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Islamic vs Conventional Capital Markets Performance and Dynamics of Development

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ABSTRACT

The use of toxic assets, the excessive indebtness, the inadequate market discipline as well as frequent financial crises have drawn the attention of the world to the importance of Islamic finance as mean of raising funds, that is based on profit and loss sharing mechanism; which in turn establishes rules of fair and ethical investments. Also, relying on capital markets to raise funds is one of main drivers that countries adopt for development of its financial markets and industry.

This research investigates the Islamic capital market resiliency and stability during and after the financial crisis. Using Islamic and conventional markets indices analysis of each individual country, the paper highlights the dynamic relationship between the variables of interest and forecasts the volatility of such indices.

The study assesses the performance of the two groups, Islamic and conventional capital markets indices, in seven countries where they conduct both Islamic and conventional finance. In order to ensure harmonization between the studied samples, the selected countries share the same feature of being initially a conventional capital markets and integrated later Islamic capital markets instruments and infrastructure with different levels of development. The empirical study sets the

variables that may affect the volatility of the Islamic vs. conventional indices. Three predictor variables are used to compare markets indices volatility of both Islamic and conventional peers among the seven selected countries, namely Bahrain, Indonesia, Kuwait, Malaysia, Qatar, Saudi Arabia, and UAE; which are: interest rates, and exchange rates. The study implies monthly closing prices of both conventional and Islamic market indices of countries under investigation for a period of 9 years (July 2007-January 2016). And monthly closing prices of exchange rates and interbank offer rates for the same period. The research also clarifies the impact of variables on the volatility of the market, and if they would affect differently the Islamic and the conventional markets.

Using ARCH and EGARCH volatility models, empirical analyses findings may report fragmented results, according to each individual country conditions and market dynamics, rather than reaching a consolidated result finding to all selected countries. So that we cannot totally accept or reject the null hypothesis stating that Islamic capital markets are less volatile, particularly in a crisis period, which is due to Islamic Sharia screening and reliance on real economic activities. Moreover, the research findings will be used to frame significant recommendations for policy makers in most selected countries, particularly the Arab world countries; while establishing the

infrastructure of Islamic capital markets. This is due to several reasons such as: seriousness of applying Islamic finance system, fundamental and economic conditions, shortage of introduced instruments, limited investor base, scarcity of qualified calibers as well as the underdeveloped stakeholders. In some cases, the market infrastructure, depth of the financial system and relevant regulations play a key role in developing Islamic capital markets.

Also, it is recommended to further explore a wider set of variables that affect the performance of Islamic capital markets such as the influence of derivatives, short selling and margin trading mechanisms that are applied in each individual country on the performance of its indices.

Key words: *Islamic capital markets; stock market indices; financial markets; global financial crisis; Islamic investments.*

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INTRODUCTION

Islamic capital markets have witnessed unprecedented expansion over the last decades. This expansion may be caused to the large growth of the capital value of the Muslim investors and their demand to invest their capital in financial products that are in accordance to the Shariah. However, the existing literature on Islamic Capital markets is thin and varies in different directions, so that it needs more explorations.

The empirical analysis investigates the different volatility levels of Islamic vs. conventional capital markets, in general, and particularly their different reactions towards the financial global crisis turbulences. This is due to the fact that Shariah screened stocks that comply with Shariah and Islamic Finance principals avoid sell of debt, hedging mechanisms like derivatives and prohibiting short selling and margin trading. Accordingly, it is expected to realize different patterns of both risk and return. However, the level of Islamic markets' indices performance vs. their conventional counterparts differs greatly from one country to another according to a set of elements such as: country market depth, openness to regional and/or international markets, the integration with other capital markets, as well as country economic fundamentals.

The research aims at exploring the impact of a set of variables on both Islamic and conventional capital market indices of the studied countries, in order to shape the relationship between such variables and the mentioned capital market indices.

Then, the empirical study enriches the literature by shaping the risk and return relationship in Islamic investments. Moreover, it highlights the different variables affecting the capital market indices volatility. It also introduces a model to assess factors affecting markets' vulnerability in order to prevent such future crises and markets' collapse and help in developing Islamic capital markets.

The research is divided into five sections; the following section will provide different aspects of the literature on Islamic finance, Islamic investments, as well as the performance of Islamic indices and their conventional peers during and after the global financial crisis. Section three discuss the theoretical framework of the study including the problem statement, the pertinent hypotheses, data collection methodology, research design, as well as statistical methodology. The fourth section highlights the findings and the research limitation. Finally, the last section draws some recommendations that can be taken into account when formulating policies to develop Islamic Capital Markets.

Literature Review

The generally recognized and the most important cause of almost all crises has been excessive and imprudent banks' lending (Trabelsi, 2011). There are three factors that nourished these practices: inadequate market discipline within the financial system resulting from the absence of profit and loss sharing (PLS), the mind-boggling expansion in the size of derivatives, particularly credit default swaps and the "too big to fail" concept which tends to give large banks an insurance that the central bank will definitely come to their rescue and not allow them to fail (Miskhin, 1997).

Despite the increasing of Islamic stocks, the empirical studies on Islamic capital markets are still thin compared to the conventional stocks. Particularly, volatility, risk premium and leverage effect of Islamic stock market indices vis-à-vis conventional stock market indices. This is interesting to investors since volatility is strongly related to risk and risk is one of the main characteristic to formulate a good investment portfolio.

Empirical results found by Aktar and Jahromi (2015), when investigated the impact of the global financial crisis on Islamic and conventional stock indices in 11 Islamic and 8 non Islamic countries, noted that Islamic stock

indices, particularly during the early stage of the crisis, outperformed their conventional counterparts. This is because Islamic institutions are banned from holding sub-prime mortgage and derivative securities. Also, authors highlighted that UK and USA markets were the strongest beneficiaries according to the study. They concluded that risk reduction and stability of Islamic stocks are magnified during the turmoil; however, this is not necessary being the case during a global recession.

Using a Stochastic Dominance test (SD) analysis, Al-Khazali et al. (2013) tried to find out whether Islamic stock indexes outperform conventional stock indexes. They used two groups of nine stock indexes in each group, selecting the Islamic and conventional counterpart. They also divided the study period into three sub-groups (1996-2000, 2001-2006, and 2007-2012).

By analyzing SD of indexes, authors they discovered that during the overall period (1996-2012) Conventional indexes stochastically dominates Islamic index in all markets except for European market. On the other hand, the global, European and US Islamic indexes dominate their conventional counterparts during (2007-2008), i.e. during and after the crisis period.

The findings of this study may have positive repercussions on individual, institutional and foreign investors, as well as policy makers. So that such investors can benefit from international diversification. As according to the study, the global Islamic index dominates its conventional peers during (2007-2012), which reflects that investors who were following the global Islamic index during (2007-2012) did performed better than investors who were following the conventional Dow Jones global index.

The study results illustrate that investing in Islamic indexes is a good hedging tool during the period (2007–2012) that includes and follows the recent financial crisis. These results are partly explained by the screens that companies should pass to be included in Dow Jones Islamic indexes. Indeed, after excluding companies whose primary business is alcohol, tobacco; pork, weapons, entertainment, and conventional finance, companies are checked using a second screen consisting of financial ratios.

Also, authors highlighted that the three Islamic indexes (Global, Europe, and US) are main indexes and the global Islamic index is a representative of all Islamic stocks in the world. Consequently, when the Global Islamic index outperforms the global conventional index, it is sufficient to conclude that Islamic or ethical investing performs better than conventional investing during the 2007-2012 period.

On the same ground, Ho et al. (2013) provided empirical evidence on risk-adjusted performance comparisons of share indices from Islamic and conventional markets.

To ensure valid comparisons, they have selected Islamic indices that are matching with conventional indices. The Treasury-bill rate and the MSCI All-World index are used as risk-free rate and world benchmark, respectively. Authors analyzed monthly returns and examined four sub-periods as crisis and non-crisis periods from 2000 to 2011. They revealed that for the overall period, the majority of Islamic indices performed relatively better than their respective conventional indices. They argued this due to the turbulent times during the last decade with the Dotcom (2000-2002) and global financial crisis (2007-2008). The Islamic indices of Dow Jones, MSCI, Russell, S&P, Kuala Lumpur, Jakarta and Swiss outperform their conventional counterpart. One reason for this may be the bear periods encountered and thus lower risk investments performed better during crisis. In view of the risk-adjusted performance measurement based on Sharpe, Treynor and Jensen alpha during the Dotcom crisis (2000–2002) period, returns from Dow Jones, Kuala Lumpur and Swiss Islamic indices indicate superior performance against conventional indices. Similarly, during the global financial crisis, the

Islamic indices including Dow Jones, MSCI, FTSE, RBS, Kuala Lumpur, Jakarta and Swiss also outperformed their conventional peers.

Therefore, authors provided evidence that during crisis periods, Islamic indices perform better than conventional ones and are less affected by the crisis providing a hedging alternative due to their lower volatility and betas.

This is also supported by Sukmana and Kholid (2010) where Islamic stock index is more resilient towards crisis compare to conventional stock index. This finding can guide investors in their investment decision by providing information on the risk and return relation during bear periods. However, results found during the crisis period are not in line with those after the crisis period.

As noted by Ho et al. (2013), after the Dotcom and global financial crisis periods, the results are not the same as during crisis periods. The results for the various indices are mixed after the Dotcom crisis where conventional Dow Jones and Swiss indices performed better than their Islamic ones but for Kuala Lumpur, Jakarta and FTSE, Islamic indices outperformed their conventional peers. Similarly, after the global financial crisis (2009–2011), performances of some conventional and Islamic indices improved above the benchmark but not for others. This

indicates that during non-crisis period, investors can make positive return from both indices but not during bear periods.

In addition, Al-Rifai (2012) showed that the Islamic indices on Dow Jones outperformed the conventional indices during the last global financial crisis. He argues that this may be due to the Shari'ah compliant screens that removed all highly leveraged firms and placed more weights on certain industries including technology, oil and gas as well as healthcare compared with financial services, entertainment and media which are more extremely affected by the business cycle.

Abbes (2012) examined the risk and return of Islamic and conventional stock markets' indices. First, the study analyzed the return and volatility characteristics of a large set of international data including 35 Islamic stock market indices and their conventional counterparts of developed markets, emerging markets, Arab and GCC markets over the period of Jun 2002 to April 2012. The analysis during the sample period reveals through a t test that both Islamic and conventional indices flow the same trend for most developed and emerging markets. So that the study notes a large decrease in returns of both indices during the global financial crisis period, and it found asymmetric relationship between returns & volatility for both Islamic and conventional indices.

In addition, the results reveal that there is no significant difference between Islamic indices returns and their conventional counterparts, through differences in Sharp ratio test and the CAPM model. The findings also suggest that the risk adjusted return of both Islamic and conventional indices were almost the same.

Ahmad and Ibrahim (2002) examined the performance of KLSI with that of KLCI over the period from 1999 to 2002. They used several risk adjusted performance measures such as a Sharpe ratio (SR), the Treynor Index (TI), the adjusted Jensen Alpha, and the t test for comparing the means. They compared raw returns and risks for entire period and bear period. Results showed that for the entire period, the Kuala Lumpur Shariah Index (KLSI) has lower return, while for the growing period (1999-2000) the Kuala Lumpur Shariah Index (KLSI) slightly outperformed the Kuala Lumpur Conventional Index (KLCI). In terms of risk, the KLCI was riskier than the KLSI over the entire period. When comparing the means, the results were statistically insignificant. In addition, the KLSI reported lower risk-adjusted returns than the KLCI, except during the growing period of 1999–2000.

The previous result is consistent with Hussein and Omran (2005), who analyzed the performance of the Dow Jones Islamic Market Index (DJIMI) that accounts for the effects of industry, size, and economic

conditions reveals that Islamic indexes. The authors found that Islamic indexes outperform their conventional counterparts in bull markets, but under perform in bear markets. Results revealed that Islamic indices do not significantly underperform conventional indices. Using co-integration tests, they showed that both series are co-integrated in a long-term. Moreover, the Granger bivariate test indicates the presence of short-run bidirectional causality between the indices.

Using co-integration technique, Hakim and Rashidian (2004) examined the relationship between DJIMI, Wilshire 5000 index, and the risk-free rate for October 1999 to September 2002 period. They found that a risk-return basis, there is no loss from the screening process used for DJIMI stocks, and Muslim investors are not worse off by investing in an Islamic index as a subset of a much larger market portfolio.

Hussein (2004) utilized the CAPM model to compare the performance of the FTSE Global Islamic index and the FTSE All World index. The sample period is divided into two sub periods, namely bull & bear period. The CAPM estimation results suggested that the performance of Islamic index is as good as its conventional counterpart. Moreover, the Islamic index performs better during the economic growth period than during bear period. Hussein (2004) also pointed that the ethical investment outperforms the unscreened portfolio in the bull market period.

On the other hand, Hashim (2008) proved that the FTSE Global Islamic index bears higher risk than the market, however the realized return is fair and appropriate, in addition,the risk of the Islamic index is less than the socially responsible index (FTSE 4 Good). Hashim (2008) used CAPM model to detect the behavior of risk-adjusted return of such indices.

Albaity and Ahmad (2008) analyzed the risk and return performance of the Kuala Lumpur Syariah Index (KLSI) and the Kuala Lumpur Composite Index (KLCI) during 1999–2005. Results revealed that Islamic indices do not significantly underperform conventional indices. Using co-integration tests, they showed that both series are co-integrated in a long-term. Moreover, the Granger bivariate test indicates the presence of short-run bidirectional causality between the indices.

Snoussi et al. (2012) applied several measures to compare the performance of a large set of Dow Jones Islamic indices to selected benchmarks. They first test the performance over the whole period and then focus on extreme events. They found no significant differences in means and standard deviation of World Islamic index and benchmark returns. However most regional and sector Islamic indexes exhibit higher standard deviations than their corresponding benchmarks. Sharpe ratios are higher for almost all Islamic indexes in the whole sample and in the

negative extreme events. However, the relative risk adjusted performance as measured by the Jensen's alpha is not systematically different from zero.

Their findings lead to three main conclusions. First, the overall results confirm that Islamic indices and conventional benchmarks exhibit different features and that the Islamic screening leads to significant differences in risk and excess return. Second, they found evidence that the relative performance of Islamic indices is different according to geographical area and activity sector. Third, lowest and highest prices do not increase the difference between the Islamic and the conventional indices in bear and bull markets; which is unlike the results of previous studies during bull & bear markets.

Liston et al. (2012) estimated GARCH (1,1) and VAR models in order to determine whether investor sentiment impacts both the excess returns and volatility of various Dow Jones Islamic equity indices. The results from GARCH estimations show that changes in investor sentiment are positively correlated with the returns of Shariah-compliant equities. In addition, they found the same result for the three firm-size portfolios (i.e., large-, medium-, and small-cap). However, investor sentiment has a larger impact on small-cap stocks. Their results from GARCH estimations also suggest that bullish shifts in investor sentiment in the

study period are accompanied by lower conditional volatility in the ensuing period.

Lean and Parsva (2012) investigated the relationship between return and market risk for the Islamic stocks in Malaysia Financial times stock exchange (FTSE) market during the period from March 2007 to February 2011. The sample consisted of three conventional indices of Bursa Malaysia, which are Bursa Malaysia index, Bursa Malaysia 100 Index and Bursa Malaysia EMAS[1] index; in addition to two Islamic indices which are Bursa Malaysia Hijrah index and Bursa Malaysia Shariah index. Daily closing prices of these indices are collected, in addition to the daily three month Kuala Lumpur interbank offer rate (KLIBOR) representing the risk free model. The study used GARCH test to re-estimate all models to cover 2007 global financial crisis period effect.

Lean and Parsva noted that both Islamic indices have higher standard deviation that the market indices, which is consistent with the common argument that the Islamic stocks bear higher risk than conventional stocks. Same findings are concluded during the global financial crisis.

[1] / Bursa Malaysia EMAS Index represents all the ordinary securities which are listed on the main board of the Bursa Malaysia that qualified for the rules of eligibility, free floating as well as liquidity.

On the other hand, Karim et al. (2012) provided new empirical evidence on the impact of subprime mortgage crisis on Islamic stock market index in Malaysia. Monthly data of Islamic stock market index and several macroeconomic variables, namely inflation, real exchange rate, interest rate and the industrial production index; covering the period of 2000 to 2011, are used in this study. Time series econometric methods such as co-integration test, Granger causality test and generalized impulse response functions are applied in examining the dynamic relationship of the variables. The empirical findings revealed that the Islamic stock market is co-integrated with other macroeconomic variables in both pre and during crisis period. To some extent, the Islamic stock markets are vulnerable to financial crisis.

Akhtar et al. (2011) argue that characteristics of Islamic financial markets reduce volatility linkages (correlations) between Islamic and conventional stocks, bonds and bills. This is due to a small set of shared information and a lower degree of cross-market hedging across these assets. Using a sample of 9 Islamic and 37 non-Islamic countries, authors found that volatility linkages that involve at least one Islamic asset are lower than volatility linkages between two conventional assets by up to 12.72 percentage points, after controlling for country and asset-specific characteristics. They estimated volatility linkage using the Pearson

correlation and a stochastic volatility model estimated using the Generalized Method of Moments (GMM). Then, they conducted univariate and multivariate analyses to compare volatility linkage that involves one or two Islamic assets, to volatility linkages between conventional assets.

Further, this effect is stronger in Islamic relative to non-Islamic countries. Therefore, Islamic assets may provide substantial diversification benefits during financial crises, as they may decrease the portfolio's sensitivity to international financial contagion risk in times when the volatilities of most asset classes and most countries tend to rise together. This implies that adding a position involving at least one Islamic asset may lead to a decrease in the portfolio's sensitivity to the international financial contagion.

As discussed in the above literatures, most researchers have made comparison studies and analyses between the Islamic and conventional investments and indices, particularly in the global financial crisis. And very little literature had been devoted for the variables influencing each type of indices, Islamic vs. conventional, and implications that policy makers can take into account while developing the Islamic capital markets in their countries.

Research Methodology and Design:

This section roadmap the research methodology, the general framework of the statistical model, as well as generating the research hypotheses.

1.1.Data collection

Data are gathered from Morgan Stanley International Indices, namely Morgan Stanley Composite Index (MSCI) for both Islamic and conventional capital market Indices of the selected countries. Monthly closing prices of the indices are gathered from Bloomberg Professional Service. In order to keep consistency and maintain harmonization among data sample of all countries' indices, we have selected MSCI family of indices; particularly, this is the sole indices family that have regular data for both conventional and Islamic indices closing prices (Islamic indices started in July 2007).

Macroeconomic variables such as Interest Rates which is reflected by the risk free rate, and the real exchange rate that affects the economic and financial performance of firms.

Data regarding the Interest Rates (risk free rate), and Exchange rates(ER) are gathered from Bloomberg network. For each stock index, return is

defined as the continuously compounded returns on stock price index. In addition, all data are retrieved from Bloomberg and Reuters information Networks.

The paper uses country market level data covering the above mentioned five countries during the 9 years period from July 2007 to January 2016.

1.2. The dependent and independent variables:

According to literature review findings and the research problem, a set of variables had been select to explain the performance of the two groups of indices.

Karim et al. (2012) support that some macro variables affect the stock market performance especially during the global financial crisis; these variables are interest rates (risk free rate), inflation (CPI), real exchange rate, as well as Industrial production index as representative of economic activity. In addition to these variables, Nayed and Hassan (2011) have added the regulatory failure and the asset liability mismatch.

As stated by Dimitrova (2005) knowledge about the link between currency rates and other assets in a portfolio is vital for the performance of the fund, because an estimate of the correlation between stock prices and exchange rates; in order to accurately estimate the variability of a

given portfolio as its expected return is implied by the variance of the portfolio.

In addition, the understanding of the stock price-exchange rate relationship may prove helpful to foresee a crisis. Khalid and Kawai (2003) as well as Hashimoto and Ito (2004) among others, claim that the link between the stock and currency markets helped propagate the Asian Financial Crisis in 1997. It is believed that the sharp depreciation of the Thai baht triggered depreciation of other currencies in the region, which led to the collapse of the stock markets as well. Awareness about such a relationship between the two markets would trigger preventive action before the spread of a crisis.

Regarding interest rates effect on stock markets, it is known that when policy rates increase, it does not have an immediate impact on the stock market. Instead, the increased policy rates have a single direct effect so that it becomes more expensive for banks to borrow money from the Central Bank. Increases in the policy rate also cause a ripple effect, and factors that influence both individuals and businesses are affected. The first indirect effect of an increased policy rates is that banks increase the rates that they charge their customers to borrow money. This has the effect of decreasing the amount of money consumers can spend. This means that people will spend less money, which will affect businesses'

top and bottom lines (that is, revenues and profits). Price inflation affects greatly interest rates. So that, actual or anticipated changes in the inflation rate cause corresponding changes in interest rates.

The mentioned independent variables (Xs), which are interest rate (IR), and Exchange rate (ER), are calculated as percent of change on a monthly basis, due to differences between countries and economies; thus, the percent of change is preferable than the price levels.

1.3.Research hypotheses

In current literature on Islamic capital markets performance, some argue that Islamic indices outperform their conventional counterparts in economic growth and bull markets periods (Hussein and Omran, 2005; Ahmad and Ibrahim, 2002). Others pointed that Islamic indices are riskier than their conventional peers (Snoussi et al. 2012). And a third group of authors and researchers, such as Abbes (2012); Hakim and Rashidian (2004); as well as Hussein (2004) found that there are no significant differences between Islamic and conventional indices performance.

Building on the previous varied literature, and in attempt to identify the variables that affect such market indices; the following hypotheses are made.

1.3.1. Hypothesis I

Merdad (2012) supported the literature sating that Islamic firms are believed to be less susceptible to financial risk and changes in interest rates than are conventional firms. In addition, Islamic firms cannot utilize risky instruments such as toxic assets and derivatives that have adversely affected conventional firms and triggered the recent 2008 global financial crisis. Also, it is well noted in the literature that Islamic firms must avoid all Gharar (uncertainty, ambiguity, and excessive risk) elements in all financial transactions and contracts, whereas, conventional firm are not obligated to do so.

Thus, hypothesis I states that ***"Islamic indices are less vulnerable to instability and have less risk exposure when compared to conventional counterparts".***

Consequently, according to the risk-return tradeoff theory which suggests that low risk is associated with low return and high risk is associated with high return, it is expected that Islamic firm stocks provide

investors with lower return than conventional firm stocks because of the lower level of risk assumed when Islamic stocks are held.

H1: $\sigma_i < \sigma_c$; where standard deviation, as measure if index volatility, of the Islamic index is expected to be lower than the standard deviation of the conventional one.

1.3.2. Hypothesis II:

Yusof and Abd. Majid (2007) investigated the effect of different monetary variables (narrow money supply, broad money supply, interest rates, exchange rates, and the industrial production index) on the conditional volatility of both Islamic and conventional stock market indices in Malaysia, and they found that macroeconomic variables are co-integrated with Malaysian Islamic stock market. This finding is consistent with Nayed and Hassan (2011) results when assessed the impact of the global financial crisis on the global financial system.

"Exchange rate and interest rate have significant impact on the market index volatility"

H2: There is a correlation between index volatility (Y), dependent variable, and independent variables (Xs).

H2: $\rho \neq 0$

1.4.Methods

To accomplish our research objective, a chain of empirical investigations is conducted, starting with descriptive analysis of the data. Then, we show the trend line graph of the indices monthly returns. Next, we examine if data stationarity is valid through unit root test. Next, we employ EGARCH (1,1) model, Exponential Generalized Autoregressive Conditional Heteroscedastic, in order to study the volatility of selected stock markets indices and estimate the model framing the relationship between variables. The methodology is addressed in detail within the following sections.

1.4.1. Indices Return Calculations:

The monthly price level of selected stock indices, for both Islamic and Conventional, are converted into monthly index returns using the following formula:

$$R_{it} = \frac{P_{it}}{P_{it-1}}$$, where

R_{it} = Stock index return at time (t),

P_{it} = Stock index price at time (t),

P_{it-1} = Stock index price at time (t-1).

1.4.2. Unit Root Test

Integration test as first test of order of integration are crucial in the time series analysis. This will imply that the result illustrates the significance of the relationship between the independent variables (Xs) and the dependent variable (Y) (Sukmana and Hidayat, 2012). Aiming at testing the order of integration of the variables, two types of unit root tests are employed in this study, which are:

1. Augmented Dickey Fuller (ADF) Test (1979), and
2. Philips Perron (PP) Test (1988).

The critical values in PP test statistics are the same with the ones of DF test, i.e. lower than < 0.05. In both cases, the null hypothesis (H0) implies that there is a unit root or non-stationary, while the alternative hypothesis (H1) indicates that the time series is stationary. And if results found are non-stationary, then, they can be transformed into a stationary series by adopting a Difference Stationary Process (DSP).

1.4.3. ARCH and EGARCH Models

As described by Engle (2001), ARCH (Autoregressive Conditionally Heteroscedastic) and GARCH (Generalized Autoregressive Conditionally Heteroscedastic) models treat heteroskedasticity as a variance to be modeled. As they are designed to deal with changing in variance with the objective to provide a volatility measure that can be used in financial decisions. Further, the nonlinear EGARCH (Exponential GARCH) that allow capturing the leverage effect, which is the different effects of positive and negative shocks on conditional volatility, has been developed by Nelson in 1991. This is meaning that EGARCH model of Nelson (1991) takes into account the relationship between variables and conditional variance and at the same time it is capable to capture various asymmetric effects. Also, Nelson (1991) has pointed out the limitation of GARCH models as they only consider the magnitude not the positivity or negativity of unexpected excess returns,

and lagged residuals determine only the size not the sign of conditional variance.

In addition, the analysis does not only imply the simple stock return series, but also it involves the residuals and squared residuals from the EGARCH model. And all analyses were conducted using E-views (version 9) statistical software package.

1.5.The Econometric Results

This section illustrates the results of EGARCH model that have been implemented to test the effect of the two predictor variables on market volatility for both Islamic and Conventional indices in respective countries. The discussion will evolve first the Islamic indices performance followed by their conventional peers for each country. In addition, a unit root test is adopted first to examine the stationarity of the data.

1.5.1. Unit Root Test

The empirical results of the unit root test of the selected countries imply that all data are stationary for the seven selected countries, which are Bahrain, Indonesia, Kuwait, Malaysia, Qatar, Saudi Arabia and UAE. These results for data series stationarity are valid for both Islamic and

conventional indices of each mentioned country. However, Bahrain, Kuwait, SA and UAE Islamic Stock indices returns were transformed to the first difference in order to maintain the stationarity of data series; this is in addition to Kuwait and UAE conventional indices as well. Also, one lag has been implied to Malaysia and Bahrain Islamic indices for the same purpose.

We can observe from table (1), which shows the results of both ADF and PP unit roots test for Islamic stock market indices, that probabilities of such tests indicate that data series are stationary at significance level of less than 1% for the ADF test in the five countries: Bahrain, Indonesia, Kuwait, Malaysia and UAE. While in Qatar and SA, the stationarity of their Islamic Indices data series as per ADF test has been realized at a level of less than 5% of significance.

Regarding PP test, the stationarity of data series of Bahrain, Kuwait, UAE and SA has been reached at a level less than 5% of significance. Meanwhile, the level of stationarity of less than 1% has been realized in Indonesia and Malaysia.

On the other hand, table (2) illustrates the results of unit root test for the conventional stock market indices. So, it can be noticed that indices data series are stationary according to ADF test at 1% level of significance for

the seven countries (Bahrain, Indonesia, Kuwait, Malaysia, Qatar, SA and UAE). As for PP test, Bahrain, Kuwait, SA and UAE have realized 5% as level of significance, while Indonesia, Malaysia, and Qatar, reached the level of 1% of significance.

From the above empirical analysis, we can report that all unit root tests' results point that all return series are stationary, particularly after adopting first difference of some indices (Bahrain, Kuwait, UAE and SA Islamic indices; in addition to Kuwait and UAE conventional indices). Also, one lag period has been applied for Malaysia Islamic index and Bahrain conventional index as well.

Accordingly, we will reject the null hypothesis (Ho) implying that examined indices' returns have a unit root, and we accept the alternative hypothesis (H1), which indicates that data series of indices returns are stationary at level 5%.

1.5.2. Descriptive Analysis

A summary of the descriptive statistical analysis of each individual country for both Islamic and conventional indices is provided in the appendices (appendix (II)-p. 47). The descriptive data analysis show set of data characteristics such as: mean, median, max, min, standard

deviation, skewness, Kurtosis, as well as Jarque-Bera. As shown in figures (3) and (4), which tackle the normal distribution and descriptive analysis of Islamic and conventional country indices, most of Islamic indices have higher levels of mean and have approximately a similar level of standard deviation compared to their conventional peers. This is except for Malaysia conventional index, which has a higher value of mean equals to 0.085 compared to -0.076 for its Islamic index.

Analysis results reveal an evidence of normal distribution as shown by the probabilities of Jarque-Bera statistics for the selected sample except for SA Islamic index. So, we can find that the remaining six countries' Islamic indices exceeded the probability value of 0.05; which reflects a good level of normality, however, SA realized 0.00 as probability value. On the conventional indices level, we perceive that all the seven countries achieved a level higher than 0.05 for Jarque-Bera probability. Accordingly, this is an important evidence for the normal distribution of the studied sample.

1.5.3. ARCH and EGARCH Methods

We first employ the following EGARCH model[2]:

$$\ln(\sigma_t^2) = \omega + \beta \ln(\sigma_{t-1}^2) + \frac{\gamma\, u_{t-1}}{\sqrt{\sigma_{t-1}^2}} + \alpha \left[\frac{|u_{t-1}|}{\sqrt{\sigma_{t-1}^2}} - \frac{\sqrt{2}}{\pi} \right]$$

The above-mentioned constants are estimated and updated by the model using the maximum likelihood via the E-views software.

The empirical analyses of the selected countries' indices reveal the following results:

Bahrain

Figures (1-2) show that Bahrain Islamic and conventional indices witnessed a pattern of volatility, where peak of volatility period was during the global financial crisis starting in March 2008. However, the Islamic index has a relatively less volatility pattern. This is also shown by the conditional standard deviation graphs (figures 7-8) of both Islamic and conventional indices, where Bahrain conventional index displayed a

[2]/ Source: Introductory Econometric for Finance (2002), p. 406.

higher volatility pattern; implying that conventional index return showed a riskier pattern.

As for Heteroscedasticity ARCH LM test, which identify the existence of ARCH effect, it is noticeable from table (3) that both Islamic and conventional indices have p values of 0.50 and 0.73 for Chi square, and 0.51 vs. 0.74 for F statistics tests respectively. Meaning that all probabilities are exceeding the p value of 0.05, with higher values in the conventional index statistics; thus, we will accept Ho stating that there is no ARCH effect for both indices.

Since the following regression model demonstrates the relationship among studied variables:

$Y = a\,FX + b\,IR + c + \varepsilon$, where

(Y) denotes the index volatility,

(FX) denotes the Foreign Exchange variable,

(IR) denotes the Interest Rate variable,

(a) and (b) are constant terms, and

(Ɛ) is the error term

Then, the following EGARCH models estimate the relationship among variables:

Bahrain Islamic Index	Bahrain Conventional Index
Y= -31.8471 FX -0.0101 IR + 116.9526	Y= 0.0055 FX -0.0277 IR + 0.9853

The above equations would imply that FX variable has much more influence on the dependent variable, the stock index, in the case of Islamic index compared to its conventional peer. Also, such influence is in the opposite direction due to negative sign. Regarding IR variable, it has negative effect on both indices with higher influence on conventional index counting for 2.77 % vs. 1.01% on Islamic one.

The coefficients of variables in variance equation of EGARCH Model revealing the impact of short and long-term volatilities and the leverage effect as well. We examine the probabilities of variables in variance equation, so we can find that all probabilities are significant at level of 1% for both Islamic and conventional indices. This is except for the long-term volatility, as the conventional one realized p value of 0.93 compared to 0.80 for its Islamic peer; meaning that volatility would increase on the long term for the conventional index more than the Islamic.

The model reveals an R squared level of 0.27 vs. 0.30 for Islamic and conventional indices respectively, which indicates that independent variables have more or less similar influence on the dependent variable in the Islamic and conventional indices.

Comparing the Dublin Watson statistic in both indices, which reveals if there is a problem of serial correlation, we find the Islamic index stat reaching around 0.23 compared to 0.25 in case of conventional index. This might result in relatively lower p-values in the test of autocorrelation and partial autocorrelation of the squared standardized residuals of the Islamic index.

Comparing the value of log likelihood that examines the goodness of model fit for both indices, results report 231.8 and 251.5 for Islamic and conventional indices respectively, which means that the data are more likely the conventional index than its Islamic counterpart.

Both Akaike information criterion and Schwarz criterion statistics are examined; these tests adjust the likelihood for the number of parameters. Findings suggest that conventional index report lower values of such statistics, -4.41 and -4.23, compared to the Islamic peer index reporting -4.84 and -4.66 respectively. Then, the conventional index data represents the better fit, as they have the lower value.

Moreover, a squared residuals test is conducted, such statistic identifies the conditional forecast error, which can be defined the difference between the squared residual return and our conditional expectation of the squared residual return (Reider, 2009). Then, the squared residuals' value is best fit when it is the closest to zero. Consequently, as shown in figure (5) and (6), the squared residuals of Bahrain Islamic index are best fit than the conventional peer since they are minimal compared to their conventional counterpart.

From the above, we can conclude that Islamic and conventional indices have almost similar performance with a relatively higher edge for conventional index as shown by illustrated statistics. So, the impact of the selected independent macro variables (risk free rate, exchange rate) have significant influence on the conventional index more than the Islamic one.

Indonesia

As shown in figures (1) and (2), both Islamic and conventional indices witnessed a similar volatility pattern, particularly in the financial crisis period. This may due to the exposure of Indonesian market to external financial chocks. In addition, Asian Islamic market is more vulnerable to persistent fundamental shocks in Asian economy (Dewandaru, 2014). So

that both Indonesian capital markets, Islamic and conventional, are affected by fundamental and financial shocks.

Regarding Heteroscedasticity ARCH LM test, table (3) illustrates that both Islamic and conventional indices have p values of 0.49 and 0.24 for Chi square, and 0.50 vs. 0.25 for F statistics tests respectively. Meaning that all probabilities are exceeding the p value of 0.05, with higher values pertaining to the Islamic index, thus, we will accept Ho stating that there is no ARCH effect for both indices.

The following EGARCH models estimate the relationship among variables:

Indonesia Islamic Index	Indonesia Conventional Index
Y= - 1.3164 FX - 0.1749 IR + 2.5090	Y= -1.3232 FX -0.3009 IR + 2.6367

The above equations would imply that FX variable has much more influence on the dependent variable, the stock index, for both Islamic index compared to its conventional peer. Also, such influence is in the opposite direction due to negative sign. Regarding IR variable, it has negative effect on both indices with higher influence on conventional index counting for 30.09 % vs. 17.49% on Islamic one.

The probabilities of variables in variance equation of EGARCH Model related to the conventional index are examined (table 5-6), so we can find that three probabilities out of four are not significant, which implies an increased volatility for the short and long term as well as higher leverage effect compared to the Islamic index that shows lower level such volatility. Moreover, the probability of the variable indicating the leverage effect is significant at less than 1% level for both indices.

The model reveals an R squared level of 0.41 vs. 0.51 for Islamic and conventional indices respectively, which indicates that selected independent variables have more influence on the dependent variable of the conventional indices compared to its Islamic peer.

Comparing the Durbin Watson statistic in both indices, which reveals if there is a problem of serial correlation, we find the Islamic index stat reaching around 1.73 compared to 1.91 for the conventional index. These values are near to 2, which reveals that there is no problem of serial correlation among studied independent variables. This might result in relatively great p-values in the test of autocorrelation and partial autocorrelation of the squared standardized residuals for both indices.

Comparing the value of log likelihood that examines the goodness of model fit for both indices, results report 161.48 and 168.89 for Islamic

and conventional indices respectively, which means that the data are relatively more to fit the conventional index than its Islamic counterpart.

Both Akaike information criterion and Schwarz criterion statistics are examined; these tests adjust the likelihood for the number of parameters. Findings suggest that conventional index report lower values of such statistics, -3.17 and -2.99, compared to the Islamic peer that reported -3.03 and -2.85 respectively. Then, the conventional index data represents the better fit, as they have the lower value.

Regarding the squared residuals' value, as shown in figure (5) and (6), the squared residuals of Indonesia Islamic index are best fit than the conventional peer since they have lower value.

Both Indonesian indices are volatile. This is due to shari'ah screening requirements and the dependence of Islamic capital markets on real economic activities rather than interest-based activities. Also, the integration of Indonesian stock market with other Asian regional markets may increase the volatility of the conventional index.

Kuwait

Figures (1-2) and (3-4) show that Kuwait conventional index witnessed a more volatile pattern compared to its Islamic peer, particularly during

the global financial crisis. This is also shown by the conditional standard deviation graphs (figures 7-8) of both Islamic and conventional indices, where Kuwait Islamic index displayed a relatively lower volatility pattern; implying that conventional index returns witnesses a riskier pattern.

As for Heteroscedasticity ARCH LM test, table (3) shows that both Islamic and conventional indices have p values of 0.90 and 0.46 for Chi square, and 0.91 vs. 0.47 for F statistics tests respectively. Meaning that all probabilities are exceeding the p value of 0.05, thus, we will accept Ho stating that there is no ARCH effect for both indices.

The following EGARCH models estimate the relationship among variables:

Kuwait Islamic Index	Kuwait Conventional Index
Y= -0.2291 FX –0.0214 IR + 1.0788	Y= -0.1746 FX -0.0234 IR + 1.0689

The above equations illustrate that FX variable has much more influence on the Islamic stock index return compared to its conventional peer. Also, such influence is in the opposite direction due to negative sign. Regarding IR variable, it has also a negative effect on both indices with

a slightly higher influence on conventional index counting for 2.34 % vs. 2.14% on Islamic one.

The coefficients of variables in variance equation of EGARCH Model indicating the impact of short and long-term volatilities and the leverage effect as well show that their probabilities are significant at level of 1% for both Islamic and conventional indices. This is with the exception of the long-term volatility, as the conventional one realized p value of 0.63 compared to 0.17 for its Islamic peer; meaning that conventional index volatility would increase on the long term more than the Islamic peer.

The model reveals an R squared level of 0.19 vs. 0.12 for Islamic and conventional indices respectively, which indicates that independent variables have greater influence on the dependent variable in the Islamic index compared to the conventional one.

Comparing the Dublin Watson statistic in both indices, we notice same stat level for both indices reaching around 0.23 vs. to 0.24 for Islamic and conventional indices respectively.

Comparing the value of log likelihood, results pointed 257.04 and 258.69 for Islamic and conventional indices respectively, which means that both indices' data have almost similar level of likelihood to fit.

Both Akaike information criterion and Schwarz criterion statistics are examined, findings reported that conventional index report lower values of such statistics, -4.93 and -4.75, compared to the Islamic peer index reporting -4.90 and -4.72 respectively. Then, the conventional index data represents the better fit, since they have the inferior value.

A squared residuals test is applied, where the squared residuals' value is best fit when it is the closest to zero. So as shown in figure (5) and (6), the squared residuals of Kuwait Islamic index are best fit than the conventional peer since they are minimal compared to their conventional counterpart.

From the studied statistics, we can conclude that Islamic index return has relatively more stable pattern than its conventional peer. This might due to the relatively wide range of Islamic financial instruments that are established in the Kuwaiti market, in addition to the good economic conditions that are reflected on the business cycles and activities. In the meantime, advanced conventional financial assets are not well developed in the Kuwaiti market, and the stock market is not linked to international markets to be more exposed to external financial shocks.

Malaysia

Figures (1-2) and (5-6) illustrate that both Malaysian indices' returns were volatile. This is because Malaysian market, as Asian financial center, has been exposed to internal and external chocks. This is due from one side to Shari'ah compliant instruments that are more reliable on real economic activities which led in turn that Islamic index be more exposed to fundamental chocks. From the other side, this will affect the fluctuations of advanced conventional instruments that exist in the Malaysian market.

Table (3) illustrates results reported by Heteroscedasticity ARCH LM test, it is observed that both Islamic and conventional indices have p values of 0.71 and 0.66 for Chi square, and 0.72 vs. 0.67 for F statistics tests respectively. Meaning that all probabilities are exceeding the p value of 0.05, thus, we will accept Ho stating that there is no ARCH effect for both indices.

The following EGARCH models estimate the relationship among variables:

The above equations would imply that FX variable has much more

Malaysia Islamic Index	Malaysia Conventional Index
Y= - 0.0182 FX – 0.0541 IR + 1.0106	Y= -0.6562 FX –0.1256 IR + 2.5652

influence on the conventional the stock index, compared to its Islamic peer with opposite direction due to negative sign. Regarding IR variable, it has negative effect on both indices with greater influence on conventional index amounting of 12.56 % vs. 5.41% on Islamic one.

We examine the probabilities of variables in variance equation of EGARCH Model that reveal the impact of short and long-term volatilities and the leverage effect as well. Results reported that all probabilities of the Islamic index are significant at level of 1% except for the long-term volatility, as p value equals to 0.655. While the probabilities of short and long term are not significant for the conventional index, as they realized p value of 0.17 and 0.15 consequently; meaning that volatility would increase on the short and long term for the conventional index more than the Islamic.

The model reveals an R squared level of 0.16 vs. 0.18 for Islamic and conventional indices respectively, which implies that independent

variables have relatively higher ability to better explain the variance fraction the conventional index return compared to its Islamic peer.

Comparing the Dublin Watson statistic in both indices, we find the Islamic index stat reaching around 0.18 compared to 1.71 for the conventional index. Which implies that the statistic is more significant in the conventional index, as it is near to 2, i.e. there is an evidence of no serial correlation among independent variables. This is reflected in relatively lower p-values in the test of autocorrelation and partial autocorrelation of the squared standardized residuals of the Islamic index.

Comparing the value of log likelihood that examines the goodness of model fit for both indices, results report 321 and 216.6 for Islamic and conventional indices respectively, which means that the data are more likely to fit in the Islamic index than its conventional counterpart.

Both Akaike information criterion and Schwarz criterion statistics are examined; these tests adjust the likelihood for the number of parameters. Findings suggest that Islamic index report lower values of such statistics, -6.22 and -6.04, compared to the conventional peer index reporting -4.11 and -3.93 respectively. Then, the conventional index data represents the better fit, as they have the lower value.

In the squared residuals test, the squared residuals' value is best fit when it is the closest to zero. So, figures (5) and (6) show that the squared residuals of Malaysia Islamic index are best fit than the conventional peer since they are minimal compared to their conventional counterpart.

From the above analysis, we can wrap up that both indices show a volatility pattern. Moreover, the selected independent macro variables (interest rate, exchange rate) have significant direct effect on the conventional index more than the Islamic one.

Qatar

Figures (1-2) show that both Qatar Islamic and conventional indices witnessed a pattern of volatility, where peak of volatility period was during the global financial crisis. However, the Islamic index reported a greater volatility pattern. This is also shown by the conditional standard deviation graphs (figures 7-8) of both Islamic and conventional indices; implying that Islamic index return demonstrates a riskier pattern.

As for Heteroscedasticity ARCH LM test, table (3) shows that both Islamic and conventional indices have p values of 0.73 and 0.97 for Chi square, and 0.73 vs. 0.97 for F statistics tests respectively. Meaning that all probabilities are exceeding the p value of 0.05 with higher values

pertaining to the conventional index statistics; thus, we will accept Ho stating that there is no ARCH effect for both indices.

The following EGARCH models estimate the relationship among variables:

Qatar Islamic Index	Qatar Conventional Index
Y= -30.7667 FX – 0.0417 IR + 113.0618	Y= -28.5609 FX – 0.0266 IR + 105.0190

The above equations illustrate that FX variable has great direct effect on both indices, with a relatively higher influence on the Islamic index, and such influence is in the opposite direction due to negative sign. Regarding IR variable, it has also a negative effect on both indices with a higher influence on Islamic index amounting for 4.17 % vs. 2.66% on conventional one.

The coefficients of variables in variance equation of EGARCH Model, indicating the impact of short and long-term volatilities and the leverage effect as well, show that their probabilities are significant at level of 1% for both Islamic and conventional indices. This is except for the long-term volatility, as the Islamic one realized p value of 0.82 compared to 0.77 for its conventional peer; meaning that Islamic index volatility may increase on the long term more than its conventional peer.

The model reveals an R squared level of 0.21 vs. 0.30 for Islamic and conventional indices respectively, which indicates that independent variables have greater ability to better explain the variance fraction of the conventional index return compared to the Islamic one.

Comparing the Dublin Watson statistic in both indices, we find more or less same stat level for both indices reaching around 0.200 vs. to 0.197for Islamic and conventional indices respectively.

Comparing the value of log likelihood, results pointed 225.81 and 235.35 for Islamic and conventional indices respectively, which means that the data are more likely to fit the conventional index than its Islamic counterpart.

Both Akaike information criterion and Schwarz criterion statistics are examined, findings pointed that conventional index report lower values of such statistics, -4.48 and -4.30, compared to the Islamic peer index that reported -4.29 and -4.11 respectively. Then, the conventional index data represents the better fit, since they have the lesser value.

A squared residuals test is applied, where the squared residuals' value is best fit when it is the closest to zero. So as shown in figure (5) and (6), the squared residuals of Qatar Islamic index are best fit than the

conventional peer since they are less compared to their conventional counterpart.

From the above analysis, we can conclude that Islamic index return has riskier pattern than its conventional peer. This is due to fundamental change in economic activities, since Islamic returns are more associated to real economic activities, where Qatar economy is depending on oil and gas exports as well as real estate sector. This is in addition to the effect of oil prices fluctuations on stock market returns as well.

Saudi Arabia

Figures (1-2) show that both SA Islamic and conventional indices witnessed a pattern of volatility, where peak of volatility period was during the global financial crisis. However, the conventional index shows greater volatility pattern. This is also illustrated by the conditional standard deviation graphs (figures 7-8) of both Islamic and conventional indices, where SA conventional index displayed a higher volatility pattern; implying that it witnesses a riskier pattern.

As for Heteroscedasticity ARCH LM test, table (3) shows that both Islamic and conventional indices have p values of 0.65 and 0.37 for Chi square, and 0.65 vs. 0.37 for F statistics tests respectively. Meaning that

all probabilities are exceeding the p value of 0.05, thus, we will accept Ho stating that there is no ARCH effect for both indices.

The following EGARCH models estimate the relationship among variables:

Saudi Arabia Islamic Index	Saudi Arabia Conventional Index
Y= -21.9598 FX – 0.0183 IR + 83.3625	Y= -12.3200 FX – 0.0044 IR + 47.2310

The above equations illustrate that FX variable has great direct effect on both indices, and such influence is in the opposite direction due to negative sign. Regarding IR variable, it has also a negative effect on both indices with a higher influence on Islamic index amounting for 1.83 % vs. 0.04% on conventional one.

The coefficients of variables in variance equation of EGARCH Model, indicating the impact of short and long-term volatilities and the leverage effect as well, show that their probabilities are significant at level of 1% for both Islamic and conventional indices. This is with the exception of the long-term volatility, as the Islamic index realized p value of 0.71 compared to 0.58 for its conventional peer; meaning that both indices volatility may increase on the long term with higher probability for the Islamic one.

The model reveals an R squared level of 0.40 vs. 0.32 for Islamic and conventional indices respectively, which indicates that independent variables have greater ability to better explain the variance fraction of the Islamic index than its conventional peer.

Comparing the Dublin Watson statistic in both indices, we find more or less same stat level for both indices reaching around 0.202 vs. to 0.227 for Islamic and conventional indices respectively.

Comparing the value of log likelihood, results pointed 285.96 and 276.30 for Islamic and conventional indices respectively; this means that the data are more likely to fit the Islamic index than its conventional counterpart.

Both Akaike information criterion and Schwarz criterion statistics are examined, findings reported that Islamic index has lower values of such statistics, -5.47 and -5.29, compared to its conventional peer that reached -5.28 and -5.10 respectively. Then, the Islamic index data represents the better fit, since they have the lower value.

A squared residuals test is applied, where the squared residuals' value is best fit when it is the closest to zero. So as shown in figure (5) and (6), the squared residuals of SA Islamic index are best fit than the

conventional peer since they are minimal compared to their conventional counterpart.

From the above statistics, we can conclude that conventional index return has riskier pattern than its Islamic peer. This is due to the abundant conventional products that exist in the Saudi stock market, particularly in comparison with other regional markets, which makes the conventional index more volatile and exposed to chocks.

UAE

Figures (1-2) show that both UAE Islamic and conventional indices witnessed a pattern of volatility, where peak of volatility period was during the global financial crisis. However, the Islamic index has a greater volatility pattern. This is also illustrated by the conditional standard deviation graphs (figures 7-8) of both Islamic and conventional indices; implying that Islamic index return shows a riskier pattern.

As for Heteroscedasticity ARCH LM test, table (3) shows that both Islamic and conventional indices have p values of 0.51 and 0.38 for Chi square, and 0.50 vs. 0.37 for F statistics tests respectively. Meaning that all probabilities are exceeding the p value of 0.05, thus, we will accept Ho stating that there is no ARCH effect for both indices.

The following EGARCH models estimate the relationship among variables:

UAE Islamic Index	UAE Conventional Index
Y= -15.7452 FX – 0.0503 IR + 58.9117	Y= 13.5046 FX – 0.0299 IR + 1.0537

The above equations illustrate that FX variable has great direct effect on both indices, and such influence is in the opposite direction for the Islamic index. Regarding IR variable, it has also a negative effect on both indices with a higher influence on Islamic index amounting for 5.03 % vs. 2.99% on conventional one.

The coefficients of variables in variance equation of EGARCH Model, indicating the impact of short and long-term volatilities and the leverage effect as well, show that their probabilities are significant at level of 1% for both Islamic and conventional indices. This is except for the long-term volatility, as the Islamic one realized p value of 0.47 compared to 0.57 for its conventional peer; meaning both indices' volatility may increase on the long term with higher magnitude for the conventional one compared to its Islamic peer.

The model reveals an R squared level of 0.35 vs. 0.16 for Islamic and conventional indices respectively, which indicates that independent

variables have greater influence on the dependent variable in the Islamic index return compared to the conventional peer.

Comparing the Dublin Watson statistic in both indices, we find approximately same stat level for both indices reaching around 0.17 vs. to 0.18 for Islamic and conventional indices respectively.

Comparing the value of log likelihood, results pointed 193.92 and 195.94 for Islamic and conventional indices respectively; this means that the data are slightly more likely to fit the conventional index than its Islamic counterpart.

Both Akaike information criterion and Schwarz criterion statistics are examined, findings pointed that Islamic index report lower values of such statistics, -3.85 and -3.67, compared to the conventional peer index that reported -3.74 and -3.56 respectively. Then, the Islamic index data represents the better fit, since they have the lesser value.

A squared residuals test is applied, where the squared residuals' value is best fit when it is the closest to zero. So as shown in figure (5) and (6), the squared residuals of UAE Islamic index are best fit than the conventional peer since they are lower than their conventional counterpart.

From the above analysis, we can conclude that Islamic index return has riskier pattern than its conventional peer. This is due to fundamental change in economic and business cycles, in addition to the limited Islamic assets compared to their conventional peers; which minimize the Islamic index diversification. Also, the selected independent macro variables (risk free rate, exchange rate) have significant influence on the Islamic index more than the conventional one.

Research Findings:

The recent financial crisis stemmed from excessive indebtedness, resting on a very small base of real wealth "the inverted debt pyramid". Heavily reliance on debt intensifies financial instability, collapse of financial institutions and crash of stock markets, which cause harm to investors, employees, as well as the society.

Islamic Stocks are the viable and ethical investment avenue to both Muslims and non-Muslims investors as they can invest according to Shariah principals without sacrificing their financial performance (Abbes, 2012). Moreover, Dewandaru et al. (2014) pointed that the global growing interest in Islamic Finance has shifted the focus from a banking-based industry to capital market-based instrument, which put a pressure on the Islamic capital markets to play a major role in Islamic Finance. Hence, Islamic Capital Markets need to be enhanced and deepen to play such a vital role. However, thin and fragmented literature highlights the set of variables affecting Islamic capital markets performance.

This empirical study aims at contributing to the current literature in order to shape the relationship between selected variables and the mentioned Islamic capital market indices and how it differs from its conventional

counterparts. Since the Islamic portfolio tends to have relatively high allocation in real sector stocks, this may considerably increase its vulnerabilities to fundamental shocks and fundamental base contagion wherever the market is integrated with regional and/or international markets. In addition, the paper targets estimating models that affect the volatility of the Islamic Capital Markets. It also introduces a model to assess factors affecting markets vulnerability in an attempt to help in developing Islamic capital markets.

According to the empirical findings, the research paper would support or reject the hypotheses, in order to shed the light on whether the Islamic market indices outperformed their conventional counterparts, and/or Islamic markets' indices witnessed more stability than their conventional peers. In addition, the statistical significance of the different independent variables will outline the model of variables affecting the volatility of market indices, so that it can be used in future analyses regarding Islamic capital markets.

Using EGARCH (1,1) variance models, empirical analyses suggest that individual results are reported for each country. Thus, we cannot completely accept or reject the null hypothesis stating that Islamic capital markets are less volatile, particularly in a crisis period, due to Shariah screening and reliance on real economic activities. So that empirical

study reported fragmented results according to each individual country conditions.

Thus, we can wrap up our empirical findings into three groups, first group shows that both types of indices illustrate a similar pattern of volatility. These are Bahrain and Malaysia. Second group of countries, is where Islamic index shows less volatility pattern, namely in Indonesia, Kuwait and Saudi Arabia. The last group of countries where Islamic index shows a greater volatility pattern consists of Qatar and UAE.

In Bahrain and Malaysia, both indices whiteness similar volatility pattern. This is because Bahraini economy has been exposed to financial sector which contributes with 27% of the GDP (Sukmana and Hidayat, 2012), this is in addition to commodity and property sectors. As for Malaysia, Islamic and conventional markets' depth, diversified instruments and openness to Asian and international markets let both indices have alike volatility performance. Thus, fundamental and economic conditions of the county, as well as the linkage with regional/international markets play a major role in having similar volatility in both types of indices.

The second group of countries: Indonesia, Kuwait and SA where Islamic Indices are less volatile than their conventional counterparts. In

Indonesia, this is mainly due to the advanced leveraged assets that are available in the Indonesian market, the depth and liquidity of such market as well as the well-established infrastructure. All enhance high level of trading for conventional instruments. While in SA, the biggest oil exporters where oil accounts for around 75% of its revenue, the market is based mainly on conventional instruments and market needs further development. This is a bit different from Kuwait that has somehow similar country fundamentals; it depends on 90% of its revenues on oil but has relatively limited and illiquid stock market.

The third group of countries consists of Qatar and UAE, where conventional indices outperform their Islamic peers in term of volatility. Qatar property investments and prices affect the fluctuation of the stock index, which makes stock market index more susceptible to instability in that real economic sector. Also, the limited diversification in Islamic assets makes the investment in Shari'ah compliant instruments riskier. Meanwhile, UAE tends to engage for a more diversified economic program to increase the non-oil sectors contribution in its GDP. Moreover, a lot of efforts have been invested to promote market development particularly on the infrastructure and the regulatory sides.

Recommendations:

The research findings may be used to draw important lessons for policy makers in designated countries while establishing the infrastructure of Islamic capital markets. This is due to several reasons among them: seriousness of applying Islamic finance system, fundamental and economic conditions, shortage of introduced instruments, limited investor base, scarcity of qualified calibers as well as the underdeveloped stakeholders and investors. In some cases, namely Bahrain, Qatar, Kuwait, Saudi Arabia and UAE, we may add the market infrastructure, depth of the financial system and pertinent regulations and supervisory scheme.

It is extremely important to set the appropriate legal and regulatory framework to allow the domestic market work properly at the same time make the country less susceptible to financial crisis and contagion. Also, policy makers should enhance the development of Non-Banking Financial Institutions with the purpose of extending the investor base to increase the liquidity in the market from one side, and to decrease commercial banks dominance Also, policy makers should support the liquidity in the supply side of offered Islamic instruments with the objective of creating liquidity in the supply side that would enhance

market liquidity. Moreover, it is advisable to address SMEs bottlenecks, particularly the access to finance, and to promote Islamic modes to enhance such industry.

The above-mentioned measures are important to maintain a healthy Islamic capital market due to the fact that Islamic assets can be protected from the crisis caused by the collapse of leveraged securities. This is due to the prohibition of excessive leveraged assets such as toxic assets and derivatives. However, they are subject to investors' sentiments, business cycles as well as economic conditions. Moreover, due to the limited diversification of Islamic assets, they tend to be concentrated in specific sectors such as commodities, real estate, trade …etc.; so they can be easily hit by economic trends such as commodities prices, or global economic slowdown. Thus, Islamic instruments cannot be immune from economic downturns.

Also, it is recommended to further explore the variables affecting the performance of Islamic capital markets. In addition, to incorporate in the studied sample a wider set of variables. As one of this empirical research limitation is the lack of testing the influence of derivatives, short selling and margin trading mechanisms that are applied in the country, on the performance of its indices.

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Appendices

Appendix (I)

Table 1: Unit root tests for Islamic Indices

Countries	ADF		PP	
	t-Statistic	Prob.,	t-Statistic	Prob.,
Bahrain*	-6.4476	0.0000	-2.2605	0.0260
Indonesia	-7.8452	0.0000	-7.9834	0.0000
Kuwait*	-5.7569	0.0000	-2.3522	0.0206
Malaysia**	-4.8583	0.0001	-5.0568	0.0000
Qatar	-3.0199	0.0368	-3.7858	0.0042
Saudi Arabia*	-2.5173	0.0138	-2.2401	0.0273
UAE*	-4.6662	0.0002	-2.0493	0.0431

*/First difference level has been applied for Bahrain, Kuwait, UAE and SA Islamic Indices.

**/One Lag period has been implemented to Malaysia Islamic index.

Table 2: Unit root tests for Conventional Indices

Countries	ADF		PP	
	t-Statistic	Prob.,	t-Statistic	Prob.,
Bahrain*	-4.0936	0.0016	-3.2581	0.0196
Indonesia	-8.05627	0.0000	-8.1259	0.0000
Kuwait**	-6.0216	0.0000	-2.4580	0.0157
Malaysia	-8.2542	0.0000	-8.5353	0.0000
Qatar	-5.4867	0.0000	-3.6483	0.0064
Saudi Arabia	-3.6958	0.0056	-3.2276	0.0212
UAE**	-5.1877	0.0000	-1.9923	0.0491

*/ One Lag period has been implemented to Bahrain conventional index.

**/First difference level has been applied for Kuwait and UAE conventional Indices.

Table 3: Heteroskedasticity ARCH LM Test for both Islamic and Conventional Indices

Countries	Islamic Test Equation				Conventional Test Equation			
Bahrain	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square(1)
	0.4327	0.4395	0.5122	0.5074	0.112	0.1141	0.7386	0.7355
Indonesia	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square(1)
	0.4573	0.4644	0.5005	0.4956	1.3333	1.3422	0.2510	0.2466
Kuwait	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square(1)
	0.0136	0.0139	0.9074	0.9063	0.5173	0.525	0.4737	0.4687
Malaysia	F-statistic	Obs*R-squared	Prob. F(1,98)	Prob. Chi-Square	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square(1)
	0.1300	0.1325	0.7192	0.7158	0.1817	0.1850	0.6708	0.6671
Qatar	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square(1)
	0.1189	0.1211	0.7310	0.7278	0.0014	0.0014	0.9702	0.9698
Saudi Arabia	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square	F-statistic	Obs*R-squared	Prob. F(1,99)	Prob. Chi-Square(1)
	0.2023	0.2059	0.6539	0.6500	0.8064	0.8160	0.3714	0.3663
UAE	F-statistic	Obs*R-squared	Prob. F(1,94)	Prob. Chi-Square	F-statistic	Obs*R-squared	Prob. F(1,98)	Prob. Chi-Square(1)
	0.42837	0.435499	0.5144	0.5093	0.7860	0.7956	0.3775	0.3724

Table 4: Significance Statistics of EGARCH model for Islamic Indices

Countries	R Square	Durbin-Watson Stat	Akaike info Criterion	Schwarz Criterion	Log likelihood
Bahrain	0.2656	0.2260	-4.4088	-4.2287	231.847
Indonesia	0.4121	1.7250	-3.0291	-2.8490	161.4842
Kuwait	0.1858	0.2264	-4.9028	-4.7226	257.0409
Malaysia*	0.1638	0.1761	-6.2191	-6.0378	321.0643
Qatar	0.2074	0.2003	-4.2904	-4.1103	225.8128
Saudi Arabia	0.3950	0.2020	-5.4698	-5.2897	285.9608
UAE**	0.3500	0.1715	-3.8541	-3.6683	193.9233

*/First difference level has been implemented for both FX and Risk-Free Rate Indices, in addition to one lag period for Malaysia Islamic Index.

**/First difference level has been applied for FX Index.

Table 5: Significance Statistics of EGARCH model for Conventional Indices

Countries	R Square	Durbin-Watson Stat	Akaike info Criterion	Schwarz Criterion	Log likelihood
Bahrain*	0.3000	0.2538	-4.8414	-4.6602	251.4916
Indonesia	0.5102	1.9084	-3.1743	-2.9941	168.8892
Kuwait	0.1172	0.2366	-4.9352	-4.7550	258.6945
Malaysia	0.1785	1.7072	-4.1097	-3.9296	216.5958
Qatar	0.2983	0.1977	-4.4776	-4.2974	235.3555
Saudi Arabia	0.3238	0.2269	-5.2804	-5.1002	276.2983
UAE**	0.1641	0.1813	-3.7415	-3.5602	195.9434

*/ One Lag period has been implemented to Bahrain conventional index, in addition to first difference level for both FX and Risk-Free Rate Indices.

**/First difference level has been applied for FX Index.

Table 6: EGARCH Results for Islamic Stock Market Indices

Countries	Mean Equation					Variance Equation				
Bahrain	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.2409	0.4425	-7.3241	0.0000
	FX Rate	-31.8471	0.0220	-1446.8550	0.0000	C(5)	1.7937	0.3840	4.6713	0.0000
	Risk Free Rate	-0.0101	0.0021	-4.7280	0.0000	C(6)	-0.0525	0.2120	-0.2477	0.8044
	C	116.9526	0.0814	1437.0030	0.0000	C(7)	0.7617	0.0584	13.0529	0.0000
	LOG(GARCH) = -3.2409 + 1.7937*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.0525 *RESID(-1)/@SQRT(GARCH(-1)) + 0.7617*LOG(GARCH(-1))									
Indonesia	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	0.0932	0.0525	1.7737	0.0761
	FX Rate	-1.3164	0.0015	-907.5369	0.0000	C(5)	-0.1232	0.0568	-2.1679	0.0302
	Risk Free Rate	-0.1749	0.0058	-30.0528	0.0000	C(6)	0.0826	0.0460	1.7950	0.0727
	C	2.5090	0.0023	1110.3040	0.0000	C(7)	1.0000	0.0009	1055.5480	0.0000
	LOG(GARCH) =0.0932 - 0.1232*ABS(RESID(-1)/@SQRT(GARCH(-1))) + 0.0826 *RESID(-1)/@SQRT(GARCH(-1)) + 0.9999*LOG(GARCH(-1))									
Kuwait	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-4.1458	0.9335	-4.4412	0.0000
	FX Rate	-0.2291	0.0989	-2.3177	0.0205	C(5)	2.0670	0.4301	4.8059	0.0000
	Risk Free Rate	-0.0214	0.0017	-12.7949	0.0000	C(6)	-0.4023	0.2908	-1.3834	0.1665
	C	1.0788	0.0291	37.0112	0.0000	C(7)	0.6831	0.1123	6.0850	0.0000
	LOG(GARCH) = -4.1458 + 2.0670*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.4023 *RESID(-1)/@SQRT(GARCH(-1)) + 0.6831*LOG(GARCH(-1))									
Malaysia	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.2817	0.7801	-4.2067	0.0000
	1st Difference FX	-0.0182	0.0044	-4.0927	0.0000	C(5)	2.2318	0.5531	4.0352	0.0001
	1st Difference IR	-0.0541	0.0037	-14.7810	0.0000	C(6)	-0.1247	0.2796	-0.4461	0.6555
	C	1.0106	0.0004	2759.6510	0.0000	C(7)	0.8572	0.0945	9.0692	0.0000
	LOG(GARCH) = -3.2817 + 2.2318*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.1247 *RESID(-1)/@SQRT(GARCH(-1)) + 0.8572*LOG(GARCH(-1))									
Qatar	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.3943	0.6464	-5.2513	0.0000
	FX Rate	-30.7667	0.7749	-39.7051	0.0000	C(5)	2.2323	0.4575	4.8796	0.0000
	Risk Free Rate	-0.0417	0.0017	-23.9334	0.0000	C(6)	0.0801	0.3535	0.2266	0.8208
	C	113.0618	2.8213	40.0739	0.0000	C(7)	0.7992	0.0784	10.1913	0.0000
	LOG(GARCH) = -3.3943 + 2.2323*ABS(RESID(-1)/@SQRT(GARCH(-1))) + 0.0801 *RESID(-1)/@SQRT(GARCH(-1)) + 0.7992*LOG(GARCH(-1))									
Saudi Arabia	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-2.3594	0.6114	-3.8589	0.0001
	FX Rate	-21.9598	0.0124	-1771.7900	0.0000	C(5)	1.8943	0.4949	3.8280	0.0001
	Risk Free Rate	-0.0183	0.0009	-20.2611	0.0000	C(6)	0.1315	0.3551	0.3703	0.7112
	C	83.3625	0.0463	1799.2520	0.0000	C(7)	0.9283	0.0725	12.8087	0.0000
	LOG(GARCH) = -2.3594 + 1.8943*ABS(RESID(-1)/@SQRT(GARCH(-1))) + 0.1315 *RESID(-1)/@SQRT(GARCH(-1)) + 0.9283*LOG(GARCH(-1))									
UAE	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.7371	0.6993	-5.3443	0.0000
	1st Difference FX	-15.7452	4.6650	-3.3752	0.0007	C(5)	2.0424	0.7855	2.6000	0.0093
	Risk Free Rate	-0.0503	0.0028	-17.8386	0.0000	C(6)	-0.2435	0.3363	-0.7241	0.4690
	C	58.9117	17.1342	3.4383	0.0006	C(7)	0.7242	0.0857	8.4513	0.0000
	LOG(GARCH) = -3.7371 + 2.0424*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.2435 *RESID(-1)/@SQRT(GARCH(-1)) + 0.7242*LOG(GARCH(-1))									

Table 7: EARCH Results for Conventional Stock Market Indices

Countries	Mean Equation					Variance Equation				
Bahrain	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.3620	0.8169	-4.1157	0.0000
	1st Difference FX	0.0055	0.0008	6.8739	0.0000	C(5)	1.8252	0.4885	3.7367	0.0002
	1st Difference IR	-0.0277	0.0022	-12.4408	0.0000	C(6)	0.0254	0.2801	0.0906	0.9278
	C	0.9853	0.0009	1082.3370	0.0000	C(7)	0.7710	0.0918	8.3972	0.0000
	LOG(GARCH) = -3.3620 + 1.8252*ABS(RESID(-1)/@SQRT(GARCH(-1))) + 0.0254 *RESID(-1)/@SQRT(GARCH(-1)) + 0.7710*LOG(GARCH(-1))									

Indonesia	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-0.0924	0.1502	-0.6153	0.5384
	FX Rate	-1.3232	0.0877	-15.0878	0.0000	C(5)	-0.2064	0.1600	-1.2895	0.1972
	Risk Free Rate	-0.3009	0.0733	-4.1045	0.0000	C(6)	-0.0512	0.0868	-0.5898	0.5553
	C	2.6367	0.0392	67.3172	0.0000	C(7)	0.9580	0.0003	2838.2090	0.0000
	LOG(GARCH) = -0.0924 - 0.2064*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.0512 *RESID(-1)/@SQRT(GARCH(-1)) + 0.9580*LOG(GARCH(-1))									

Kuwait	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.4538	0.5091	-6.7842	0.0000
	FX Rate	-0.1746	0.0479	-3.6437	0.0003	C(5)	1.9162	0.3328	5.7570	0.0000
	Risk Free Rate	-0.0234	0.0010	-23.9472	0.0000	C(6)	-0.0929	0.1908	-0.4869	0.6263
	C	1.0689	0.0143	74.6191	0.0000	C(7)	0.7794	0.0461	16.9019	0.0000
	LOG(GARCH) = -3.4538 +1.9162*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.0929 *RESID(-1)/@SQRT(GARCH(-1)) + 0.7794*LOG(GARCH(-1))									

Malaysia	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-0.0991	0.0722	-1.3719	0.1701
	FX Rate	-0.6562	0.0003	-2376.0800	0.0000	C(5)	-0.1334	0.0939	-1.4207	0.1554
	Risk Free Rate	-0.1256	0.0011	-112.4834	0.0000	C(6)	-0.1671	0.0436	-3.8350	0.0001
	C	2.5652	0.0007	3704.9920	0.0000	C(7)	0.9700	0.0047	205.1382	0.0000
	LOG(GARCH) = -0.0991 - 0.1334*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.1671 *RESID(-1)/@SQRT(GARCH(-1)) + 0.9700*LOG(GARCH(-1))									

Qatar	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.0125	0.6219	-4.8442	0.0000
	FX Rate	-28.5609	2.7764	-10.2871	0.0000	C(5)	1.7464	0.4100	4.2591	0.0000
	Risk Free Rate	-0.0266	0.0028	-9.3616	0.0000	C(6)	-0.0769	0.2638	-0.2916	0.7706
	C	105.0190	10.1097	10.3880	0.0000	C(7)	0.7993	0.0854	9.3598	0.0000
	LOG(GARCH) = -3.0125 + 1.7464*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.0769 *RESID(-1)/@SQRT(GARCH(-1)) + 0.7993*LOG(GARCH(-1))									

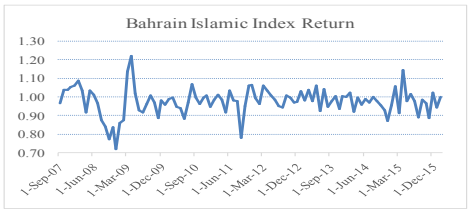
Saudi Arabia	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-2.4025	0.6975	-3.4445	0.0006
	FX Rate	-12.3200	0.1852	-66.5229	0.0000	C(5)	1.7418	0.4091	4.2576	0.0000
	Risk Free Rate	-0.0044	0.0004	-9.9020	0.0000	C(6)	-0.1404	0.2556	-0.5491	0.5829
	C	47.2310	0.6941	68.0460	0.0000	C(7)	0.8940	0.0939	9.5185	0.0000
	LOG(GARCH) = -2.4025 + 1.7418*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.1404 *RESID(-1)/@SQRT(GARCH(-1)) + 0.8940*LOG(GARCH(-1))									

UAE	Variable	Coefficient	Std. Error	z-Statistic	Prob.	Variable	Coefficient	Std. Error	z-Statistic	Prob.
						C(4)	-3.1869	0.9763	-3.2642	0.0011
	FX Rate	13.5046	18.0238	0.7493	0.4537	C(5)	1.9662	0.4944	3.9769	0.0001
	Risk Free Rate	-0.0299	0.0027	-11.2545	0.0000	C(6)	-0.1736	0.3091	-0.5616	0.5744
	C	1.0537	0.0036	290.2398	0.0000	C(7)	0.7838	0.1416	5.5367	0.0000
	LOG(GARCH) = -3.1869 + 1.9662*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.1736 *RESID(-1)/@SQRT(GARCH(-1)) + 0.7838*LOG(GARCH(-1))									

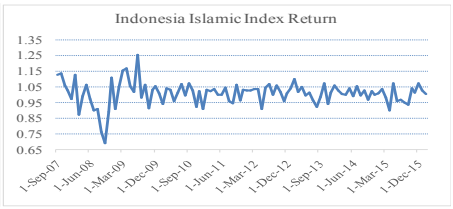
Appendix (II)

Figure 1: Performance of Islamic Stock Market Indices

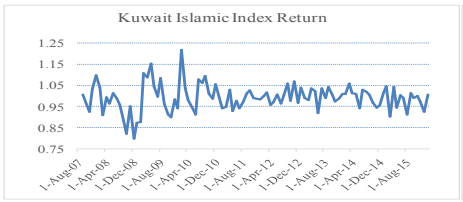
Bahrain



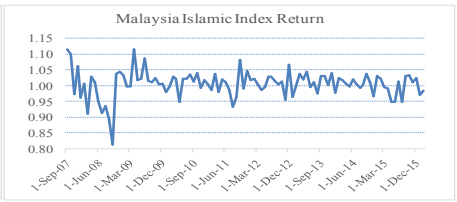
Indonesia



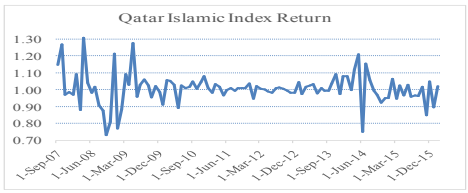
Kuwait



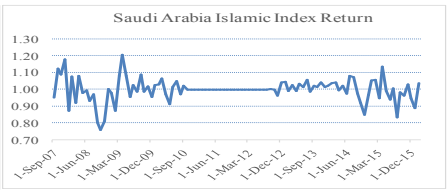
Malaysia



Qatar



Saudi Arabia



UAE

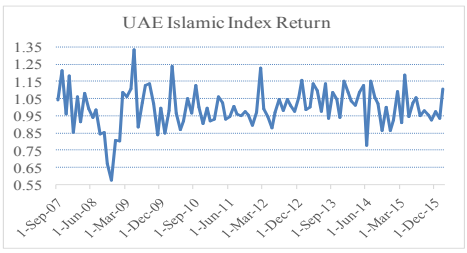
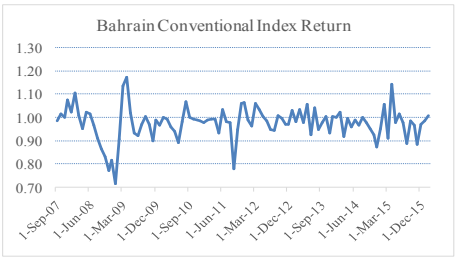
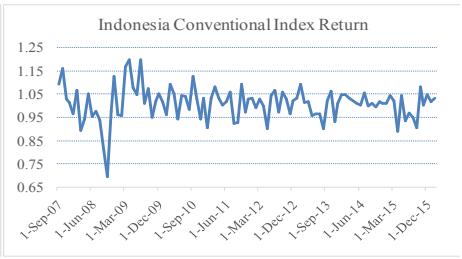


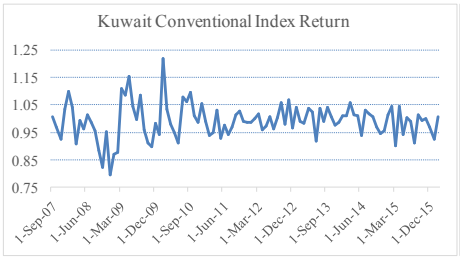
Figure 2: Performance of Conventional Stock Market Indices

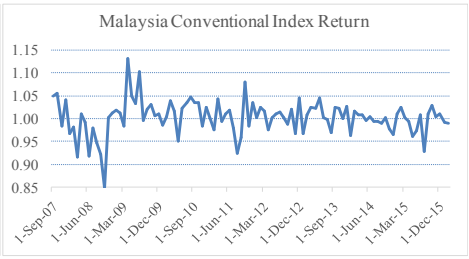
Bahrain



Indonesia







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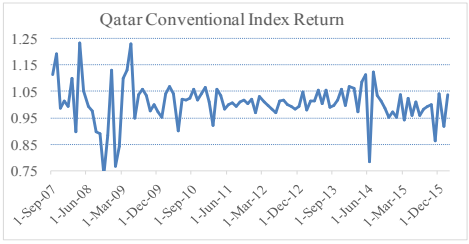
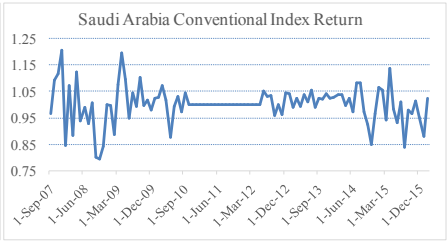


Saudi Arabia



UAE

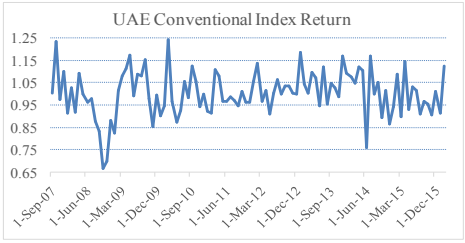
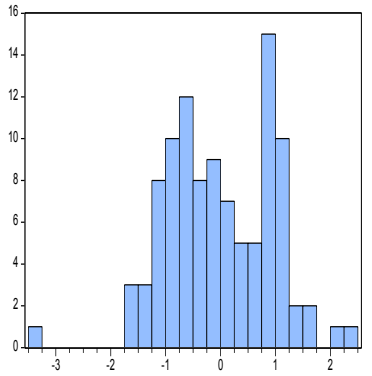
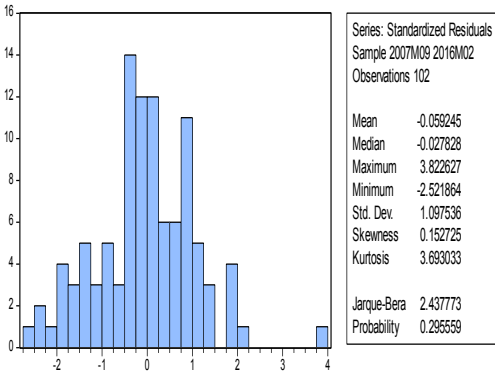


Figure 3: Normal Distribution of Standard Residuals for Islamic Indices

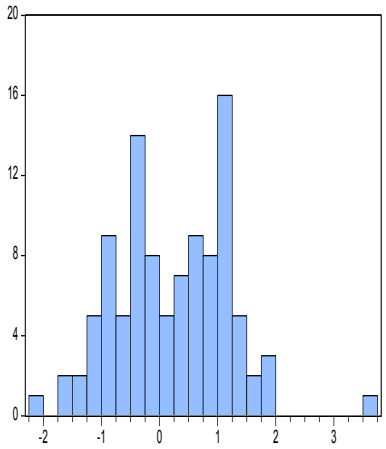
Bahrain



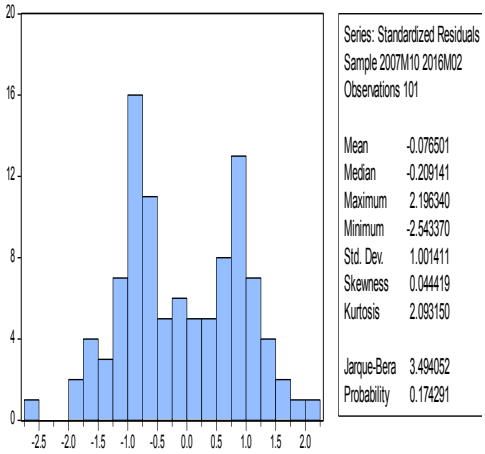
Indonesia



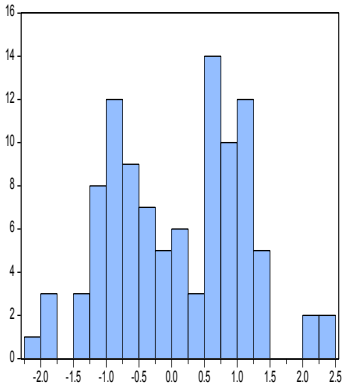
Kuwait



Malaysia

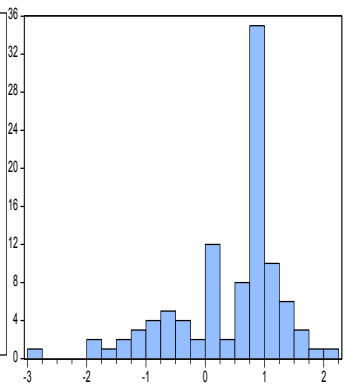


Qatar



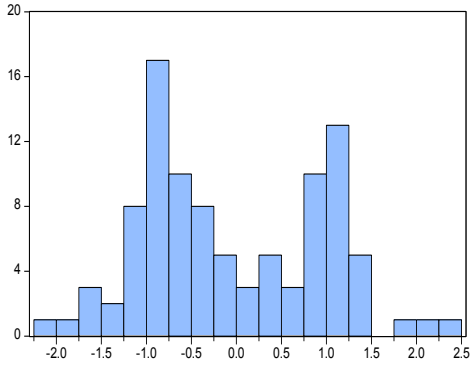
Series: Standardized Residuals	
Sample 2007M09 2016M02	
Observations 102	
Mean	0.064950
Median	0.153583
Maximum	2.350967
Minimum	-2.054358
Std. Dev.	1.000767
Skewness	-0.016916
Kurtosis	2.257032
Jarque-Bera	2.350872
Probability	0.308684

Saudi Arabia



Series: Standardized Residuals	
Sample 2007M09 2016M02	
Observations 102	
Mean	0.425053
Median	0.830388
Maximum	2.149442
Minimum	-2.932813
Std. Dev.	0.910811
Skewness	-1.102162
Kurtosis	4.053076
Jarque-Bera	25.36407
Probability	0.000003

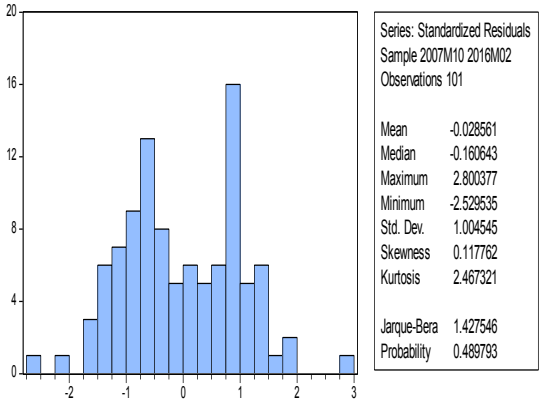
UAE



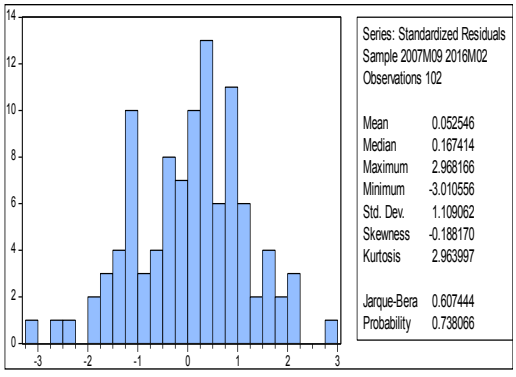
Series: Standardized Residuals	
Sample 2008M02 2016M02	
Observations 97	
Mean	-0.057928
Median	-0.387295
Maximum	2.430997
Minimum	-2.004766
Std. Dev.	1.003841
Skewness	0.270169
Kurtosis	1.972009
Jarque-Bera	5.451118
Probability	0.065510

Figure 4: Normal Distribution of Standard Residuals for Conventional Indices

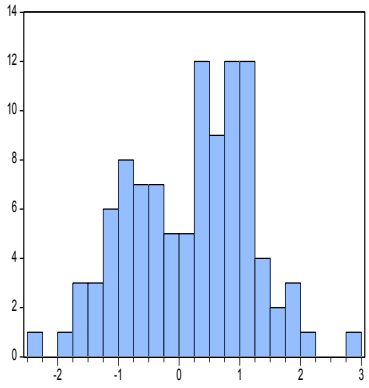
Bahrain



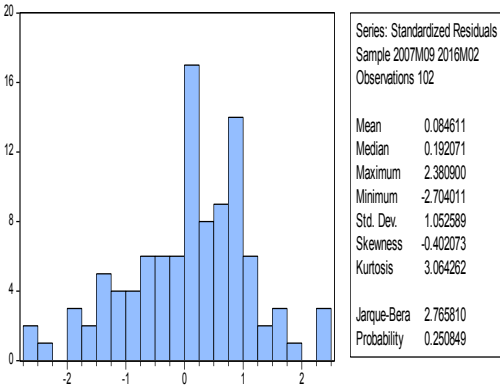
Indonesia



Kuwait



Malaysia



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