Bryant University

HONORS THESIS

The Effect of the Arab Spring on the Performance of Islamic and Conventional Banks in Egypt: Which Model Performs Better Amidst Crisis?

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Table of Contents

Abstract

The purpose of this empirical study is to analyze the relationship between financial institutions and performance in times of external crisis and evaluate whether there is a difference in performance between bank models; Islamic (IBs) and conventional (CBs). Egypt surrounding the Arab Spring event (2009-2013) is taken as a case study, comparing 6 conventional banks and 3 Islamic banks. Financial ratio analysis is the main method employed, allowing performance to be measured by efficiency, capital adequacy, profitability, solvency, liquidity, and credit risk. Due to the small sample sizes, normality in the distribution cannot be assumed and so the nonparametric rank order Mann-Whitney U test was employed to assess the significance of the results of the ratio analysis as well as effect size analysis of the strength of association between the two samples performance. Results of the financial ratio analysis show overall, CBs have superior performance in all performance indicators examined other than with Cost-Income and NIM. With progression nearing and through the crisis event period, efficiency performance for both bank models were equally volatile and stable, while IBs were able to increase capital adequacy and solvency performance during the crisis. IBs profitability was significantly negatively impacted by the crisis, other than related to NIM, while CBs increased profitability rates. IBs liquidity performance worsened and then improved midway through the crisis while CBs stabilized liquidity rates. Lastly, IBs were able to improve credit risk performance midway through the crisis period while CBs declined midway. Results of the nonparametric tests hold these observed differences in results are insignificant and have weak effect size for all but the TENL ratio.

Introduction

The topic of my capstone project revolves around increasing my understanding of the field of Islamic or Shariah-compliant finance, relating to my concentration in finance – but at the same time coinciding with my major in international business and minor in political science. My interest in the subject stems from my academic background, but also from my personal background, as my family is from Pakistan - where Islamic financing is used extensively. Herein I have always had a personal interest in learning the differences between conventional banking methods and those employed by Islamic financial institutions as a dual citizen of Pakistan and the United States. My additional choice of focusing on Islamic banking's role in Egypt during the Arab Spring crisis rather than on Pakistan is my interest in answering a question I feel has not been attempted by research in the field to date, which is the effect of the crisis on the potential difference in performance across bank model within a nation – as I feel Pakistan does not have just one critical time period to look at to be able to draw similar conclusions. Alongside this, from my own knowledgeability of the events in this region since the onset of this still current financial and political crisis and availability of data, this country during the Arab uprising presents an applicable sample to ideally answer this question.

The purpose of this project is thus to look at how financial and political crises effects financial institutions like banks. I hope to in the end be able to assess how internally banks are able to handle external crises – based off their different foundational goals. This is significant, as prior to research I already know Islamic banks are intrinsically different from other or western banking systems in that they run through a profit-loss sharing system. And with this, I hope to learn the differences between Islamic and conventional banking regarding their services and products, and why these differences are relevant. The relevance or value of this project is to contribute to growing literature in the field evaluating the performance of banks amidst crisis while addressing the limits of past research.

There have been studies with comparable methodology and scope, though most focus on profitability, and do not look in depth at each variable of performance over the course of a crisis with the Arab Spring period. Research looks at other metrics too, such as efficiency, and employ models and statistical analysis that cannot be applied to this sample – and so this study attempts to branch off of past pursuits by applying a different methodology with the use of nonparametric statistics – while increasing my own understanding of this field of statistics in the process. Other studies look at only Islamic banks in multiple countries during a given time period, and so cannot take into account country specific conditions or the relationship to non-Islamic bank performance.

The worth of this project is to establish a true picture of the financial health or position of financial institutions amidst crises – by taking Egypt during the Arab Spring as a case study. Conclusions that can be drawn from such a project are important to not only depositors and shareholders, but to managers and regulators of both types of institutions – and can help drive key institutional decisions and policies made in response or anticipation to external crises. This is substantial as financial institutions play a key role in economies as they provide the necessary funds to drive growth and development.

In order to answer this question, financial ratio analysis is performed on the Egyptian financial statement data from FactSet to analyze the trends of each bank model relative to each other as well as across time. This will allow for discussion on the variation of the impact of the crisis on each internal determinant or variable of

performance. The nonparametric test of rank order with the Mann-Whitney U test is performed to determine the significance of the results obtained through the ratio analysis and whether they can be generalized for these two population samples. The study ends with a discussion of the implications of our results from both parts of the analysis.

Literature Review

In today's financially global environment, it is nearly impossible to work without encountering other manners of banking, and it is just as important when evaluating one's own system and bank model to remain innovative as well as concurrent to whatever issues may press one's own organization and larger economy. In this comes the importance in understanding the backgrounds and principles of both bank models evaluated in this research paper, as well as to establish the connection and relevance of the effects of external crisis on these differing banking structures. Already there have been various studies done in the realm of Islamic finance that either explore the significance of a wide range of internal and external variables on bank performance or focus in on certain indicators of financial ratio analysis like profitability – and both were looked at in order to complete this unique research project.

Without looking too deep into his theological presentation behind Islamic banking's foundation, Hassan (2007) is still able to present a great compilation of the key operating differences that Islamic banks equip against competing non-Islamic financial institutions. He summarizes Islamic banks rely on a combination of three key principles; sharing, leasing, and sale – which is how funds have to essentially be channeled through. In contrast, the financial transactions and profit of conventional banks are built on interest and the debtor-lender relationship. Islamic institutions also share an extra layer of corporate governance with Sharia boards to monitor their religious adherence. This is since they face strict rules, such as the prohibition of *riba* or interest in all transactions, prohibition of *gharar* or speculation in activities, the payment of *zhakat* - which can be seen as a social welfare or wealth redistribution payment banks have a duty to payout, and lastly all business and investments must be in those activities deemed *halal* or in line with Islamic principles – excluding anything to do with gambling, alcohol, etc.

Visser's (2013) discussion accompanies Hassan's and explains how these principles form the unique balance sheet or assets and liabilities of an Islamic bank – though each individual bank is evidently open to its own goals as well as the laws of its country, plus the increasing need to interact with other interest-based banks. This brings in a list of financial instruments that are supposed to be built on the idea of either profit-sharing or profit-and-loss sharing (PLS). This is since it is important to note, in the Quran *riba* is clearly frowned up, but profit itself is not. Likewise, Lewis (2010) clarifies *mudaraba* and *musharaka* are the two most preferred PLS forms used by banks to raise funds. *Mudaraba* is a silent contract where one party is the financier who entrusts funds to the other party, who undertakes management of it and the venture. The entrepreneur becomes a trustee who returns the principal plus a pre-agreed profit while keeping the leftovers for himself. Thus, the financier is the one who bears the liability for losses, though it is limited to their own contribution. *Musharaka* is an equity partnership or joint venture contract where instead all parties have the right to management. Profits are pre-agreed and losses are shared too, based on contributions – and this type of contract is known for financing commercial enterprises, real estate development, or rural finance.

Non-PLS instruments include the popular *murabaha* or cost-plus contract, *ijara* which is rent or lease that

still contains an allowable profit component, and types of loans with commission in place of interest. *Sukuk* is also a type of bond that cannot represent a debt as conventional bonds may, so it is instead obtained through the securitization of an asset. Aside from these there are many other even more complex instruments Islamic institutions may employ. With this, before his study, Fayed (2013) also explains Islamic banks maintain three types of deposit accounts: current, savings, and investment - with the latter two showing differences from conventional banks. Savings deposits vary and may involve a full guarantee, with no profit promised, while others are more like investments that banks use to invest in fairly risk-free and short-term projects. Investment deposits meanwhile are for a fixed or unlimited time period where profits or losses are expected to be shared in a given proportion with the bank. Capital isn't guaranteed, though banks equip several methods to acquire assets or financing projects that can be broadly categorized into three areas: investment, trade and lending.

Fayed's performance study continues on to compare Islamic and conventional banking in Egypt between 2008 to 2010, employing financial ratio analysis to gauge profitability, liquidity, credit risk, and solvency using the Bank-o-meter model. His project provides useful context for my own research, as his results indicate the superiority of conventional banks over Islamic ones in all ratio criteria – though he includes no further statistical analysis into these figures. With similar objective but more statistical testing, El Massah and Al-Sayed (2015) focus on the UAE and found differences in performance indicators are statistically significant. Islamic banks were on average less solvent, less profitable, more liquid, and yet had higher credit risk – matching Fayed's findings. Another comparable study by Elsiefy (2013) looked at Qatar, while including growth rates, market shares, and such trends in its analysis of the ratios too in its attempt to also address whether Islamic banks are able to showcase sustainable growth amidst financial crisis. Looking at data pre and post the financial crisis, he found Islamic banks maintain stronger total assets, credit, and deposits growth rates but less sustainable profitability rates over conventional banks in these periods. His asset quality and risk ratios exhibit Islamic banks sustain lower nonperforming loans and are less leveraged too. He also interestingly found they were more efficient in utilizing assets and less liquid, which is inconsistent with the accepted view Islamic banks are excessively liquid.

Aside from comparative performance studies, the other type of study consulted for this project includes those that employ their own linear regression models and extensively focus on establishing a relationship between a number of variables to profitability as the dependent. These involve complex statistical analysis but using Hassan and Bashir's (2005) study on the determinants of profitability I attempted to understand these studies. Using their regression model and bank level data, they established a relationship between bank characteristics and a financial environment on the performance of Islamic banks. They came up with determinants of Islamic bank profitability while controlling for the macroenvironment, financial market structure, and taxation - including high capital and loan-to-asset ratios. They also asserted taxes negatively affect bank performance while fortunate macro conditions give positive performance. They also discovered profitability and overhead have a strong positive correlation. Alongside this, Buse, Ganea, and Circiumaru (2010) present a paper on how the analysis of financial-economic performances can be done through linear regression. They go through various techniques, explain an exhaustive number of variables that can be applied, and attempt to breakdown models and steps in testing them. Their objective was developing and applying an econometrical model capable of relating the economic rate of return, as an indicator of a firm's financial-economic performance, with determinant factors in Romania. It was in the end a pretty high-level analysis I could partially

understand – but thus allowed me to narrow down my ideas for my own methodology in my study.

After reading this, Yahya, Akhtar, and Tabash (2017) applied this to their own project on the effect of political instability and other macroeconomic factors on the profitability of Islamic banks in Yemen surrounding the Arab uprising. They likewise developed two of their own models for profitability with nine independent variables and ROA and ROE as dependents. Their statistical and regression results hold operating efficiency and financial risk have significant negative relationships with profitability, while capital adequacy exhibits an insignificant negative relationship. Onwards, assets size, assets management, liquidity, deposits, GDP, inflation, and political instability have a significant positive impact on ROA and ROE. A similar empirical study on Qatari banks by Ibrahim (2016) employed descriptive statistics, a t-test on each variable, and correlation and regression analyses like most other studies aforesaid. He found ROA, liquidity, and capital adequacy values are higher for Islamic banks – while bank size is greater with conventional. And his regression held bank size and liquidity are significant in affecting profitability for both bank models. A comparable study with parallel results done by Almanaseer (2014) took the same idea and applied it to multiple countries and a period of financial crisis, looking to the GCC during the 2005 to 2012. However, he found the financial crisis did not have a significant impact on Islamic banks profitability. He further found increasing owners' equity decreased the impact of the financial crisis on profitability - while the impact of the financial crisis itself on profitability increased with likewise increasing total assets, liquidity, and overhead expenses. I also enjoyed the detailedness of the discussion of his hypotheses and results, which I may adapt.

My research next took me to nonparametric statistics, due to the nature of the small bank population of 9 in total available through FactSet. Nonparametrics are used in times when regular parametric statistics are not applicable or cannot be assumed, where Corder and Foreman (2014) summate parametric samples as those that may be randomly drawn from a normally distributed population, consist of independent observations except for paired values, consist of values on an interval or ratio measurement scale, have respective populations of approximately equal variances, approximately resemble a normal distribution, or are adequately large - as prior researchers Pett (1997) and Salkind (2004) held most researchers suggest $n > 30$ while Warner (2008) pushed for consideration of $n > 20$ as a minimum and $n > 10$ by group as a minimum. This led me to consider the Mann-Whitney U test, as it is the nonparametric equivalent of the t-test for independent samples. This test involves combining and rank ordering the data to determine if the values are randomly mixed or if they cluster at opposite ends. A random rank ordered signifies the two samples are not different, while clusters of one sample's values would indicate a difference.

Based off this, a Mann-Whitney U-test statistic for each of the two samples can be computed as;

$$U_i = n_1 n_2 + \frac{n_i(n_i+1)}{2} - \sum R_i$$

where U_i is the test statistic for the sample of interest, n_i is the number of values from the sample of interest, n_1 is the number of values from the first sample, n_2 is the number of values from the second sample, and $\sum R_i$ is the sum of the ranks from the sample of interest. The lesser of the two computed values for U_1 and U_2 is chosen as the obtained value, U. Using this, the statistics can then be tested for significance by using a table of critical values given the sample sizes and a chosen level of risk or significance, known as α or alpha. This determines if the null and alternative hypotheses may be rejected, where the null hypothesis typically states the two samples are identical or have no significant difference in ranks while the alternative states the opposite. If the obtained value or U is more than or equal to the critical value or CV the null hypothesis must

not be rejected, whereas if it is less than the critical value it is be rejected.

Following this, further analysis can be conducted to identify the strength of the treatment, or the degree of association between the samples, with effect size computed as;

$$ES = \frac{|Z|}{\sqrt{n}}$$

where *ES* varies from 0 to 1, $|Z|$ signifies the absolute value of the z-score, and *n* the total number of observations. A value of .1 is thus identified as small or a weak association, .3 as medium or moderate, and .5 as large or a strong association according to Cohen (1988).

The formulas for finding the mean, standard deviation, and the z-score are further specified within the parameters of effect size analysis, with;

$$\bar{x} = \frac{n_1 n_2}{2}$$

where $\bar{x}$ is the mean, and n_1 is the number of values from the first sample and n_2 the number of values from the second sample.

Standard deviation represented as s is calculated as,

$$s = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}$$

and the z-score represented as $z^*$is calculated as,

$$z^* = \frac{U_i - \bar{x}}{s}$$

with U_i representing the *U* statistic from the sample of interest.

Focusing on these key sources, I was able to narrow down my own project's scope and methodology to include and explore many of the aforementioned concepts and tests. Looking at what others have done has also pushed me to not focus just on profitability like the latter studies do, but rather on establishing an overall picture of Islamic and conventional bank performance – as was my original objective. Hence, a review of the literature already present on this topic was key to my own comprehension of Islamic finance and allows me to use as well as look beyond what past research is present in this discipline.

Research Design

Research Question

The research question is as follows; "Is there a difference in the performance of conventional and Islamic banks in times of crises?" which will be answered by looking at a sample of banks focused on the Arab Spring time period in Egypt.

Definitions of key terms include…

- ***Performance*** refers to the comparative results of each bank's ratios which serve as performance indicators (for efficiency, capital adequacy, profitability, solvency, liquidity, and credit risk)

- ***Islamic banks*** are those that employ "a banking system that is based on the principles of Islamic or Sharia law and guided by Islamic economics. Two fundamental principles of Islamic banking are the sharing of profit and loss, and the prohibition of the collection and payment of interest by lenders and investors" (Lim, 2019)

- whereas ***Conventional banks*** for the purpose of this project are those that offer more than just Islamic or shariah compliant products, and are instead based off the debtor-creditor relationship and make profits off charging interest

- ***Crisis*** refers to the chosen Arab Spring event, as representative of a crucial time of instability that branches out with significant effects on a state's economic, political and other given affairs

- ***Arab Spring*** as "a series of antigovernment uprisings affecting Arab countries of North Africa and the Middle East beginning in 2010" until about 2012 for the purposes of this paper (Arab Spring)

- ***Egypt*** means only looking at a data sample focused in this country alone

The main objectives for this project are:

1) To look at the differences in performance for each bank model across time
2) To look at the differences in performance across institutional types (conventional versus Islamic)
3) To examine the variation of the impact of the crisis on each internal determinant (variable) of performance - using ratio and other non-parametric statistical analysis

Since time is of importance to evaluating the effect of the progression through and after the crises on bank performance, and to see the difference of the crises period to before and after, 5 years of financial data are split into 3 approximated categories according to historical events while pin-pointing the onset of the crises towards the end of 2009; Before Arab Spring (2009), During Arab Spring (2010-2012), and After Arab Spring (2013).

This will allow me to frame a picture of the effect of the Arab Spring on these differing banks and bank models over time, and pinpoint when and where each may have performed better or worse regarding the different performance indicators against time. In the end, the goal is for the analysis of the trends and significance in the disparities between ratios and banks to lead into my conclusions on this data sample and the overall topic of this research.

Research Methodology

Foremost, this project involves Financial Ratio Analysis of the performance indicators using historical financial statement data, including income statements and balance sheets. Financial ratios are beneficial in permitting mathematical comparisons of financial statement line items as both small and larger businesses are represented proportionally. The relationships between these statements and ratios allows one to compare different companies in given industries, as well as prove useful to illustrating the financial standing and performance of a business. There are many advantages to ratio analysis, including how they simplify financial

statements, facilitate inter-firm comparisons, and can have a part in investment or planning decisions. The bank data for this analysis has been obtained from primary data available in the FactSet database. The results of the ratio analysis are to be summated graphically to better visualize relative trends between bank models.

Tests as said under objective 3 are planned to be performed. Due to the sample size, this will require non-parametric statistical analysis as normality in the sample cannot be assumed. The non-parametric tests used in this study are a rank order test, specifically the Mann-Whitney U test since the two samples (Islamic and conventional banks) are independent, and Effect Size Analysis as explained in the literature review. Lastly a Descriptive Statistics Summary of mean, standard deviation, and skewness to compare and analyze the performance of Islamic and conventional banks is included. This provides simple summaries about the sample and the measures in a manageable form.

This approach and methodology are appropriate for the frame and discipline of this project based off the extensive review of literature, where many other studies use a compilation of these methods and tests. This methodology and scope will also again allow me to differentiate my work from past work in this field to answer my unique question and small sample with the addition of nonparametric tests. With this, it is also important that I realize my own grasp of statistics and finance up to this point, and so cannot perform as complex tests as other professionals or published fellows in this field may – but am still open to being able to learn and perform a number of statistical analysis as aforementioned in my attempt to complete this project.

Data Sample

The data sample available in FactSet of 3 Islamic and 6 Conventional Banks covering the necessary years in Egypt are identified below, purposely excluding those banks specialized in certain areas of finance while understanding all the banks included have varying asset sizes.

Islamic Banks	Conventional Banks
Faisal Islamic Bank of Egypt	Bank of Alexandria
Al Baraka Bank Egypt	Al Ahli Bank of Kuwait-Egypt
Abu Dhabi Islamic Bank-Egypt	Commercial International Bank-Egypt
	Qatar National Bank Al-Ahli
	Suez Canal Bank-Egypt
	Blom Bank-Egypt

Performance Indicators & Financial Ratios Employed in Study

Performance Indicator	Ratio	Calculation	Definition & Significance
Efficiency	**Cost-Income Ratio**	$\frac{Operating\ or\ Non-Interest\ Expense}{Operating\ Income}$	Measures a bank's costs relative to income and spending relative to revenue generation. Lower ratios signify higher efficiency and cost management and profitability.
	Operating Efficiency	$\frac{Total\ Operating\ or\ Non-Interest\ Expense}{Total\ Assets}$	Measures the effectiveness of management in keeping costs low while generating revenues. Lower ratios signify higher operational efficiency.
Capital Adequacy	**Capital Adequacy Ratio (CAR)**	$\frac{Total\ Common\ Equity-Intangible\ Assets}{Total\ Assets-Intangible\ Assets}$	Measures a bank's available capital relative to their risk-weighted assets or credit exposures, and their ability to absorb losses in times of financial shock or downturn. Higher ratios signify greater capital adequacy and stability and lower risk.
Profitability	**Return on Assets (ROA)**	$\frac{Net\ Income}{Total\ Assets}$	Measures the effectiveness of management in generating profits off its available assets. Higher ratios signify higher profitability.
	Return on Equity (ROE)	$\frac{Net\ Income}{Shareholder\ Equity}$	Measures the effectiveness of management in using equity or net assets to earn profits. Higher ratios signify higher profitability.
	Net Profit Margin (NPM)	$\frac{Net\ Income}{Revenue}$	Measures net income or profit to generated revenues, and how much each dollar of revenue translates into profit. Higher ratios signify higher profitability.

	Net Interest Margin (NIM)	$\frac{Interest\ Income - Interest\ Expense}{Avg.\ Earning\ Assets\ \ or\ Invested\ Assets}$	Measures the difference between interest income generated by the banks and the amount paid out to depositors in relation to their investments. Higher ratios signify higher profitability.
Solvency	**Debt-to-Equity**	$\frac{Total\ Debt}{Total\ Shareholder\ Equity}$	Measures a firm's financial leverage and the degree of their financing through debt rather than self-owned funds. Also reflects the ability of shareholder equity to cover outstanding debts in times of financial shock or downturn. Too high ratios suggest a firm cannot generate enough cash to satisfy debt obligation, but too low suggest a firm is not taking advantage of increased profits. Lower ratios are considered less risky.
Liquidity	**Loans-to-Assets**	$\frac{Total\ Loans}{Total\ Assets}$	Measures how much total assets is tied up in loans for a bank. Higher ratios signify lower liquidity and higher risk.
	Loans-to-Deposits	$\frac{Total\ Loans}{Total\ Deposits}$	Measures a bank's ability to cover loan losses and withdrawals from customers. Too high ratios suggest a firm is not liquid enough to cover unforeseen needs for funds, but too low suggest a firm is not earning optimally. Higher ratios signify lower liquidity and higher risk.
Credit Risk	**Total Equity to Net Loans (TENL)**	$\frac{Total\ Equity}{Net\ Loans}$	Measures a bank's ability for equity to cover loan losses, as in times of financial shock or downturn. Higher ratios signify lower credit risk.

Hypotheses

My hypotheses delve into my predictions (and some explanations for these) for each core variable or performance indicator category underneath the measurement of performance, as well as relative to the progression of time with the external crisis event, and for the nonparametric test to see whether we can accept the results of the ratio analysis as follows;

Ratio Analysis Hypotheses

H_1: There are no significant differences in efficiency performance (Cost-Income Ratio & Operating Efficiency) between both bank models.

H_2: There is a negative relationship between efficiency and the external crisis for both bank models.

H_3: Conventional banks lead in capital adequacy (CAR).

H_4: There is a negative relationship between capital adequacy and the external crisis; this negative relationship is stronger or more apparent in conventional banks.

- Presuming the effect of capital flight, etc. hits conventional banks harder

H_5: Conventional banks lead in all profitability indicators (ROA, ROE, NPM, NIM).

H_6: There is a negative relationship between profitability and the external crisis; this negative relationship is stronger or more apparent in conventional banks.

- Presuming conventional banks are more concerned with achieving profits than Islamic banks.
- Considering the positive relationship between profitability and risk.

H_7: Islamic banks lead in solvency (Debt-to-Equity).

H_8: There is a negative relationship between solvency and the external crisis; this negative relationship is stronger or more apparent in conventional banks.

- Under presumption conventional banks have higher debt in general.

H_9 Islamic banks lead in all liquidity indicators (Loan-to-Assets & Loan-to-Deposits).

H_{10}: There is a positive relationship between liquidity and the external crisis; this positive relationship is stronger or more apparent in Islamic banks.

- Under presumption Islamic banks are already more liquid before the crisis and only increase this throughout the crisis.

H_{11}: Conventional banks lead in credit risk (Total Equity to Net Loans).

H_{12}: There is a positive relationship between credit risk and the external crisis; this positive relationship is stronger or more apparent in conventional banks.

- Under presumption conventional banks utilize more debt-financing while Islamic banking relies more on asset-backed securities and equity participation.

Mann-Whitney U Test Hypotheses

H_O: The two populations are identical, or there is no tendency of ranks of one method to be higher or lower than the other.

H_A: The two populations are not identical, or there is a tendency of ranks of one method to be systematically higher or lower than the other.

Results

Financial Ratio Graphs

Figures 1-11 below illustrate trends between Conventional and Islamic Bank ratio results, with visible differences between bank models across time in many cases.

Efficiency

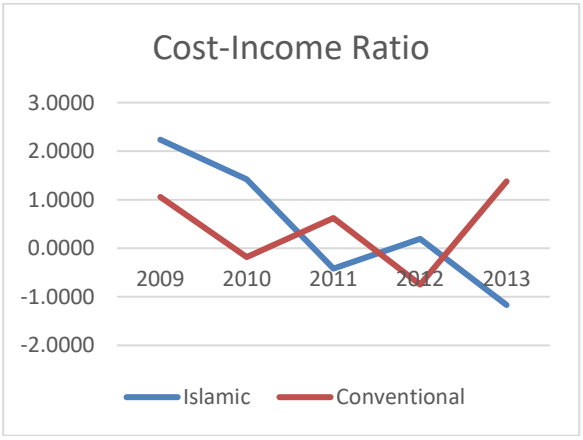

Figure 1 – Cost-Income Ratio

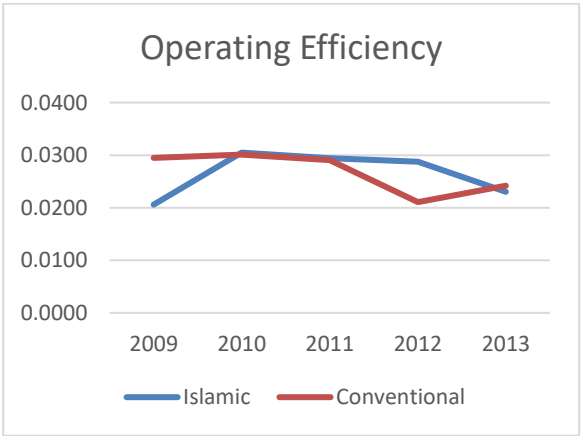

Figure 2 – Operating Efficiency Ratio

Capital Adequacy

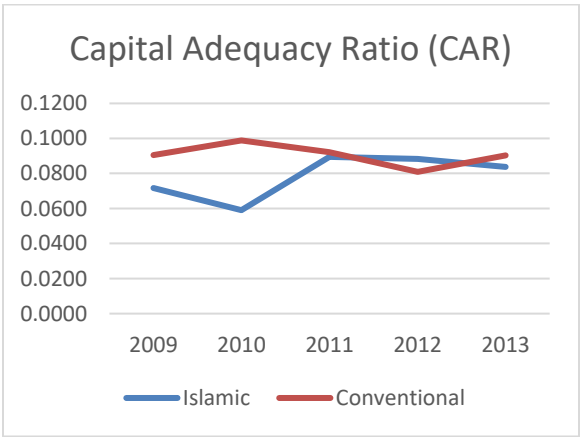

Figure 3 – Capital Adequacy Ratio

Profitability

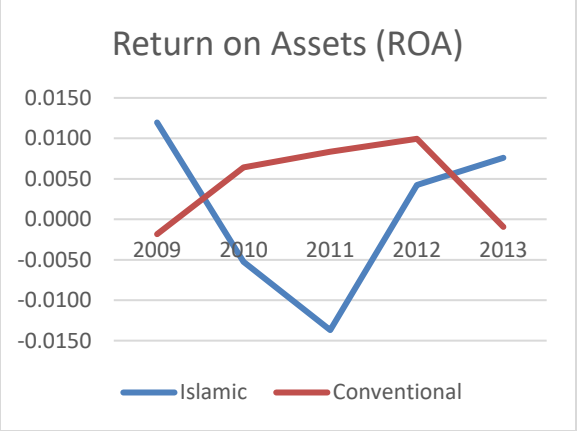

Figure 4 – Return on Assets Ratio

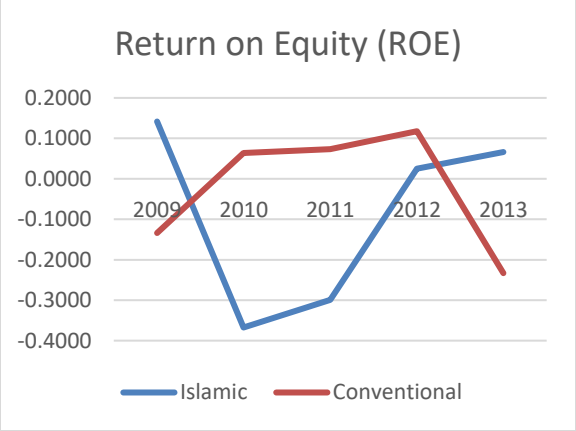

Figure 5 – Return on Equity Ratio

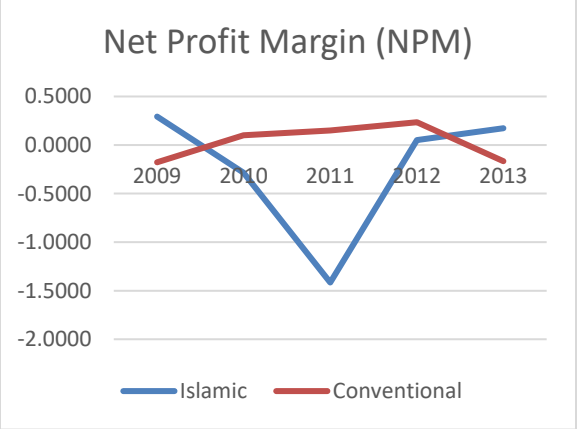

Figure 6 – Net Profit Margin Ratio

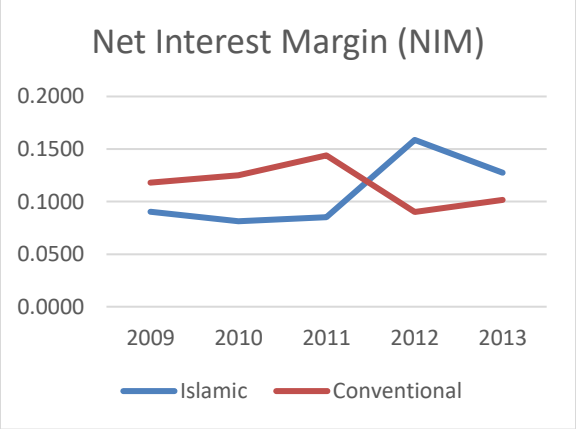

Figure 7 – Net Interest Margin Ratio

Solvency

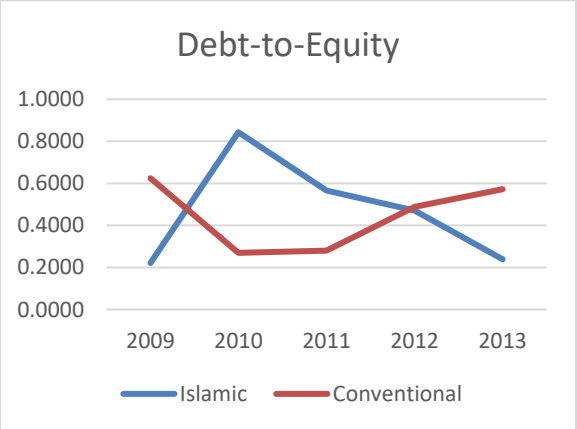

Figure 8 – Debt to Equity Ratio

Liquidity

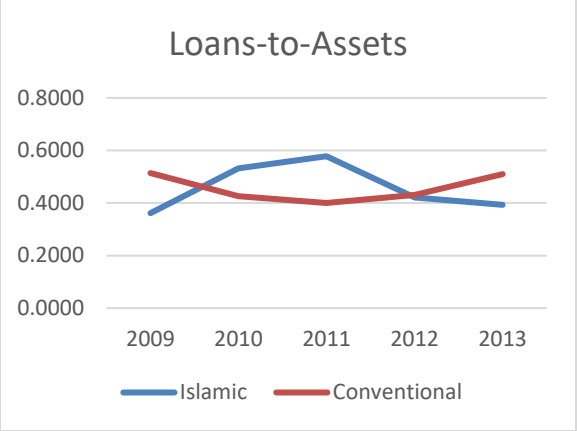

Figure 9 – Loans to Assets Ratio

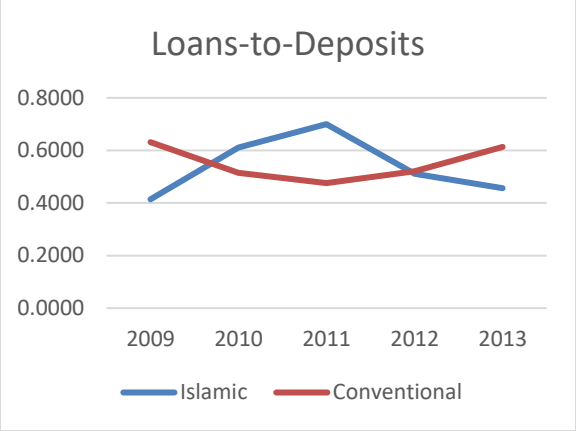

Figure 10 – Loans to Deposits Ratio

Credit Risk

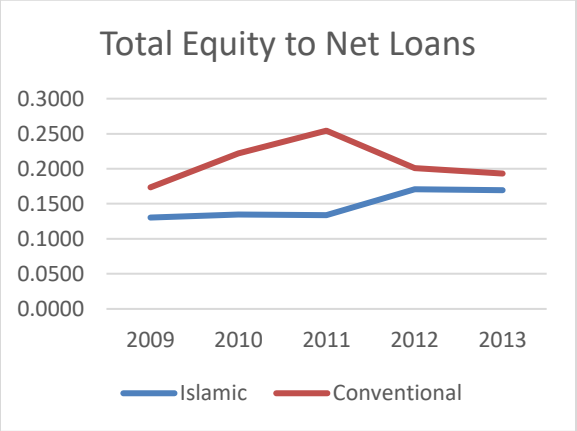

Figure 11 – Total Equity to Net Loans Ratio

Mann-Whitney U-Test Results

As presented in Appendixes B through L, the rank tests for 'All Years' resulted in the U-statistic being greater than the critical value of 143, as identified in Appendix A due to rank samples or *n* of 15 and 30 and a chosen α of .05, except in the case of the last ratio of Total Equity to Net Loans (TENL) where the U-statistic was less than the critical value. This means all ratios aside from TENL result in acceptance of the null hypothesis (H_O) and rejection of the alternative hypothesis (H_A) – declaring both samples ratios tend to not be systematically higher or lower than one another with 95% confidence (α =.05). This in effect discredits the ability to normalize the differences in performance shown in Figures 1-10 for these two bank population samples in Egypt. The rank tests for 'Year by Year' were included to show the spread of the U-values across all 5 years, held against a smaller critical value of 1 due to *n* of 3 and 6 as shown in Appendix A. This reveals variance across the 5 years, with a U-value arising in both the Loan to Assets and Loan to Deposits ratios being less than the critical value and thus rejecting the null hypothesis, as shown in Appendixes J and K.

Effect Size Results

Results of the effect size analysis, as presented in Appendixes M through W, follow those of the Mann Whitney U-test as looking at 'All Years' indicates all ratios other than for TENL resulted in a weak degree of association or strength, or small effect size between both sample groups, whereas TENL resulted in a moderate strength or medium effect size. This in consequence states that there is a weak significance of the results or differences observed between both groups ratio performance. The results for 'Year by Year' were again included to point out observed variance in the effect size from weak to moderate and even sometimes strong across the 5-year periods, as in Appendixes M through O and S through W. Moreover, these identified strong points when matched up to the financial ratio graphs are frequently at points of the graph when both sample groups move in opposite or parallel directions to each other rather than in convergence. Herein these results may also be affected by the short time span and sample looked at in this study.

Descriptive Statistics Summary

Figure 12 below offers a statistical summary for each sample's ratios, allowing for side to side comparison of mean, standard deviation, minimum and maximum values.

Performance Indicator	*Ratio*	*Mean*		*Standard Deviation*		*Minimum*		*Maximum*	
		Islamic	***Conv***	***Islamic***	***Conv***	***Islamic***	***Conv***	***Islamic***	***Conv***
# Observations		15	30	15	30	15	30	15	30
Efficiency	**Cost-Income**	0.4535	0.4239	2.2697	3.8643	-4.5699	-9.6947	4.7088	12.7519
	Op Efficiency	0.0265	0.0268	0.0121	0.0120	0.0070	0.0095	0.0510	0.0604
Capital Adequacy Ratio	**CAR**	0.0785	0.0905	0.0272	0.0289	0.0291	0.0307	0.1237	0.1260
Profitability	**ROA**	0.0010	0.0044	0.0225	0.0197	-0.0458	-0.0605	0.0266	0.0264
	ROE	-0.0868	-0.0224	0.4751	0.4365	-1.3974	-1.9201	0.2340	0.2514
	NPM	-0.2360	0.0281	1.2234	0.5789	-4.2190	0.5013	0.4956	0.5013
	NIM	0.1086	0.1158	0.0594	0.0554	0.0253	0.0396	0.2274	0.3025
Solvency	**Debt-to-Equity**	0.4683	0.4472	0.4469	0.4121	0.0201	0.0497	1.4164	1.4308
Liquidity	**Loans-to-Assets**	0.4570	0.4562	0.1403	0.1352	0.1635	0.1212	0.6384	0.6607
	Loans-to-Deposits	0.5384	0.5511	0.1725	0.1687	0.1797	0.1378	0.7267	0.7837
Credit Risk	**TENL**	0.1478	0.2088	0.0606	0.0923	0.0662	0.0734	0.2676	0.5252

Figure 12 – Descriptive Statistics Summary

Discussion

Withstanding the nonparametric tests disability to generalize or make significant these two samples results, a discussion of the visible trends across these bank samples and time period within the realm of this specific population sample study is relevant towards our understanding of Islamic and Conventional banks operations and performance amidst crises. As shown in Figures 4-6 and 8-10, key points of intersection exist at least 1 to 2 times over the course of the short 5 year period examined for most ratios – especially in 2010 and 2012, which are critical periods around the onset and easing of the crises event that appear to denote moments of recovery or re-balancing in the trends. On the other hand, Figure 11 for TENL suggests the two samples start to converge following 2013 - presumably in a shared effort by both banks to re-stabilize credit risks post-crises.

Further discussion of the financial ratio results relative to the proposed hypotheses are as follows:

H_1: There are no significant differences in efficiency performance (Cost-Income Ratio & Operating Efficiency) between both bank models.

H_1 is rejected regarding the Cost to Income ratio based off Figure 1, where both sample groups continuously move inversely to one another, whereas based off Figure 2 H_1 is accepted for the Operating Efficiency ratio. Figure 1's rather high volatility suggests both bank models struggled with managing costs and profits, notably in their ability to generate revenues which for many fiscal years during the Arab Spring were reported negative. There is less variability between Islamic and conventional banks performance in Figure 2, where they converge throughout 2010-2011 while conventional banks were able to increase operating efficiency 2011 and after showing further careful management of costs.

H_2: There is a negative relationship between efficiency and the external crisis for both bank models.

H_2 is accepted regarding the Cost to Income ratio as shown in Figure 1, where for both bank models this efficiency performance declined and became rather volatile over the course of the Arab Spring. H_2 is meanwhile rejected for Operating Efficiency as shown in Figure 2, Islamic banks efficiency performance was little effected over the course of the Arab Spring whereas conventional banks saw a decrease and thus higher operational efficiency 2011-2013.

H_3: Conventional banks lead in capital adequacy (CAR).

H_3 is accepted based off Figure 3 as well as Figure 12 since overall conventional banks tended to lead in terms of CAR, with their mean and minimum values being consistently higher than those of the Islamic bank group. This reveals conventional banks generally have higher levels of capital available to them as in terms of common equity, which allows them to better absorb shock and lessen risk, while Islamic banks were able to increase CAR during the course of the crisis.

H_4: There is a negative relationship between capital adequacy and the external crisis; this negative relationship is stronger or more apparent in conventional banks.

H_4 is rejected as unlike expected in Figure 3, the crises event had a positive effect on CAR for Islamic banks while performance did drop minimally for conventional banks. This may be contributed by earlier

presumptions on the effect of capital flight hitting conventional banks harder and ability to retain capital relative to assets, showing conventional banks are strained more in meeting financial obligations during the Arab Spring in terms of this stability measure.

H_5: Conventional banks lead in all profitability indicators (ROA, ROE, NPM, NIM).

H_5 is accepted for all profitability ratios other than NIM, as shown in Figure 7 conventional banks were negatively affected midway through the crises period. This is contributed by a decreasing amount of income or revenue generated off increasing assets and equity for the overall Islamic bank group. This shows that even with profit-loss-sharing instruments implemented, Islamic banks faced substantial losses during the crises period - which falls in line with lower profitability's reported in past studies (Fayed, 2013; Elsiefy 2013). Conversely, the Islamic banks increase in NIM performance during the course of the crises rejects H_5 as Islamic banks as a group were able to generate increasing interest income with amounts of earning assets in face of the crisis while conventional banks were unable to.

H_6: There is a negative relationship between profitability and the external crisis; this negative relationship is stronger or more apparent in conventional banks.

H_6 is rejected as all profitability ratios other than NIM show a stronger negative relationship between the crises and profitability in the Islamic group. Figures 4-6 show Islamic banks were significantly negatively impacted by the Arab Spring, with drops in ROA, ROE, and NPM performance in 2010 to 2011 while conventional banks were able to stabilize profitability performance during the crises period.

H_7: Islamic banks lead in solvency (Debt-to-Equity).

H_7 is rejected as Figure 8 shows conventional banks had less volatile and lower Debt-to-Equity performance over the total sample study's period, whereas Islamic banks faced larger debt obligations with higher risk that significantly increased solvency performance nearing the crisis period – and then dropped following it.

H_8: There is a negative relationship between solvency and the external crisis; this negative relationship is stronger or more apparent in conventional banks.

H_8 is rejected as again conventional banks were able to lead in solvency performance withstanding the crisis period, while the negative relationship between the crisis and solvency is more apparent in the Islamic bank group's higher Debt-to-Equity performance.

H_9 Islamic banks lead in all liquidity indicators (Loan-to-Assets & Loan-to-Deposits).

H_9 is rejected as Figures 9-10 show the conventional bank group was able to maintain less volatile and lower liquidity ratio performance throughout the sample's study period relative to Islamic banks, suggesting more of Islamic banks total assets are tied up in loans as well as more loans being unable to be covered by deposits.

H_{10}: There is a positive relationship between liquidity and the external crisis; this positive relationship is stronger or more apparent in Islamic banks.

H_{10} is rejected as the Islamic bank group faced a sharp increase and decrease in performance around the

identified onset and end of the crisis period, showing a negative relationship between time and liquidity performance – while the conventional group's liquidity performance was little effected by the external crisis.

H_{11}: Conventional banks lead in credit risk (Total Equity to Net Loans).

H_{11} is accepted as conventional banks showed higher credit risk performance overall in the study's years relative to Islamic banks in Figure 11 and thus lower credit risk - though with a slight drop in 2011 and thus weakening ability to cover loan losses in the middle of the crisis event and following.

H_{12}: There is a positive relationship between credit risk and the external crisis; this positive relationship is stronger or more apparent in conventional banks.

H_{12} is accepted for Islamic banks while rejected for conventional banks who showed a negative relationship or drop in credit risk performance during the crisis period, while suggesting nearing convergence of both groups following post-crisis 2012 and after.

Conclusions and Further Research

This study investigated the impact of the external Arab Spring crisis event on Islamic and conventional bank group's performance in Egypt from 2009 to 2013, through financial ratio analysis of performance indicators reflective of efficiency, capital adequacy, profitability, solvency, liquidity, and credit risk - and whether these then suggest a difference in performance related to differences amid bank models. The results of this analysis broke many preconceived assumptions on the capital breakdown and strategies of both models and the crisis's effect, as revealed in the Discussion. These observed differences in performance were tested for significance through nonparametric tests, in which all ratios except TENL were found to not be statistically significant with 95% confidence and to have a small effect size. And yet with a small and statistically insignificant sample, the ratio conclusions replicate those of Fayed (2013), El-Massah and Al-Sayed (2015) among others.

Results of the ratio analysis in the realm of this sample study, referring back to the original question, indicate that regarding efficiency and capital adequacy performance there is no difference between models – while profitability, solvency, liquidity, and credit risk result in an observed difference as further discussed below:

1) Considering efficiency performance, Cost-Income performance is far more volatile and effected by a crisis event than Operational Efficiency – suggesting common challenges as well as responses to maintaining efficiency may exist between both bank models.
2) Capital adequacy is a smaller concern for both bank models as both had strategies in place that allowed them to fairly maintain or increase absorption of shock throughout the crisis event.
3) Profitability is significantly impacted by crisis events for both bank models, but especially an area of concern for Islamic banks – who should consider policies or financial instruments that may decrease volatility or curb losses.
4) Solvency is significantly impacted by crisis events for both bank models, but especially an area of concern for Islamic banks pre-crisis – and should rebalance leverage or limit the use of debt financing in times of shock.
5) Liquidity is a larger concern for Islamic banks during a crisis event whereas conventional banks have strategies or less reliance on loans during the course of the crisis that allow them to better withstand

liquidity needs during a crisis.

6) Credit risk is a larger concern for conventional banks in the face of a crisis event while Islamic banks are able to decrease this risk – and so conventional banks should consider possible credit or loan limits or other such precautions in times of crisis. Since this performance starts to converge post-crisis, it also suggests growing convergence in practices between models in managing credit risk.

Continuing this study on a larger scale or diverse sample outside of Egypt relative to an event may be considered to see the effect on bank model performance as well as on earning statistically significant results. This study was limited to bank data available on FactSet, while identifiable resources available with more funding include BankScope and The Banker which can increase the sample. A deeper look at whether the Islamic banks looked at in this study are purely PLS or not and what type of financial instruments they offer may also be considered in future studies, and how this may explain their performance. This may also lead into discussion of banking regulations or policies across firms and best practices in times of crises.

Appendices

Appendix A - Critical Values for the Mann-Whitney U-Test

Level of significance: 95% (P = 0.05)

Size of the largest sample (n_2)

Size of the smallest sample (n_1)

	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
3	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	13	13
4	2	3	4	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	17	18	19	20	21	22	23
5	3	5	6	7	8	9	11	12	13	14	15	17	18	19	20	22	23	24	25	27	28	29	30	32	33
6	5	6	8	10	11	13	14	16	17	19	21	22	24	25	27	29	30	32	33	35	37	38	40	42	43
7		8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54
8			13	15	17	19	22	24	26	29	31	34	36	38	41	43	45	48	50	53	55	57	60	62	65
9				17	20	23	26	28	31	34	37	39	42	45	48	50	53	56	59	62	64	67	70	73	76
10					23	26	29	33	36	39	42	45	48	52	55	58	61	64	67	71	74	77	80	83	87
11						30	33	37	40	44	47	51	55	58	62	65	69	73	76	80	83	87	90	94	98
12							37	41	45	49	53	57	61	65	69	73	77	81	85	89	93	97	101	105	109
13								45	50	54	59	63	67	72	76	80	85	89	94	98	102	107	111	116	120
14									55	59	64	67	74	78	83	88	93	98	102	107	112	118	122	127	131
15										64	70	75	80	85	90	96	101	106	111	117	122	125	132	138	143
16											75	81	86	92	98	103	109	115	120	126	132	138	143	149	154
17												87	93	99	105	111	117	123	129	135	141	147	154	160	166
18													99	106	112	119	125	132	138	145	151	158	164	171	177
19														113	119	126	133	140	147	154	161	168	175	182	189
20															127	134	141	149	156	163	171	178	186	193	200
21																142	150	157	165	173	181	188	196	204	212
22																	158	166	174	182	191	199	207	215	223
23																		175	183	192	200	209	218	226	235
24																			192	201	210	219	228	238	247
25																				211	220	230	239	249	258
26																					230	240	250	260	270
27																						250	261	271	282
28																							272	282	293
29																								294	305
30																									317

Appendix B - Cost-Income Ratio - Mann-Whitney U-Test Results

All Years:

Year	Score	Rank	Sample
	4.7088	2	Islamic
	0.8676	22	Islamic
	1.1317	15	Islamic
	0.8244	24	Conv
	-0.9712	37	Conv
	12.7519	1	Conv
	1.4807	10	Conv
	1.7074	9	Conv
2009	-9.4653	44	Conv
	4.0602	4	Islamic
	0.9727	18	Islamic
	-0.7678	36	Islamic
	-1.2278	38	Conv
	1.7954	8	Conv
	1.9897	7	Conv
	-5.1484	43	Conv
	0.9669	19	Conv
2010	0.5234	31	Conv
	-0.5244	35	Islamic
	-1.6812	39	Islamic
	0.9501	20	Islamic
	2.7489	5	Conv
	-2.3814	41	Conv
	0.9314	21	Conv
	0.6047	30	Conv
	1.0036	17	Conv
2011	0.8111	25	Conv
	1.3394	12	Islamic
	1.2611	13	Islamic
	-2.0095	40	Islamic
	0.4621	32	Conv
	0.8658	23	Conv
	0.8024	26	Conv
	0.6165	29	Conv
	-9.6947	45	Conv
2012	2.4560	6	Conv
	-4.5699	42	Islamic
	0.3053	33	Islamic
	0.7577	27	Islamic
	1.0097	16	Conv
	0.6453	28	Conv
	-0.4990	34	Conv
	4.4381	3	Conv
	1.4550	11	Conv
2013	1.2134	14	Conv

	Test Statistic		U-Value
$\sum R_I$	Islamic:	358	212
$\sum R_C$	Conv:	661	254

Critical Value (.05α) = 143

Interpret Results

U > CV	Accept H_O
	RejectH_A

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	4.7088	2	Islamic	$\sum R_I$	Islamic:	13	11		
	0.8676	6	Islamic						
	1.1317	5	Islamic						
	0.8244	7	Conv	$\sum R_C$	Conv:	32	7	U>CV	Accept H_O
	-0.9712	8	Conv						
	12.7519	1	Conv		Critical Value (.05α) = 1				
	1.4807	4	Conv						
	1.7074	3	Conv						
2009	-9.4653	9	Conv						
	4.0602	1	Islamic	$\sum R_I$	Islamic:	12	12		
	0.9727	4	Islamic						
	-0.7678	7	Islamic						
	-1.2278	8	Conv	$\sum R_C$	Conv:	33	6	U >CV	Accept H_O
	1.7954	3	Conv						
	1.9897	2	Conv						
	-5.1484	9	Conv						
	0.9669	5	Conv						
2010	0.5234	6	Conv						
	-0.5244	7	Islamic	$\sum R_I$	Islamic:	18	6	U >CV	Accept H_O
	-1.6812	8	Islamic						
	0.9501	3	Islamic						
	2.7489	1	Conv	$\sum R_C$	Conv:	27	12		
	-2.3814	9	Conv						
	0.9314	4	Conv						
	0.6047	6	Conv						
	1.0036	2	Conv						
2011	0.8111	5	Conv						
	1.3394	2	Islamic	$\sum R_I$	Islamic:	13	11		
	1.2611	3	Islamic						
	-2.0095	8	Islamic						
	0.4621	7	Conv	$\sum R_C$	Conv:	32	7	U > CV	Accept H_O
	0.8658	4	Conv						
	0.8024	5	Conv						
	0.6165	6	Conv						
	-9.6947	9	Conv						
2012	2.4560	1	Conv						
	-4.5699	9	Islamic	$\sum R_I$	Islamic:	21	3	U > CV	Accept H_O
	0.3053	7	Islamic						
	0.7577	5	Islamic						
	1.0097	4	Conv	$\sum R_C$	Conv:	24	15		
	0.6453	6	Conv						
	-0.4990	8	Conv						
	4.4381	1	Conv						
	1.4550	2	Conv						
2013	1.2134	3	Conv						

Appendix C - Operating Efficiency Ratio - Mann-Whitney U-Test Results

All Years: Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0252	18	Islamic	$\sum R_I$	Islamic:	336	234		
	0.0248	19	Islamic						
	0.0118	43	Islamic						
	0.0214	27	Conv	$\sum R_C$	Conv:	699	216	U>CV	Accept H_O
	0.0440	5	Conv						
	0.0207	30	Conv						
	0.0301	13	Conv						
	0.0210	29	Conv						
2009	0.0398	8	Conv						
	0.0235	23	Islamic						
	0.0242	20	Islamic						
	0.0438	6	Islamic						
	0.0275	15	Conv						
	0.0271	16	Conv						
	0.0231	25	Conv						
	0.0517	2	Conv						
	0.0319	12	Conv						
2010	0.0193	34	Conv						
	0.0510	3	Islamic						
	0.0162	40	Islamic						
	0.0211	28	Islamic						
	0.0241	21	Conv						
	0.0604	1	Conv						
	0.0292	14	Conv						
	0.0198	33	Conv						
	0.0169	39	Conv						
2011	0.0238	22	Conv						
	0.0255	17	Islamic						
	0.0204	31	Islamic						
	0.0404	7	Islamic						
	0.0095	44	Conv						
	0.0203	32	Conv						
	0.0136	41	Conv						
	0.0178	38	Conv						
	0.0467	4	Conv						
2012	0.0186	36	Conv						
	0.0390	10	Islamic						
	0.0070	45	Islamic						
	0.0231	26	Islamic						
	0.0133	42	Conv						
	0.0184	37	Conv						
	0.0393	9	Conv						
	0.0187	35	Conv						
	0.0324	11	Conv						
2013	0.0232	24	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
								U > CV	Accept H_O
	0.0252	4	Islamic	$\sum R_I$	Islamic:	18	6		
	0.0248	5	Islamic						
	0.0118	9	Islamic						
	0.0214	6	Conv	$\sum R_C$	Conv:	27	12		
	0.0440	1	Conv						
	0.0207	8	Conv						
	0.0301	3	Conv						
	0.0210	7	Conv						
2009	0.0398	2	Conv						
	0.0235	7	Islamic	$\sum R_I$	Islamic:	15	9		
	0.0242	6	Islamic						
	0.0438	2	Islamic						
								U > CV	Accept H_O
	0.0275	4	Conv	$\sum R_C$	Conv:	30	9		
	0.0271	5	Conv						
	0.0231	8	Conv						
	0.0517	1	Conv						
	0.0319	3	Conv						
2010	0.0193	9	Conv						
								U > CV	Accept H_O
	0.0510	2	Islamic	$\sum R_I$	Islamic:	17	7		
	0.0162	9	Islamic						
	0.0211	6	Islamic						
	0.0241	4	Conv	$\sum R_C$	Conv:	28	11		
	0.0604	1	Conv						
	0.0292	3	Conv						
	0.0198	7	Conv						
	0.0169	8	Conv						
2011	0.0238	5	Conv						
	0.0255	3	Islamic	$\sum R_I$	Islamic:	9	15		
	0.0204	4	Islamic						
	0.0404	2	Islamic						
								U > CV	Accept H_O
	0.0095	9	Conv	$\sum R_C$	Conv:	36	3		
	0.0203	5	Conv						
	0.0136	8	Conv						
	0.0178	7	Conv						
	0.0467	1	Conv						
2012	0.0186	6	Conv						
	0.0390	2	Islamic	$\sum R_I$	Islamic:	16	8	U>CV	AcceptH_O
	0.0070	9	Islamic						
	0.0231	5	Islamic						
	0.0133	8	Conv	$\sum R_C$	Conv:	29	10		
	0.0184	7	Conv						
	0.0393	1	Conv						
	0.0187	6	Conv						
	0.0324	3	Conv						
2013	0.0232	4	Conv						

Appendix D - CAR - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0569	39	Islamic	$\sum R_I$	Islamic:	409	161	U > CV	Accept H_O
	0.0982	20	Islamic						Reject H_A
	0.0602	37	Islamic						
	0.1072	16	Conv	$\sum R_C$	Conv:	626	289		
	0.0400	42	Conv						
	0.1138	10	Conv						
	0.1039	19	Conv						
	0.1073	14	Conv						
2009	0.0708	29	Conv						
	0.0506	40	Islamic						
	0.0975	23	Islamic						
	0.0291	45	Islamic						
	0.1214	5	Conv						
	0.0970	24	Conv						
	0.1185	6	Conv						
	0.0779	26	Conv						
	0.0732	28	Conv						
2010	0.1051	18	Conv						
	0.0469	41	Islamic						
	0.1237	3	Islamic						
	0.0978	21	Islamic						
	0.1260	1	Conv						
	0.0610	35	Conv						
	0.0648	32	Conv						
	0.1148	8	Conv						
	0.0638	33	Conv						
2011	0.1218	4	Conv						
	0.0894	25	Islamic						
	0.1092	12	Islamic						
	0.0664	31	Islamic						
	0.0594	38	Conv						
	0.0976	22	Conv						
	0.0612	34	Conv						
	0.1245	2	Conv						
	0.0371	43	Conv						
2012	0.1057	17	Conv						
	0.0756	27	Islamic						
	0.0683	30	Islamic						
	0.1073	15	Islamic						
	0.0608	36	Conv						
	0.1166	7	Conv						
	0.0307	44	Conv						
	0.1084	13	Conv						
	0.1104	11	Conv						
2013	0.1145	9	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0569	8	Islamic	$\sum R_I$	Islamic:	20	4	U>CV	Accept H_O
	0.0982	5	Islamic						
	0.0602	7	Islamic						
	0.1072	3	Conv	$\sum R_C$	Conv:	25	14		
	0.0400	9	Conv						
	0.1138	1	Conv						
	0.1039	4	Conv						
	0.1073	2	Conv						
2009	0.0708	6	Conv						
	0.0506	8	Islamic	$\sum R_I$	Islamic:	21	3	U>CV	Accept H_O
	0.0975	4	Islamic						
	0.0291	9	Islamic						
	0.1214	1	Conv	$\sum R_C$	Conv:	24	15		
	0.0970	5	Conv						
	0.1185	2	Conv						
	0.0779	6	Conv						
	0.0732	7	Conv						
2010	0.1051	3	Conv						
	0.0469	9	Islamic	$\sum R_I$	Islamic:	16	8	U>CV	Accept H_O
	0.1237	2	Islamic						
	0.0978	5	Islamic						
	0.1260	1	Conv	$\sum R_C$	Conv:	29	10		
	0.0610	8	Conv						
	0.0648	6	Conv						
	0.1148	4	Conv						
	0.0638	7	Conv						
2011	0.1218	3	Conv						
	0.0894	5	Islamic	$\sum R_I$	Islamic:	13	11		
	0.1092	2	Islamic						
	0.0664	6	Islamic						
	0.0594	8	Conv	$\sum R_C$	Conv:	32	7	U>CV	Accept H_O
	0.0976	4	Conv						
	0.0612	7	Conv						
	0.1245	1	Conv						
	0.0371	9	Conv						
2012	0.1057	3	Conv						
	0.0756	6	Islamic	$\sum R_I$	Islamic:	18	6	U>CV	Accept H_O
	0.0683	7	Islamic						
	0.1073	5	Islamic						
	0.0608	8	Conv	$\sum R_C$	Conv:	27	12		
	0.1166	1	Conv						
	0.0307	9	Conv						
	0.1084	4	Conv						
	0.1104	3	Conv						
2013	0.1145	2	Conv						

Appendix E - ROA Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0045	30	Islamic	$\sum R_I$	Islamic:	355	215	U>CV	Accept H_O
	0.0236	5	Islamic						Reject H_A
	0.0078	23	Islamic						
	0.0220	7	Conv	$\sum R_C$	Conv:	674	241		
	-0.0433	43	Conv						
	0.0000	32	Conv						
	0.0152	15	Conv						
	0.0062	25	Conv						
2009	-0.0111	36	Conv						
	0.0048	29	Islamic						
	0.0208	9	Islamic						
	-0.0413	42	Islamic						
	0.0000	32	Conv						
	0.0088	21	Conv						
	0.0070	24	Conv						
	-0.0192	40	Conv						
	0.0154	14	Conv						
2010	0.0264	2	Conv						
	-0.0458	44	Islamic						
	-0.0130	37	Islamic						
	0.0176	11	Islamic						
	0.0061	26	Conv						
	-0.0255	41	Conv						
	0.0150	16	Conv						
	0.0237	4	Conv						
	0.0091	20	Conv						
2011	0.0218	8	Conv						
	0.0163	12	Islamic						
	0.0126	17	Islamic						
	-0.0162	39	Islamic						
	0.0054	28	Conv						
	0.0189	10	Conv						
	0.0081	22	Conv						
	0.0229	6	Conv						
	0.0044	31	Conv						
2012	0.0000	32	Conv						
	-0.0145	38	Islamic						
	0.0107	18	Islamic						
	0.0266	1	Islamic						
	0.0056	27	Conv						
	0.0238	3	Conv						
	-0.0605	45	Conv						
	0.0000	32	Conv						
	0.0162	13	Conv						
2013	0.0094	19	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0045	6	Islamic	$\sum R_I$	Islamic:	11	13		
	0.0236	1	Islamic						
	0.0078	4	Islamic						
	0.0220	2	Conv	$\sum R_C$	Conv:	34	5	U>CV	Accept H_O
	-0.0433	9	Conv						
	0.0000	7	Conv						
	0.0152	3	Conv						
	0.0062	5	Conv						
2009	-0.0111	8	Conv						
	0.0048	6	Islamic	$\sum R_I$	Islamic:	17	7	U>CV	Accept H_O
	0.0208	2	Islamic						
	-0.0413	9	Islamic						
	0.0000	7	Conv	$\sum R_C$	Conv:	28	11		
	0.0088	4	Conv						
	0.0070	5	Conv						
	-0.0192	8	Conv						
	0.0154	3	Conv						
2010	0.0264	1	Conv						
	-0.0458	9	Islamic	$\sum R_I$	Islamic:	19	5	U>CV	Accept H_O
	-0.0130	7	Islamic						
	0.0176	3	Islamic						
	0.0061	6	Conv	$\sum R_C$	Conv:	26	13		
	-0.0255	8	Conv						
	0.0150	4	Conv						
	0.0237	1	Conv						
	0.0091	5	Conv						
2011	0.0218	2	Conv						
	0.0163	3	Islamic	$\sum R_I$	Islamic:	16	8	U>CV	Accept H_O
	0.0126	4	Islamic						
	-0.0162	9	Islamic						
	0.0054	6	Conv	$\sum R_C$	Conv:	29	10		
	0.0189	2	Conv						
	0.0081	5	Conv						
	0.0229	1	Conv						
	0.0044	7	Conv						
2012	0.0000	8	Conv						
	-0.0145	8	Islamic	$\sum R_I$	Islamic:	13	11		
	0.0107	4	Islamic						
	0.0266	1	Islamic						
	0.0056	6	Conv	$\sum R_C$	Conv:	32	7	U>CV	Reject H_O
	0.0238	2	Conv						
	-0.0605	9	Conv						
	0.0000	7	Conv						
	0.0162	3	Conv						
2013	0.0094	5	Conv						

Appendix F - ROE Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0786	28	Islamic	$\sum R_I$	Islamic:	346	224	U>CV	Accept H_O
	0.2161	4	Islamic						Reject H_A
	0.1303	20	Islamic						
	0.2020	7	Conv	$\sum R_C$	Conv:	683	232		
	-1.0648	43	Conv						
	0.0000	32	Conv						
	0.1457	16	Conv						
	0.0576	30	Conv						
2009	-0.1427	37	Conv						
	0.0945	23	Islamic						
	0.2005	9	Islamic						
	-1.3974	44	Islamic						
	0.0000	32	Conv						
	0.0897	26	Conv						
	0.0587	29	Conv						
	-0.2233	40	Conv						
	0.2086	5	Conv						
2010	0.2514	1	Conv						
	-0.9725	42	Islamic						
	-0.1047	36	Islamic						
	0.1785	13	Islamic						
	0.0481	31	Conv						
	-0.3645	41	Conv						
	0.2291	3	Conv						
	0.2057	6	Conv						
	0.1422	18	Conv						
2011	0.1774	14	Conv						
	0.1826	11	Islamic						
	0.1156	22	Islamic						
	-0.2223	39	Islamic						
	0.0902	25	Conv						
	0.1848	10	Conv						
	0.1322	19	Conv						
	0.1823	12	Conv						
	0.1165	21	Conv						
2012	0.0000	32	Conv						
	-0.1916	38	Islamic						
	0.1563	15	Islamic						
	0.2340	2	Islamic						
	0.0915	24	Conv						
	0.2019	8	Conv						
	-1.9201	45	Conv						
	0.0000	32	Conv						
	0.1456	17	Conv						
2013	0.0819	27	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0786	5	Islamic	$\sum R_I$	Islamic:	10	14		
	0.2161	1	Islamic						
	0.1303	4	Islamic						
	0.2020	2	Conv	$\sum R_C$	Conv:	35	4	U>CV	Accept H_O
	-1.0648	9	Conv						
	0.0000	7	Conv						
	0.1457	3	Conv						
	0.0576	6	Conv						
2009	-0.1427	8	Conv						
	0.0945	4	Islamic	$\sum R_I$	Islamic:	16	8	U>CV	Accept H_O
	0.2005	3	Islamic						
	-1.3974	9	Islamic						
	0.0000	7	Conv	$\sum R_C$	Conv:	29	10		
	0.0897	5	Conv						
	0.0587	6	Conv						
	-0.2233	8	Conv						
	0.2086	2	Conv						
2010	0.2514	1	Conv						
	-0.9725	9	Islamic	$\sum R_I$	Islamic:	19	5	U>CV	Accept H_O
	-0.1047	7	Islamic						
	0.1785	3	Islamic						
	0.0481	6	Conv	$\sum R_C$	Conv:	26	13		
	-0.3645	8	Conv						
	0.2291	1	Conv						
	0.2057	2	Conv						
	0.1422	5	Conv						
2011	0.1774	4	Conv						
	0.1826	2	Islamic	$\sum R_I$	Islamic:	17	7	U>CV	Accept H_O
	0.1156	6	Islamic						
	-0.2223	9	Islamic						
	0.0902	7	Conv	$\sum R_C$	Conv:	28	11		
	0.1848	1	Conv						
	0.1322	4	Conv						
	0.1823	3	Conv						
	0.1165	5	Conv						
2012	0.0000	8	Conv						
	-0.1916	8	Islamic	$\sum R_I$	Islamic:	12	12		
	0.1563	3	Islamic						
	0.2340	1	Islamic						
	0.0915	5	Conv	$\sum R_C$	Conv:	33	6	U>CV	Accept H_O
	0.2019	2	Conv						
	-1.9201	9	Conv						
	0.0000	7	Conv						
	0.1456	4	Conv						
2013	0.0819	6	Conv						

Appendix G - NPM Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.1465	30	Islamic	$\sum R_I$	Islamic:	338	232		
	0.4310	6	Islamic						
	0.3018	15	Islamic						
	0.4749	4	Conv	$\sum R_C$	Conv:	691	224	U>CV	Accept H_O
	-1.6853	43	Conv						Reject H_A
	0.0000	32	Conv						
	0.2498	17	Conv						
	0.1529	29	Conv						
2009	-0.2585	36	Conv						
	0.1633	27	Islamic						
	0.4504	5	Islamic						
	-1.4654	42	Islamic						
	0.0000	32	Conv						
	0.1692	25	Conv						
	0.1831	23	Conv						
	-0.3953	38	Conv						
	0.2324	20	Conv						
2010	0.4118	7	Conv						
	-4.2190	45	Islamic						
	-0.4033	39	Islamic						
	0.3753	10	Islamic						
	0.1565	28	Conv						
	-0.5008	40	Conv						
	0.2442	18	Conv						
	0.4010	8	Conv						
	0.2353	19	Conv						
2011	0.3643	11	Conv						
	0.3549	12	Islamic						
	0.3450	14	Islamic						
	-0.5437	41	Islamic						
	0.1729	24	Conv						
	0.3976	9	Conv						
	0.2224	21	Conv						
	0.5013	1	Conv						
	0.1156	31	Conv						
2012	0.0000	32	Conv						
	-0.3202	37	Islamic						
	0.3475	13	Islamic						
	0.4956	2	Islamic						
	0.1652	26	Conv						
	0.4860	3	Conv						
	-2.1261	44	Conv						
	0.0000	32	Conv						
	0.2619	16	Conv						
2013	0.2096	22	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.1465	6	Islamic	$\sum R_I$	Islamic:	11	13		
	0.4310	2	Islamic						
	0.3018	3	Islamic						
	0.4749	1	Conv	$\sum R_C$	Conv:	34	5	U>CV	Accept H_O
	-1.6853	9	Conv						
	0.0000	7	Conv						
	0.2498	4	Conv						
	0.1529	5	Conv						
2009	-0.2585	8	Conv						
	0.1633	6	Islamic	$\sum R_I$	Islamic:	16	8	U>CV	Accept H_O
	0.4504	1	Islamic						
	-1.4654	9	Islamic						
	0.0000	7	Conv	$\sum R_C$	Conv:	29	10		
	0.1692	5	Conv						
	0.1831	4	Conv						
	-0.3953	8	Conv						
	0.2324	3	Conv						
2010	0.4118	2	Conv						
	-4.2190	9	Islamic	$\sum R_I$	Islamic:	18	6	U>CV	Accept H_O
	-0.4033	7	Islamic						
	0.3753	2	Islamic						
	0.1565	6	Conv	$\sum R_C$	Conv:	27	12		
	-0.5008	8	Conv						
	0.2442	4	Conv						
	0.4010	1	Conv						
	0.2353	5	Conv						
2011	0.3643	3	Conv						
	0.3549	3	Islamic	$\sum R_I$	Islamic:	16	8	U>CV	Accept H_O
	0.3450	4	Islamic						
	-0.5437	9	Islamic						
	0.1729	6	Conv	$\sum R_C$	Conv:	29	10		
	0.3976	2	Conv						
	0.2224	5	Conv						
	0.5013	1	Conv						
	0.1156	7	Conv						
2012	0.0000	8	Conv						
	-0.3202	8	Islamic	$\sum R_I$	Islamic:	12	12		
	0.3475	3	Islamic						
	0.4956	1	Islamic						
	0.1652	6	Conv	$\sum R_C$	Conv:	33	6	U>CV	Accept H_O
	0.4860	2	Conv						
	-2.1261	9	Conv						
	0.0000	7	Conv						
	0.2619	4	Conv						
2013	0.2096	5	Conv						

Appendix H - NIM Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.1032	24	Islamic	$\sum R_I$	Islamic:	361	209	U>CV	Accept H_O
	0.1104	21	Islamic						Reject H_A
	0.0577	40	Islamic						
	0.1170	17	Conv	$\sum R_C$	Conv:	674	241		
	0.0396	44	Conv						
	0.0733	34	Conv						
	0.1846	6	Conv						
	0.0998	25	Conv						
2009	0.1940	5	Conv						
	0.0431	42	Islamic						
	0.1578	9	Islamic						
	0.0430	43	Islamic						
	0.0681	36	Conv						
	0.1580	8	Conv						
	0.1121	20	Conv						
	0.1988	4	Conv						
	0.0989	26	Conv						
2010	0.1145	19	Conv						
	0.0253	45	Islamic						
	0.0729	35	Islamic						
	0.1569	11	Islamic						
	0.1299	14	Conv						
	0.3025	1	Conv						
	0.0960	27	Conv						
	0.1302	13	Conv						
	0.0761	31	Conv						
2011	0.1290	15	Conv						
	0.1332	12	Islamic						
	0.1154	18	Islamic						
	0.2274	2	Islamic						
	0.0584	39	Conv						
	0.1101	22	Conv						
	0.0745	32	Conv						
	0.1575	10	Conv						
	0.0834	30	Conv						
2012	0.0569	41	Conv						
	0.2048	3	Islamic						
	0.0734	33	Islamic						
	0.1045	23	Islamic						
	0.0856	29	Conv						
	0.1287	16	Conv						
	0.0636	38	Conv						
	0.0664	37	Conv						
	0.1747	7	Conv						
2013	0.0916	28	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.1032	5	Islamic	$\sum R_I$	Islamic:	17	7	U>CV	Accept H_O
	0.1104	4	Islamic						
	0.0577	8	Islamic						
	0.1170	3	Conv	$\sum R_C$	Conv:	28	11		
	0.0396	9	Conv						
	0.0733	7	Conv						
	0.1846	2	Conv						
	0.0998	6	Conv						
2009	0.1940	1	Conv						
	0.0431	8	Islamic	$\sum R_I$	Islamic:	20	4	U>CV	Accept H_O
	0.1578	3	Islamic						
	0.0430	9	Islamic						
	0.0681	7	Conv	$\sum R_C$	Conv:	25	14		
	0.1580	2	Conv						
	0.1121	5	Conv						
	0.1988	1	Conv						
	0.0989	6	Conv						
2010	0.1145	4	Conv						
	0.0253	9	Islamic	$\sum R_I$	Islamic:	19	5	U>CV	Accept H_O
	0.0729	8	Islamic						
	0.1569	2	Islamic						
	0.1299	4	Conv	$\sum R_C$	Conv:	26	13		
	0.3025	1	Conv						
	0.0960	6	Conv						
	0.1302	3	Conv						
	0.0761	7	Conv						
2011	0.1290	5	Conv						
	0.1332	3	Islamic	$\sum R_I$	Islamic:	8	16		
	0.1154	4	Islamic						
	0.2274	1	Islamic						
	0.0584	8	Conv	$\sum R_C$	Conv:	37	2	U>CV	Accept H_O
	0.1101	5	Conv						
	0.0745	7	Conv						
	0.1575	2	Conv						
	0.0834	6	Conv						
2012	0.0569	9	Conv						
	0.2048	1	Islamic	$\sum R_I$	Islamic:	12	12		
	0.0734	7	Islamic						
	0.1045	4	Islamic						
	0.0856	6	Conv	$\sum R_C$	Conv:	33	6	U>CV	Accept H_O
	0.1287	3	Conv						
	0.0636	9	Conv						
	0.0664	8	Conv						
	0.1747	2	Conv						
2013	0.0916	5	Conv						

Appendix I - Debt-to-Equity Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample
	0.0658	42	Islamic
	0.0788	39	Islamic
	0.5196	15	Islamic
	0.2771	24	Conv
	1.3861	3	Conv
	1.4308	1	Conv
	0.3381	21	Conv
	0.2651	25	Conv
2009	0.0497	43	Conv
	0.8301	9	Islamic
	0.2830	23	Islamic
	1.4164	2	Islamic
	0.5954	12	Conv
	0.4902	18	Conv
	0.1615	31	Conv
	0.1000	38	Conv
	0.1439	34	Conv
2010	0.1259	36	Conv
	0.0201	45	Islamic
	0.4952	17	Islamic
	1.1839	4	Islamic
	0.1139	37	Conv
	0.5630	14	Conv
	0.1580	32	Conv
	0.1659	30	Conv
	0.6107	11	Conv
2011	0.0710	41	Conv
	1.0022	8	Islamic
	0.1690	29	Islamic
	0.2415	26	Islamic
	0.2125	27	Conv
	0.3936	19	Conv
	0.5710	13	Conv
	0.3079	22	Conv
	0.3441	20	Conv
2012	1.1032	7	Conv
	0.5103	16	Islamic
	0.0392	44	Islamic
	0.1693	28	Islamic
	0.7921	10	Conv
	0.1452	33	Conv
	1.1412	6	Conv
	1.1554	5	Conv
	0.0761	40	Conv
2013	0.1265	35	Conv

	Test Statistic		U-Value	Interpret Results	
$\sum R_I$	Islamic:	347	223	U>CV	Accept H_O
					Reject H_A
$\sum R_C$	Conv:	688	227		

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0658	8	Islamic	$\sum R_I$	Islamic:	18	6	U>CV	Accept H_O
	0.0788	7	Islamic						
	0.5196	3	Islamic						
	0.2771	5	Conv	$\sum R_C$	Conv:	27	12		
	1.3861	2	Conv						
	1.4308	1	Conv						
	0.3381	4	Conv						
	0.2651	6	Conv						
2009	0.0497	9	Conv						
	0.8301	2	Islamic	$\sum R_I$	Islamic:	8	16		
	0.2830	5	Islamic						
	1.4164	1	Islamic						
	0.5954	3	Conv	$\sum R_C$	Conv:	37	2	U>CV	Accept H_O
	0.4902	4	Conv						
	0.1615	6	Conv						
	0.1000	9	Conv						
	0.1439	7	Conv						
2010	0.1259	8	Conv						
	0.0201	9	Islamic	$\sum R_I$	Islamic:	14	10		
	0.4952	4	Islamic						
	1.1839	1	Islamic						
	0.1139	7	Conv	$\sum R_C$	Conv:	31	8	U>CV	Accept H_O
	0.5630	3	Conv						
	0.1580	6	Conv						
	0.1659	5	Conv						
	0.6107	2	Conv						
2011	0.0710	8	Conv						
	1.0022	2	Islamic	$\sum R_I$	Islamic:	18	6	U>CV	Accept H_O
	0.1690	9	Islamic						
	0.2415	7	Islamic						
	0.2125	8	Conv	$\sum R_C$	Conv:	27	12		
	0.3936	4	Conv						
	0.5710	3	Conv						
	0.3079	6	Conv						
	0.3441	5	Conv						
2012	1.1032	1	Conv						
	0.5103	4	Islamic	$\sum R_I$	Islamic:	18	6	U>CV	Accept H_O
	0.0392	9	Islamic						
	0.1693	5	Islamic						
	0.7921	3	Conv	$\sum R_C$	Conv:	27	12		
	0.1452	6	Conv						
	1.1412	2	Conv						
	1.1554	1	Conv						
	0.0761	8	Conv						
2013	0.1265	7	Conv						

Appendix J - Loans-to-Assets Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
									Accept H_O
	0.1979	41	Islamic	$\sum R_I$	Islamic:	345	225	U>CV	Reject Ha
	0.4490	29	Islamic						
	0.4372	32	Islamic						
	0.5338	16	Conv	$\sum R_C$	Conv:	690	225		
	0.5922	4	Conv						
	0.5575	7	Conv						
	0.5345	15	Conv						
	0.3124	40	Conv						
2009	0.5532	10	Conv						
	0.4409	31	Islamic						
	0.5274	18	Islamic						
	0.6256	3	Islamic						
	0.5499	12	Conv						
	0.5740	6	Conv						
	0.3813	37	Conv						
	0.5249	19	Conv						
	0.1263	44	Conv						
2010	0.3982	35	Conv						
	0.6384	2	Islamic						
	0.5564	8	Islamic						
	0.5391	13	Islamic						
	0.4169	34	Conv						
	0.4677	25	Conv						
	0.1212	45	Conv						
	0.4588	27	Conv						
	0.4352	33	Conv						
2011	0.5002	21	Conv						
	0.5525	11	Islamic						
	0.3192	38	Islamic						
	0.3910	36	Islamic						
	0.1406	43	Conv						
	0.4851	23	Conv						
	0.4671	26	Conv						
	0.5545	9	Conv						
	0.4471	30	Conv						
2012	0.4918	22	Conv						
	0.5319	17	Islamic						
	0.1635	42	Islamic						
	0.4849	24	Islamic						
	0.4567	28	Conv						
	0.5805	5	Conv						
	0.6607	1	Conv						
	0.5097	20	Conv						
	0.5377	14	Conv						
2013	0.3167	39	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.1979	9	Islamic	$\sum R_I$	Islamic:	22	2	U=CV	Accept H_O
	0.4490	6	Islamic						
	0.4372	7	Islamic						
	0.5338	5	Conv	$\sum R_C$	Conv:	23	16		
	0.5922	1	Conv						
	0.5575	2	Conv						
	0.5345	4	Conv						
	0.3124	8	Conv						
2009	0.5532	3	Conv						
	0.4409	6	Islamic	$\sum R_I$	Islamic:	11	13		
	0.5274	4	Islamic						
	0.6256	1	Islamic						
	0.5499	3	Conv	$\sum R_C$	Conv:	34	5	U>CV	Accept H_O
	0.5740	2	Conv						
	0.3813	8	Conv						
	0.5249	5	Conv						
	0.1263	9	Conv						
2010	0.3982	7	Conv						
	0.6384	1	Islamic	$\sum R_I$	Islamic:	6	18		
	0.5564	2	Islamic						
	0.5391	3	Islamic						
	0.4169	8	Conv	$\sum R_C$	Conv:	39	0	U<CV	Reject H_O
	0.4677	5	Conv						
	0.1212	9	Conv						
	0.4588	6	Conv						
	0.4352	7	Conv						
2011	0.5002	4	Conv						
	0.5525	2	Islamic	$\sum R_I$	Islamic:	17	7	U>CV	Accept H_O
	0.3192	8	Islamic						
	0.3910	7	Islamic						
	0.1406	9	Conv	$\sum R_C$	Conv:	28	11		
	0.4851	4	Conv						
	0.4671	5	Conv						
	0.5545	1	Conv						
	0.4471	6	Conv						
2012	0.4918	3	Conv						
	0.5319	4	Islamic	$\sum R_I$	Islamic:	19	5	U>CV	Accept H_O
	0.1635	9	Islamic						
	0.4849	6	Islamic						
	0.4567	7	Conv	$\sum R_C$	Conv:	26	13		
	0.5805	2	Conv						
	0.6607	1	Conv						
	0.5097	5	Conv						
	0.5377	3	Conv						
2013	0.3167	8	Conv						

Appendix K - Loans-to-Deposits Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.2151	41	Islamic	$\sum R_I$	Islamic:	352	218	U>CV	Accept H_O
	0.5272	29	Islamic						Reject H_A
	0.4999	34	Islamic						
	0.6489	15	Conv	$\sum R_C$	Conv:	683	232		
	0.6717	13	Conv						
	0.7837	1	Conv						
	0.6566	14	Conv						
	0.3848	39	Conv						
2009	0.6434	18	Conv						
	0.5055	32	Islamic						
	0.6397	19	Islamic						
	0.6877	10	Islamic						
	0.6959	7	Conv						
	0.7051	5	Conv						
	0.4713	35	Conv						
	0.6023	21	Conv						
	0.1454	44	Conv						
2010	0.4677	36	Conv						
	0.6797	11	Islamic						
	0.6938	8	Islamic						
	0.7267	3	Islamic						
	0.5150	30	Conv						
	0.5419	27	Conv						
	0.1378	45	Conv						
	0.5480	25	Conv						
	0.5110	31	Conv						
2011	0.6011	22	Conv						
	0.7076	4	Islamic						
	0.3866	38	Islamic						
	0.4375	37	Islamic						
	0.1583	43	Conv						
	0.5807	23	Conv						
	0.5441	26	Conv						
	0.6922	9	Conv						
	0.5015	33	Conv						
2012	0.6454	17	Conv						
	0.6120	20	Islamic						
	0.1797	42	Islamic						
	0.5774	24	Islamic						
	0.5357	28	Conv						
	0.7022	6	Conv						
	0.7354	2	Conv						
	0.6776	12	Conv						
	0.6486	16	Conv						
2013	0.3788	40	Conv						

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.2151	9	Islamic	$\sum R_I$	Islamic:	22	2	U>CV	Accept H_O
	0.5272	6	Islamic						
	0.4999	7	Islamic						
	0.6489	4	Conv	$\sum R_C$	Conv:	23	16		
	0.6717	2	Conv						
	0.7837	1	Conv						
	0.6566	3	Conv						
	0.3848	8	Conv						
2009	0.6434	5	Conv						
	0.5055	6	Islamic	$\sum R_I$	Islamic:	13	11		
	0.6397	4	Islamic						
	0.6877	3	Islamic						
	0.6959	2	Conv	$\sum R_C$	Conv:	32	7	U>CV	Accept H_O
	0.7051	1	Conv						
	0.4713	7	Conv						
	0.6023	5	Conv						
	0.1454	9	Conv						
2010	0.4677	8	Conv						
	0.6797	3	Islamic	$\sum R_I$	Islamic:	6	18		
	0.6938	2	Islamic						
	0.7267	1	Islamic						
	0.5150	7	Conv	$\sum R_C$	Conv:	39	0	U<CV	Reject H_O
	0.5419	6	Conv						
	0.1378	9	Conv						
	0.5480	5	Conv						
	0.5110	8	Conv						
2011	0.6011	4	Conv						
	0.7076	1	Islamic	$\sum R_I$	Islamic:	16	8	U>CV	Accept H_O
	0.3866	8	Islamic						
	0.4375	7	Islamic						
	0.1583	9	Conv	$\sum R_C$	Conv:	29	10		
	0.5807	4	Conv						
	0.5441	5	Conv						
	0.6922	2	Conv						
	0.5015	6	Conv						
2012	0.6454	3	Conv						
	0.6120	5	Islamic	$\sum R_I$	Islamic:	20	4	U>CV	Accept H_O
	0.1797	9	Islamic						
	0.5774	6	Islamic						
	0.5357	7	Conv	$\sum R_C$	Conv:	25	14		
	0.7022	2	Conv						
	0.7354	1	Conv						
	0.6776	3	Conv						
	0.6486	4	Conv						
2013	0.3788	8	Conv						

Appendix L - TENL Ratio - Mann-Whitney U-Test Results

All Years

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results
	0.0880	41	Islamic	$\sum R_I$	Islamic:	442	128	U<CV Reject H_O
	0.2130	16	Islamic					
	0.0902	39	Islamic					
	0.1940	19	Conv	$\sum R_C$	Conv:	593	322	
	0.1017	38	Conv					
	0.2237	13	Conv					
	0.1665	25	Conv					
	0.2369	12	Conv					
2009	0.1181	36	Conv					
	0.1702	24	Islamic					
	0.1659	26	Islamic					
	0.0678	44	Islamic					
	0.2005	18	Conv					
	0.1599	28	Conv					
	0.2419	9	Conv					
	0.1293	34	Conv					
	0.3615	2	Conv					
2010	0.2382	11	Conv					
	0.0662	45	Islamic					
	0.1912	22	Islamic					
	0.1434	32	Islamic					
	0.2792	6	Conv					
	0.1167	37	Conv					
	0.5252	1	Conv					
	0.2185	15	Conv					
	0.1456	31	Conv					
2011	0.2408	10	Conv					
	0.1554	29	Islamic					
	0.2676	8	Islamic					
	0.0892	40	Islamic					
	0.3156	3	Conv					
	0.1914	21	Conv					
	0.1309	33	Conv					
	0.2072	17	Conv					
	0.0838	42	Conv					
2012	0.2761	7	Conv					
	0.1217	35	Islamic					
	0.1645	27	Islamic					
	0.2225	14	Islamic					
	0.1494	30	Conv					
	0.1938	20	Conv					
	0.0734	43	Conv					
	0.2835	4	Conv					
	0.1795	23	Conv					
2013	0.2801	5	Conv					

Year by Year

Year	Score	Rank	Sample		Test Statistic		U-Value	Interpret Results	
	0.0880	9	Islamic	$\sum R_I$	Islamic:	20	4	U>CV	Accept H_O
	0.2130	3	Islamic						
	0.0902	8	Islamic						
	0.1940	4	Conv	$\sum R_C$	Conv:	25	14		
	0.1017	7	Conv						
	0.2237	2	Conv						
	0.1665	5	Conv						
	0.2369	1	Conv						
2009	0.1181	6	Conv						
	0.1702	5	Islamic	$\sum R_I$	Islamic:	20	4	U>CV	Accept H_O
	0.1659	6	Islamic						
	0.0678	9	Islamic						
	0.2005	4	Conv	$\sum R_C$	Conv:	25	14		
	0.1599	7	Conv						
	0.2419	2	Conv						
	0.1293	8	Conv						
	0.3615	1	Conv						
2010	0.2382	3	Conv						
	0.0662	9	Islamic	$\sum R_I$	Islamic:	21	3	U>CV	Accept H_O
	0.1912	5	Islamic						
	0.1434	7	Islamic						
	0.2792	2	Conv	$\sum R_C$	Conv:	24	15		
	0.1167	8	Conv						
	0.5252	1	Conv						
	0.2185	4	Conv						
	0.1456	6	Conv						
2011	0.2408	3	Conv						
	0.1554	6	Islamic	$\sum R_I$	Islamic:	17	7	U>CV	Accept H_O
	0.2676	3	Islamic						
	0.0892	8	Islamic						
	0.3156	1	Conv	$\sum R_C$	Conv:	28	11		
	0.1914	5	Conv						
	0.1309	7	Conv						
	0.2072	4	Conv						
	0.0838	9	Conv						
2012	0.2761	2	Conv						
	0.1217	8	Islamic	$\sum R_I$	Islamic:	17	7	U>CV	Accept H_O
	0.1645	6	Islamic						
	0.2225	3	Islamic						
	0.1494	7	Conv	$\sum R_C$	Conv:	28	11		
	0.1938	4	Conv						
	0.0734	9	Conv						
	0.2835	1	Conv						
	0.1795	5	Conv						
2013	0.2801	2	Conv						

Appendix M - Cost-Income Ratio – Effect Size Results

All Years

Effect Size Analysis…	
$Mean_U$	225
σ	41.53312
Z-score	-0.313
ES	0.04666

Interpret Results

0.1	Weak
0.3	Moderate
0.5	Strong

ES: Weak

Year by Year

	Effect Size Analysis…		
	$Mean_U$	9	
	σ	3.872983	
	Z-score	-0.5164	
2009			
	ES	0.172133	Weak
	Z-score	-0.7746	
2010			
	ES	0.258199	Moderate
	Z-score	-0.7746	
2011			
	ES	0.258199	Moderate
	Z-score	-0.5164	
2012			
	ES	0.172133	Weak
	Z-score	-1.54919	
2013			
	ES	0.516398	Strong

Appendix N - Operating Efficiency Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-0.21669	
ES	0.032303	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-0.7746	
2009			
	ES	0.258199	Moderate
	Z-score	0	
2010			
	ES	0	Weak
	Z-score	-0.5164	
2011			
	ES	0.172133	Weak
	Z-score	-1.54919	
2012			
	ES	0.516398	Strong
	Z-score	-0.2582	
2013			
	ES	0.086066	Weak

Appendix O - CAR – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-1.54094	
ES	0.22971	Weak to Moderate

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-1.29099	
2009			
	ES	0.430331	Moderate
	Z-score	-1.54919	
2010			
	ES	0.516398	Strong
	Z-score	-0.2582	
2011			
	ES	0.086066	Weak
	Z-score	-0.5164	
2012			
	ES	0.172133	Weak
	Z-score	-0.7746	
2013			
	ES	0.258199	Moderate

Appendix P - ROA Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-0.24077	
ES	0.035892	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-1.0328	
2009			
	ES	0.344265	Moderate
	Z-score	-0.5164	
2010			
	ES	0.172133	Weak
	Z-score	-1.0328	
2011			
	ES	0.344265	Moderate
	Z-score	-0.2582	
2012			
	ES	0.086066	Weak
	Z-score	-0.5164	
2013			
	ES	0.172133	Weak

Appendix Q - ROE Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-0.02408	
ES	0.003589	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-1.29099	
2009			
	ES	0.430331	Moderate
	Z-score	-0.2582	
2010			
	ES	0.086066	Weak
	Z-score	-1.0328	
2011			
	ES	0.344265	Moderate
	Z-score	-0.5164	
2012			
	ES	0.172133	Weak
	Z-score	-0.7746	
2013			
	ES	0.258199	Moderate

Appendix R - NPM Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-0.02408	
ES	0.003589	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-1.0328	
2009			
	ES	0.344265	Moderate
	Z-score	-0.2582	
2010			
	ES	0.086066	Weak
	Z-score	-0.7746	
2011			
	ES	0.258199	Moderate
	Z-score	-0.2582	
2012			
	ES	0.086066	Weak
	Z-score	-0.7746	
2013			
	ES	0.258199	Moderate

Appendix S - NIM Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-0.38523	
ES	0.057427	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-0.5164	
2009			
	ES	0.172133	Weak
	Z-score	-1.29099	
2010			
	ES	0.430331	Moderate
	Z-score	-1.0328	
2011			
	ES	0.344265	Moderate
	Z-score	-1.80739	
2012			
	ES	0.602464	Strong
	Z-score	-0.7746	
2013			
	ES	0.258199	Moderate

Appendix T - Debt-to-Equity Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-0.04815	
ES	0.007178	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-0.7746	
2009			
	ES	0.258199	Moderate
	Z-score	-1.80739	
2010			
	ES	0.602464	Strong
	Z-score	-0.2582	
2011			
	ES	0.086066	Weak
	Z-score	-0.7746	
2012			
	ES	0.258199	Moderate
	Z-score	-0.7746	
2013			
	ES	0.258199	Moderate

Appendix U - Loans-to-Assets Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	0	
ES	0	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-1.80739	
2009			
	ES	0.602464	Strong
	Z-score	-1.0328	
2010			
	ES	0.344265	Moderate
	Z-score	-2.32379	
2011			
	ES	0.774597	Strong
	Z-score	-0.5164	
2012			
	ES	0.172133	Weak
	Z-score	-1.0328	
2013			
	ES	0.344265	Moderate

Appendix V - Loans-to-Deposits Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-0.16854	
ES	0.025124	Weak

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-1.80739	
2009			
	ES	0.602464	Strong
	Z-score	-0.5164	
2010			
	ES	0.172133	Weak
	Z-score	-2.32379	
2011			
	ES	0.774597	Strong
	Z-score	-0.2582	
2012			
	ES	0.086066	Weak
	Z-score	-1.29099	
2013			
	ES	0.430331	Moderate

Appendix W - TENL Ratio – Effect Size Results

All Years

Effect Size Analysis		Interpret Results
$Mean_U$	225	Scale 0 to 1
σ	41.53312	
Z-score	-2.33549	
ES	0.348154	Moderate

Year by Year

	Effect Size Analysis		Interpret Results
	$Mean_U$	9	Scale 0 to 1
	σ	3.872983	
	Z-score	-1.29099	
2009			
	ES	0.430331	Moderate
	Z-score	-1.29099	
2010			
	ES	0.430331	Moderate
	Z-score	-1.54919	
2011			
	ES	0.516398	Strong
	Z-score	-0.5164	
2012			
	ES	0.172133	Weak
	Z-score	-0.5164	
2013			
	ES	0.172133	Weak

References

Almanaseer, Mousa (2014). The Impact of the Financial Crisis on the Islamic Banks Profitability - Evidence from GCC. International Journal of Financial Research. Vol. 5, No. 3. Sciedu Press.

Arab Spring. Retrieved from https://www.merriam-webster.com/dictionary/Arab Spring

Buse, Lucian; Ganea, Mirela; Circiumaru, Daniel (2010). Using Linear Regression In The Analysis Of Financial-Economic Performances. Annals of University of Craiova - Economic Sciences Series, University of Craiova, Faculty of Economics and Business Administration, Vol. 2, No.38, 1-12.

Cohen, Jacob (1988). Statistical Power Analysis for the Behavioral Sciences. Second Edition. New York: Academic Press.

Corder, G. W., & Foreman, D. I. (2014). Nonparametric statistics: A step-by-step approach, May: 1-3, 70-73. Retrieved from ProQuest Ebook Central, http://ebookcentral.proquest.com/lib/bryant/detail.action?docID=1676115.

El Massah, Suzanna, and Al Sayed, Ola Al (2015). Banking sector performance: Islamic and conventional banks in the UAE. International Journal of Information Technology and Business Management, 36: 69–81.

Elsiefy, Elsayed (2013). Comparative Analysis of Qatari Islamic Banks Performance versus Conventional Banks Before, During and After the Financial Crisis. International Journal of Business and Commerce, Vol. 3, No.3.

Fayed, Mona Esam (2013). Comparative Performance Study of Conventional and Islamic Banking in Egypt. Journal of Applied Finance & Banking, Vol. 3, No. 2.

Ibrahim, A. J. (2016). Empirical findings on the profitability of banks in Qatar: Islamic vs conventional. International Journal of Business and Commerce, Vol. 5, Issue 4, 63-78.

Hassan, M. Kabir & Bashir, Abdel-Hameed M. (2005). Determinants of Islamic Banking Profitability. Islamic Perspectives on Wealth Creation, May: 118–40.

Hassan, M. Kabir. & Lewis, Mervyn (2007). Handbook of Islamic banking. Cheltenham, UK; Northampton, MA, USA: Edward Elgar Publishing, Inc.

Lewis, Mervin K. (2010). In What Ways Does Islamic Banking Differ from Conventional Finance?, CFA Digest, 40(1), 83-84.

Lim, S. (2019, April 24). Islamic Banking. Retrieved from https://www.investopedia.com/terms/i/islamicbanking.asp

Visser, Hans (2013). Islamic Finance: Principles and Practice. Second Edition. Cheltenham, UK; Northampton, MA, USA: Edward Elgar Publishing, Inc.

Yahya, Ali T.; Akhtar, Asif; Tabash, Mosab I. (2017). The impact of political instability, macroeconomic and bank-specific factors on the profitability of Islamic banks. Investment Management and Financial Innovations, Vol. 14, Issue 4, 30-39.