to perfect quality of compliance (Hair et al., 2006: 654).

This study investigates the Islamic banks operating in the QISMUT countries. According to the 'World Islamic Banking Competition Report 2013-14' prepared by Ernst&Young Turkey, an Audit and Counseling Corporation, QISMUT countries (Qatar, Indonesia, Saudi Arabia, Malaysia, UAE and Turkey) which include also Turkey will play an important role in the globalization of Islamic banking industry.

In this respect, the scope of this research is selected to include QISMUT countries in order to be able to reveal the financial disparities and similarities of Islamic banks and to contribute to the literature with valuable outputs. Profiles of these countries with respect to other QISMUT countries are given in Table 2.

Table 2: General Profiles of QISMUT Countries (2013)

	Population (million)	Islamic Finance Assets	Share in the QISMUT countries	Global Share of the Islamic Banking Assets
Qatar	2.2	$54,4 billion	9%	3%
Indonesia	248.5	$21,4 billion	4%	1%
Saudi Arabia	31	$245 billion	43%	16%
Malaysia	29.8	$140 billion	22%	8%
UAE	9.3	$83 billion	15%	5%
Turkey	76.1	$50 billion	7%	2%
Total	396.9	$593.8 billion	100%	35%

Source: Ernst and Young; World Islamic Banking Competitiveness Report 2013–14

Muslim population residing in the QISMUT countries constitutes the potential clientele of Islamic banks. The total population of these six countries adds up to 400 million people. Indonesia is the most crowded QISMUT country. Qatar, on the other hand, is the one with the lowest population density. However, Islamic banking assets in Indonesia are the lowest of all proportionally. This share is slightly higher in countries with strict Islamic rules in effect. QISMUT member Saudi Arabia has a 16% market share in the global Islamic banking market. QISMUT member Indonesia, on the other hand, has the smallest market share with 1%. The total share of these 6 QISMUT countries in the global Islamic banking market is 35%. Saudi Arabia is the leading country in terms of Islamic financial assets with 43% when compared to other QISMUT countries. Indonesia, on the other hand, accounts for the lowest share in this respect (see Table 2). Names of the banks included in the analysis are given in Table 3.

Table 3: Banks which are Included in the Analysis

Countries	*Number of bank*	*Banks included in the analysis*
Katar (Qatar)	6	(Q1) Al Khaliji Commercial Bank and Islmaic Banking, (Q2) Commercial Bank, (Q3) Masraf Al Rayan–Qatar, (Q4) Qatar Islamic bank, (Q5) Qatar National Bank, (Q6) Qatar International Islamic Bank
Endonezya Indonesia	15	(I1)Bank Pembangunan Daerah (BPD) Banda Aceh, (I2)PT Bank Tabungan Pensiunan Nasional (BTPN), (I3)PT Bank Danamon, (I4)PT Bank Permata, (I5)PT Bank Sinarmas, (I6)PT Bank Syariah BNI, (I7)PT Bank Syariah BRI, (I8)PT Bank Syariah Bukopin, (I9)PT Bank Syariah Jabardan Banten (BJB), (I10)PT Bank Syariah Mandiri, (I11)PT Bank Syariah Mega Indonesia, (I12)PT Bank Syariah Panin, (I13)PT Bank Syariah Victoria, (I14)PT CIMB Niaga, (I15)PT OCBC NISP
Sudi Arabistan (Saudi Arabia)	11	(S1)Al Rajhi Banking & Investment Corporation, (S2)Alinma Bank, (S3)Arab National Bank, (S4)Bank AlJazira, (S5)Bank Albilad, (S6)Banque Saudi Fransi Islamic Banking, (S7)Riyad Bank, (S8)Samba Financial Group, (S9)Saudi Hollandi Bank, (S10)The National Commercial Bank, (S11)The Saudi Investment Bank
Malezya (Malaysia)	13	(M1)Al Rajhi Banking & Inv. Corp. (Malaysia), (M2)Alliance Islamic Bank Berhad, (M3)Asian Finance Bank, (M4)Bank Islam Malaysia Berhad, (M5)Bank Kerjasama Rakyat Malaysia Berhad, (M6)Bank Pembangunan Malaysia Berhad, (M7)CIMB Islamic Bank Berhad, (M8)Hong Leong Islamic Bank Berhad, (M9)Malayan Banking Berhad, (M10)Maybank Islamic Berhad, (M11)OCBC Al-Amin Bank Berhad, (M12)Public Islamic Bank Berhad, (M13)RHB Islamic Bank Berhad
Birleşik Arap Emirlikleri (UAE)	7	(U1)Abu Dhabi Islamic Bank, (U2)Emirates Islamic Bank, (U3)Sharjah Islamic Bank, (U4)Ajman Bank, (U5)Siraj Islamic Banking, (U6)Emirates NBD PJSC, (U7)Union National Bank
Türkiye Turkey	4	(T1)Albaraka Turk Participation Bank, (T2)Asya Finance Participation Bank, (T3)Türkiye Finance Participation Bank, (T4)Kuwait Turk Participation Bank

Cluster and Multidimensional Scaling analyses involved a total of 56 Islamic banks; 6 operating in Qatar, 15 in Indonesia, 11 in Saudi Arabia, 13 in Malaysia, 7 in UAE, and 4 in Turkey. Banks included in the analysis are given an individual code. Banks will be represented with these codes in the clusters obtained from the analysis (Table 3).

Financial ratios were used in order to identify the financial similarities and disparities between Islamic banks operating in the QISMUT countries by means of Cluster and Multidimensional Scaling Analysis. Financial ratios included in the analysis are given in Table 4.

Table 4: Financial ratios which are Included in the Analysis

Financial Ratio Grouping	*Code*	*Financial Ratio*
Profitability	P1	Efficiency Ratio
	P2	Operating Leverage
	P3	Non-interest Income / Operation Income
	P4	Fee Revenue (%)
	P5	Loan Growth (%)
	P6	Deposit Growth (%)
Risk	R1	Loan Loss Provision (% of Avg. Loans)
	R2	Nonperforming Loans (% of Total Loans)
Other Ratios	O1	Tier 1 Risk-Adjusted Capital Ratio
	O2	EOP Loans / EOP Deposits
	O3	Securities % Avg. Earning Assets
DuPont/Earning Power	D1	Pretax ROA
	D2	x Leverage (Assets/Equity)
	D3	Pretax ROE
	D4	Reinvestment Rate

Fifteen financial ratios and variables were used under 4 categories in order to analyze the financial similarities and disparities or the banks operating in QISMUT countries. Analysis includes efficiency ratio, operating leverage, non-interest income/operation income, fee revenue, loan growth, and deposit growth as profitability ratios/variables. Loan loss provision and nonperforming loans/total loans are taken as risk variables. Tier 1 risk-adjusted capital ratio, EOP loans/EOP deposits, and securities earning ratio are included in the analysis as other ratios. Finally, pretax ROA, assets/equity, pretax ROE, and reinvestment rate are used as DuPont ratios in order to classify the banks in question.

4. FINDINGS

This study aims to identify the financial similarities and outputs of the Islamic banks operating in QISMUT countries and the data collected in this study was investigated using cluster analysis and multidimensional analysis. The analysis results obtained using financial ratios from each bank operating in these 6 countries were then examined for their similarities and disparities. Results from the Cluster Analysis and Multidimensional Scaling Analysis were evaluated separately in order to provide separate results for the analysis periods of 2012-2013-2014.

4.1. Results of the Cluster Analysis

Correct classification rate which is obtained using Discriminant analysis, average shadow stats and Dunn's partition coefficient were used in order to test the number of clusters generated according to the banking data obtained from 56 Islamic banks operating in QISMUT countries and the relevant cluster validity. Cluster validity results are shown in Table 5 for a reliable analysis.

Table 5: Number of Clusters and Cluster Validity Results

# of Clusters	Correct Classification Rate (Discriminant)	Average Shadow Stats	Dunn's Partition Coefficient
2	86%	0.454	0.781
3	**92%**	**0.596**	**0.795**
4	78%	0.454	0.694
5	75%	0.452	0.645
6	67%	0.324	0.620
7	64%	0.358	0.609
8	60%	0.324	0.581

Maximum values of correct classification rate, average shadow stats and Dunn's partition coefficient are considered in order to identify the number of clusters and cluster validity. According to the correct classification rate findings shown in Table 4, it was found that the best cluster structure includes 3 clusters with a rate of 92%. Similarly, average shadow stats value (0.596) and Dunn's partition coefficient (0.795) confirm the best cluster structure to include 3 clusters.

K-Means technique, one of the methods of non-hierarchical clustering, was used in the analysis. This technique pre-estimates the number of clusters. According to the analyses, 3 clusters were identified and the distributions of QISMUT Islamic banks by the years are given in Tables 6, 7 and 8.

Table 6: QISMUT Islamic Banks Distribution in Clusters for 2012

Cluster Number	# of Banks in the Cluster	% of Banks in the Cluster	Banks in the Cluster
1st Cluster	41	73%	Q1,Q2,Q3,Q4,Q5,Q6,I1,I2,I3,I6,I7,I9,I10,I13I14,I15,S1, S2,S3,S4,S5,S6,S7,S8,S9,S10,S11,M1,M3,M5,M6,U1,U3, U4,U5,U6,U7, T1,T2, T3, T4
2nd Cluster	1	2%	I12
3rd Cluster	14	25%	I4,I5,I8,I11,M2,M4,M7,M8,M9,M10,M11,M12,M13,U2

According to the Cluster Analysis results for 2012 (Table 6), 1st cluster includes 41 out of 56 banks in the sample. Thus, 1st cluster accounts for the 73% of all the banks. All 6 Islamic banks operating in Qatar, all 11 Islamic banks operating in Saudi Arabia, and all 4 Islamic banks operating in Turkey fall in this cluster. The 2nd cluster accounts for only one bank. There is only 2% of all the banks included in the analyses fall in this cluster. PT Bank Syariah Panin, a bank operating in Indonesia, is financially different than the other banks included in the sample. The 3rd cluster includes 4 out of 15 Indonesian Islamic banks, 9 out of 13 Malaysian Islamic banks and 1 out of 7 UAE banks. There is 25% of all the banks included in the analyses falling in the 3rd cluster.

According to the cluster analysis results for 2012, Islamic banks operating in Qatar, Saudi Arabia, and Turkey have similar properties in terms of profitability, growth and risk.

Table 7: QISMUT Islamic Banks Distribution in Clusters for 2013

Cluster Number	# of Banks in the Cluster	% of Banks in the Cluster	Banks in the Cluster
1st Cluster	1	2%	I12
2nd Cluster	4	7%	M7,M10,M11,M14
3rd Cluster	51	91%	Q1,Q2,Q3,Q4,Q5,Q6,I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11, I13,I14,I15,S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S11,M1, M2,M3,M4,M5,M6,M8,M9,M12,U1,U2,U3,U4,U5,U6, U7,T1,T2,T3,T4

When the clusters were investigated for the financial variables of 2013 (Table 7), the 1st cluster includes 1 bank (2% of total); the 2nd cluster includes 4 banks (7% of total), and the 3rd cluster includes 51 banks (91% of total). All 6 Islamic banks operating in Qatar, all 11 Islamic banks operating in Saudi Arabia, all 4 Islamic banks operate in Turkey, and all 7 banks operating in UAE fall in the 3rd cluster. All 4 banks included in the 2nd cluster operate in Malaysia. These 4 banks are financially different when compared to the Islamic banks operating in other countries. The 1st cluster accounts for only one bank, PT Bank Syariah Panin from Indonesia. As it was the case for 2012, PT Bank Syariah Panin, a bank operating in Indonesia, was financially different when compared to the other banks included in the sample also in 2013. Islamic banks operating in Qatar, Saudi Arabia, UAE and Turkey have similar properties in terms of profitability, growth and risk in 2013.

Table 8: QISMUT Islamic Banks Distribution in Clusters for 2014

Cluster Number	# of Banks in the Cluster	% of Banks in the Cluster	Banks in the Cluster
1st Cluster	19	34%	I1,I4,I8,I9,I11,I13,S4,S10,M1,M2,M4,M8,M9,M12,U2, U4,T1, T2,T3
2nd Cluster	33	59%	Q1,Q2,Q3,Q4,Q5,Q6,I2,I3,I5,I6,I7,I10,I12,I14,I15,S1,S2, S3,S5,S6, S7,S8,S9,S11,M3,M5,M6,U1,U3,U5,U6,U7,T4
3rd Cluster	4	7%	M7,M10,M11,M13

Banks are found to be distinctly differentiated from each other in 2014. The 1st cluster includes 19 Islamic banks (34% of total), the 2nd cluster includes 33 Islamic banks (59% of total) and the 3rd cluster includes 4 Islamic banks (7%). All 4 banks included in the 3rd cluster operate in Malaysia. All banks included in the 2nd cluster along with all bank operating in Qatar and Saudi Arabia are found to have financial similarities. The 3 Islamic banks operating in Turkey fall in the 1st cluster which indicates a similarity with Islamic

banks operating in Indonesia, Malaysia, and UAE. Islamic banks operating in Qatar and Saudi Arabia have similar properties in terms of profitability, growth and risk in 2014.

Thus the financial similarities and disparities of 56 Islamic banks operating in the QISMUT countries were identified using the cluster analysis. It is important to confirm the classifications obtained using the cluster analysis with Multidimensional Scaling Analysis.

4.2. Multidimensional Scaling Analysis Results

Multidimensional Scaling Analysis makes use of a measure called stress values in order to determine if the number of dimensions used in the graphical setup is acceptable. Table 9 shows the stress values and RSQ values obtained as part of this analysis.

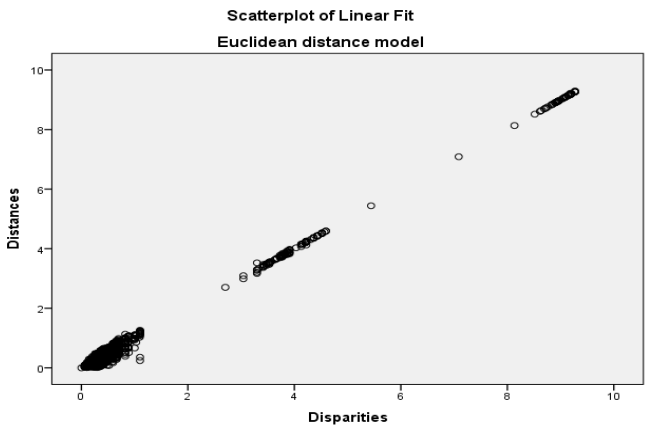
Table 9: Stress and RSQ Results of Multidimensional Scaling Analysis

Analysis Years	*Stress Values*	*RSQ*
2012	0.05963	.99560
2013	0.05836	.99586
2014	0.06967	.99300

Stress values were obtained using Kruskal's Stress Formula 1. The 2 dimensions were used for Multidimensional Scaling Analysis. The 4 iterations were conducted until the point the value of stress statistics is smaller than 0.001 for both of these dimensions. Accordingly, stress value for 2012, 0.05963 (0.05 < 0.10), is consistent. Stress values of these 2 dimensions account for 99.560%. Stress value for 2013, 0.05836 (0.05 < 0.10), is consistent. Stress values of these dimensions account for 99.586% in 2013. Stress values for 2014 were found to be 0.06967. This value is an indication of good consistency as it is in the range between Stress values of these dimensions account for 99.300% in 2014. Stress coefficients show that the number of dimensions used in the graphical setup obtained from the Multidimensional Scaling Analysis is acceptable for all three years. RSQ values prove to be quite high for each year.

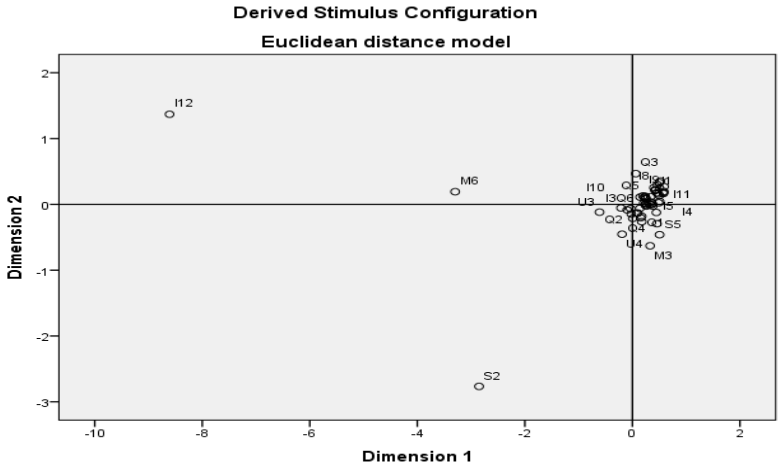
Figure 1 shows the Euclidean Distance Constellation Diagram for the Multidimensional Scaling Analysis of Islamic Banks operating in QISMUT countries in 2012 while Figure 2 shows the Euclidean Distance Model for the same year.

Figure 1: Euclidean Distance Constellation Diagram for 2012



As seen in Figure 1, the distances and disparities obtained from the Multidimensional Scaling Analysis of Islamic banks operating in QISMUT countries are aligned in a linear manner (bottom left to top right). In this context, the purpose of the Multidimensional Scaling Analysis was to measure the similarities between the estimated distances generated according to the disparity matrix and the distance matrix obtained through the use of the direct data. According to the results of this research, it was found that the estimated distances were consistent with the actual values as the estimated values were similar to the ones in the distance matrix obtained from data.

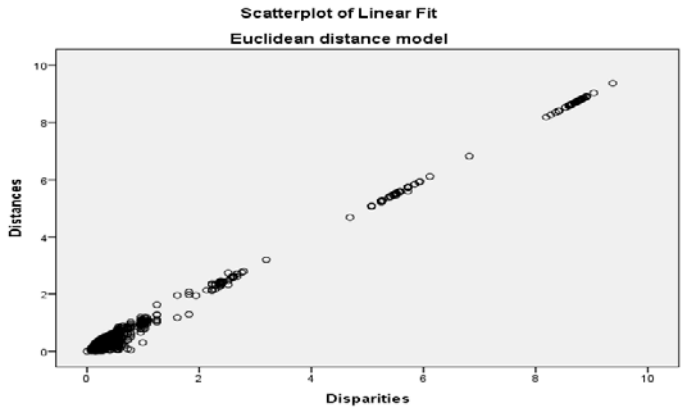
Figure 2: Euclidean Distance Model for 2012



According to the Figure 2, 53 out of 56 banks included in the analysis have financial similarities (accumulated around Euclid) as per the Euclidean distance model which shows the relations between units (QISMUT Islamic banks) on a 2-dimensional space. According to the Euclidean distance model for 2012, 3 banks (I12: PT Bank Syariah Panin, M6: Bank Pembangunan Malaysia Berhad and S2: Alinma Bank) have financial disparities when compared to the other Islamic banks.

Figure 3 shows the Euclidean Distance Constellation Diagram for the Multidimensional Scaling Analysis of Islamic Banks operating in QISMUT countries in 2013 while Figure 4 shows the Euclidean Distance Model for the same year.

Figure 3: Euclidean Distance Constellation Diagram for 2013



It was found that the distances identified using Multidimensional Scaling Analysis of the QISMUT countries and their disparities have a linear relationship. According to the results of Euclidean distance model for 2013, it was found that the estimated distances were consistent with the actual values as the estimated values were similar to the ones in the distance matrix obtained from data.

Figure 4: Euclidean Distance Model for 2013

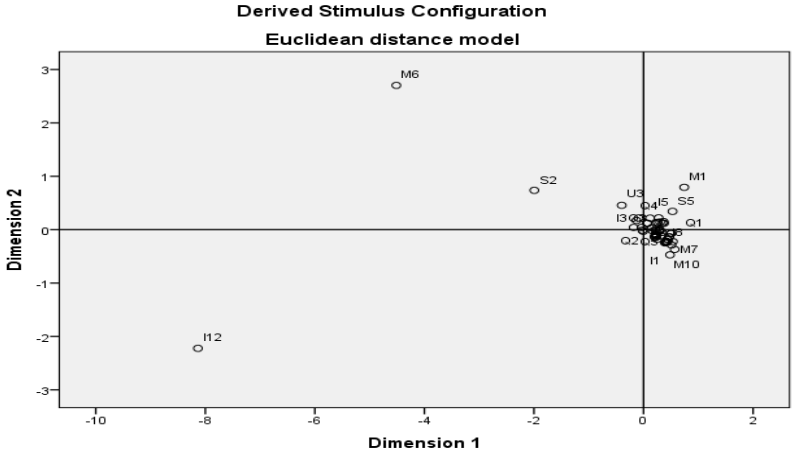


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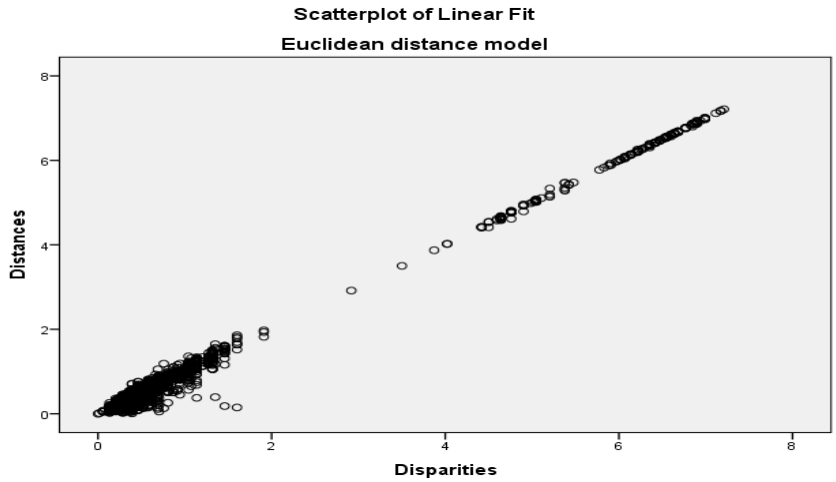
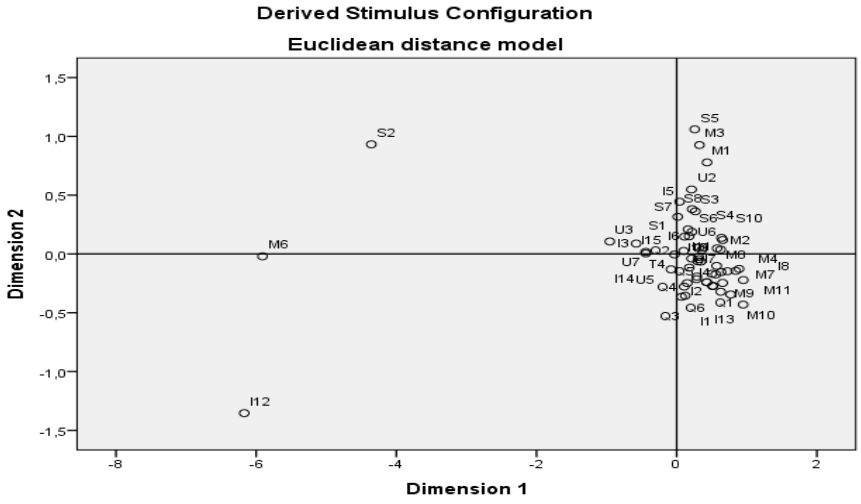
Figure 5 shows the Euclidean Distance Constellation Diagram for the Multidimensional Scaling Analysis of Islamic Banks operating in QISMUT countries in 2013 while Figure 6 shows the Euclidean Distance Model for the same year.

Figure 5: Euclidean Distance Constellation Diagram for 2014



It was found that the distances identified using Multidimensional Scaling Analysis of the QISMUT countries and their disparities have a linear relationship. According to the results of Euclidean distance model for 2014, it was found that the estimated distances were consistent with the actual values as the estimated values were similar to the ones in the distance matrix obtained from data.

Figure 6: Euclidean Distance Model for 2014



According to the Figure 6, 53 out of 56 banks included in the analysis have financial similarities (accumulated around Euclid) as per the Euclidean distance model which shows the relations between units (QISMUT Islamic banks) on a 2-dimensional space. According to the Euclidean distance model for 2014, 3 banks (I12: PT Bank Syariah Panin, M6: Bank Pembangunan Malaysia Berhad and S2: Alinma Bank) have financial disparities when compared to the other Islamic banks. Therefore, Islamic banks operating in Qatar, UAE and Turkey have similar properties in terms of profitability, growth and risk in 2013.

As it is shown in the Euclidean distance graphs, Islamic banks operating in QISMUT countries are quite similar in terms of their financial ratios collected for 2012 and 2013, thus, clustered very close to each other in the graph. Only 3 of the banks were distant from this cluster. In 2014, on the other hand, distances between banks clustered are slightly expanded when compared to the other years.

5. CONCLUSION

Islamic banking activities, one of the building blocks of Islamic finance, have recently been developing in the global arena. Growing its market share in the global economy, Islamic finance is led by the countries called QISMUT in the recent years. Consisting of Qatar, Indonesia, Saudi Arabia, Malaysia, UAE and Turkey; QISMUT is anticipated to drive the Islamic capital which rapidly grows its market share in the global finance system. Efficient operability of Islamic banks is important for the healthy development of many economies when this substantial market share is taken into consideration.

This study identified the financial similarities and disparities between Islamic banks using cluster analysis and multidimensional scaling analysis. Financial similarity and disparity levels of Islamic banks operating in the QISMUT countries were duly measured. Financial similarities and disparities of Islamic banks were then separately evaluated for a period between 2012 and 2014 using profitability, growth, risk and DuPont ratios.

According to the cluster analysis results for 2012, Islamic banks operating in Qatar, Saudi Arabia, and Turkey have similar properties in terms of profitability, growth and risk. For the same year, 53 out of 56 banks included in the analysis have financial similarities (accumulated around Euclid) as per the Euclidean distance model and Multidimensional Scaling Analysis. According to the Euclidean distance model for 2012, 3 banks (I12: PT Bank Syariah Panin, M6: Bank Pembangunan Malaysia Berhad and S2: Alinma Bank) have financial disparities when compared to the other Islamic banks.

As it was the case for 2012, PT Bank Syariah Panin of Indonesia was financially different when compared to the other banks included in the sample also in 2013. Islamic banks operating in Qatar, Saudi Arabia, UAE and Turkey have similar properties in terms of profitability, growth and risk in 2013. 53 out of 56 banks included in the analysis have financial similarities (accumulated around Euclid) as per the Euclidean distance model which shows the relations between QISMUT Islamic banks on a 2-dimensional space. According to the Euclidean distance model for 2013, 3 banks (I12: PT Bank Syariah Panin, M6: Bank Pembangunan Malaysia Berhad, and S2: Alinma Bank) have financial disparities when compared to the other Islamic banks. Therefore, Islamic banks operating in Qatar, UAE and Turkey have similar properties in terms of profitability, growth and risk in 2013.

According to the Cluster analysis results for 2014, Islamic banks operating in Qatar and Saudi Arabia have similar properties in terms of profitability, growth and risk. For the same year, 53 out of 56 banks included in the analysis have financial similarities (accumulated around Euclid) as per the Euclidean distance model. According to the Euclidean distance model for 2014, 3 banks (I12: PT Bank Syariah Panin, M6: Bank Pembangunan Malaysia Berhad, and S2: Alinma Bank) have financial disparities when compared to the other Islamic banks. Therefore, Islamic banks operating in Qatar, UAE and Turkey have similar properties in terms of profitability, growth and risk in 2013.

As it is shown in the Euclidean distance graphs, Islamic banks operating in QISMUT countries are quite similar in terms of their financial ratios collected for 2012 and 2013, thus, clustered very close to each other in the graph. Only 3 of the banks were distant from this cluster. In 2014, on the other hand, distances between banks clustered are slightly expanded when compared to the other years.

In line with the findings of this study, it would be fair to say that QISMUT countries which will make their mark in the future of Islamic finance and banking have similarities in terms of financial ratios.

This study is an original research measuring the similarities and disparities of Islamic banks operating in QISMUT countries which are expected to lead the future of Islamic banking and finance. In this respect, this study will make a significant contribution to the literature. Future research may focus on extended numbers of Islamic banks operating in QISMUT countries and may diversify the research periods and variables.

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