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Global Financial Crisis and Integration of Islamic Stock Markets in Developed and Developing Countries

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Table of Contents

Contents **Page**

Acknowledgements..... i

Table of Content..... iii

List of Tables..... v

List of Figures..... v

Acronyms/Abbreviations..... vi

Abstract vii

1. Introduction. 1

1.1 Background..... 1

1.2 Objectives of Study..... 3

1.3 Contributions of Study..... 4

1.4 Organization of Study..... 4

2. The Islamic Equity Market..... 6

2.1 Basic Characteristics of Islamic Equity Market..... 6

2.2 Critical Roles of *Shari'ah* Advisory Council..... 7

2.3 Islamic Stock Market Indices..... 9

2.4 Issues Arising from Non-Standardization of Islamic Equity Markets..... 12

3. Literature Review..... 15

3.1 Implications of Stock Market Integration..... 15

3.2 Integration among Conventional Stock Markets..... 17

3.3 Stock Market Integration and Financial Crisis..... 19

3.4 Integration among Islamic Stock Markets..... 21

4. Methodology..... 26

4.1 Data Description..... 26

4.2 Methods of Investigations..... 27

4.2.1 ARDL Bound Testing Approach..... 27

4.2.2 Generalised Method of Moments..... 29

5. Results and Discussion..... 30
5.1 Basic Descriptions..... 30
5.2 Descriptive Analysis 31
5.3 Correlation Analysis..... 33
5.4 Bi-variate Causality Analysis..... 34
5.5 ARDL Analysis..... 36
5.6 Multi-variate Analysis using GMM 38

6. Conclusions..... 41
6.1 Summary of Major Findings 41
6.2 Implications of Study..... 42
6.3 Limitations and Directions for Further Researc 44

References..... 46

Appendix..... 53

List of Tables

		Page
Table 1	Changes in Stock Indices: Conventional Versus Islamic Stock Indices	31
Table 2	Descriptive Statistics of Islamic Stock Indices	33
Table 3	Correlations among Islamic Stock Returns	34
Table 4	Summary of Bi-variate Granger Causality Results	35
Table 5	ARDL F-Statistics for Testing Existence of Co-integration	37
Table 6	Results of Multivariate VECM Analysis for During Crisis Period	39

List of Figures

		Page
Figure 1	Plots of Selected Islamic Stock Indices 9 January 2005 – 10 January 2010	30

Acronyms/Abbreviations

ARDL	Auto-Regressive Distributed Lag
ASEAN	Association of Southeast Asian Nations
CAPM	Capital Asset Pricing Model
DJIM	Dow Jones Islamic Market
FBM	FTSE Bursa Malaysia
GCC	Gulf Cooperation Council
GMM	Generalized Method of Moments
MENA	Middle-East and North African
MSCI	Morgan Stanley Capital International
SAC	*Shari'ah* Advisory Council
S&P's	Standard & Poor's
VECM	Vector Error Correction Mechanism

Abstract

This study aims to determine the impact of the 2007 global financial crisis on the integration of the Islamic stock markets. Seven Islamic stock markets are selected based on the countries' level of development and geographical factor. Specifically, of the seven Islamic stock markets selected, four are from the developing countries, namely Malaysia, Indonesia, Turkey and Kuwait, and three are from the developed countries, namely the US, UK and Japan. Also, Malaysia and Indonesia are developing countries from the Asian region, while Turkey and Kuwait are from the MENA region. These categorizations would allow the determination if the level of development and geographical factor have significant influences on the responses of the stock markets to the global financial shocks.

In determining the impact of the financial crisis on integration of the Islamic stock markets, the period of analysis is being divided into two sample periods: the pre-crisis period spans from January 9, 2005 to July 22, 2007 and during the crisis period spans from July 29, 2007 to January 10, 2010. The study relies on two major time-series investigation techniques, namely the Auto-Regressive Distributed Lag (ARDL) approach and multi-variate Vector Error Correction Mechanism (VECM) based on the Generalized Method of Moments (GMM). The ARDL approach is used to determine the existence of long-run integration among the stock markets, while the multi-variate VECM based on the GMM is adopted to provide a robust analysis of short and long-run dynamic causal linkages among the stock markets. The study uses weekly closing stock indices data of the Dow Jones Islamic Index series gathered from the Bloomberg database.

The study documents several interesting findings which can be summarized as follows:

(i) The results show that the Islamic stock markets are not spared from the global financial crisis as all the Islamic stock markets included in this study were adversely affected by the financial crisis. This is reflected by the lower returns and more volatile nature of the Islamic stock markets in the crisis period than the non-crisis period;

(ii) The Islamic stock markets show stronger correlations and integration in the crisis period than the pre-crisis period as indicated by the significant and greater values of correlation coefficients during the crisis period compared to the pre-crisis period;

(iii) Increasing causalities are recorded among the Islamic stock markets in the crisis period than the pre-crisis period, with significant causations originating from the markets perceived as "non-influential" and several incidences of "reverse causality" being documented;

(iv) During non-crisis period, there are increased integrations among Islamic stock markets of similar level of development, suggesting that investors can gain by diversifying their portfolios in the Islamic stock markets of different levels of development;

(v) During crisis period, there are increased integrations among Islamic stock markets in similar geographical area, suggesting that investors can gain by diversifying their portfolios in markets of different geographical area.

The practical implementations of the findings are enormous. Since it is shown that the Islamic stock markets are as vulnerable as the conventional stock markets to the global financial shocks, it is important that the industry players and policymakers remained vigilant to ensure stability of the Islamic stock market. This highlights the importance of ensuring continuous prudent risk management practices and devising suitable hedging mechanisms and relevant risk mitigation techniques. Second, the greater integration among the Islamic stock markets during the crisis period highlights the need to take pre-emptive measures to avoid a wide-scale decline in the Islamic stock market during the global financial crisis. Third, in terms of portfolio diversification benefits, investors should be aware of the market condition in strategizing their capital portfolio. In the context of the Islamic stock markets, both the level of development and geographical factor are important considerations for diversification depending on the market condition. Lastly, the inter-dependencies among the Islamic stock markets also have important implications for the macro-stabilization policies as well as the financial policies of multi-national corporations in these countries. The co-integrated Islamic stock markets suggest that there is a need for policy coordination among these markets to mitigate the impacts of financial fluctuations.

Keywords: Islamic stock markets, integration; financial crisis; diversification benefits

JEL Classifications: C15; F15; G14

1. INTRODUCTION

1.1 Background

The Islamic banking and finance industry has captured substantial interests in the financial market particularly in the aftermath of the recent global financial crisis. A specific segment of the industry that has been receiving much attention following the crisis is the Islamic equity market. Indeed, the Islamic equity market has been one of the rapidly growing segments of the Islamic finance industry that contributes significantly to the burgeoning growth of the industry. Reflecting the strong interest, funds invested in the Islamic equity market as measured by the market capitalization of the Dow Jones Islamic Markets Index reached US$4.34 trillion at end-2008 (Siddiqui, 2008). Globally, there are more than 500 *shari'ah*-compliant funds available in 2008 and the number is estimated to reach 1,000 by 2010 (Islamic Finance News, September 2008). Equity funds that apply Islamic screening principles currently stand at nearly US$750 billion and is expected to hit the US$1 trillion mark by end-2010 (McKinsey and Company, 2007). In terms of growth, the market for Islamic investment products is currently growing at an estimated 15-20 percent per annum (FTSE, 2009). As the conventional equity market remains in doldrums due to the prolonged effects of the global financial crisis, the demand for the Islamic equity market is expected to increase further in tandem with the sustained rapid growth of the Islamic banking and finance industry.

The demand for the Islamic investment products has increased substantially in both the developed and developing countries. The pioneers in developing the Islamic finance industry have been the developing Muslim countries such as Malaysia, Egypt, Pakistan and Sudan. Witnessing its viability and sustainability, other developing Muslim countries have followed suit, including Indonesia, Brunei and several of the Gulf Cooperation Council (GCC) countries such as Bahrain and Qatar. Other countries such as Singapore started to have the interest on the industry as it is seen as one of a profitable market niches in the banking and finance industry. Of late, as the Islamic finance industry continues to gain momentum and demonstrates its resilience against the global economic and financial uncertainties, the demand for such investment products also comes from the developed countries such as the UK, Japan and the US. Together, this contributes to the rapid growth of the Islamic finance industry.

Due to its increased presence in the global financial scenario, the Islamic banking and finance industry is no longer seen as peripheral to its conventional counterpart, but currently is playing a complementary role that has high potential to be developed further as a viable

alternative to the conventional financial system. As such, concerted efforts have been undertaken by the policymakers and industry players to strengthen the foundation for healthy growth of the industry. Many countries have taken measures to provide enabling environment to accommodate and nurture the development of the industry. In several countries such as Malaysia and the UK, tax preferential measures and banking and financial laws amendments are undertaken to enable the financial transactions to be carried out as required by the Islamic law or *shari'ah*. With the current development in the global financial scenario, further efforts are undertaken to prepare the Islamic banking industry to face the new global financial challenges. Malaysia, for example, has put in place a financial safety-net framework for the Islamic banking industry comprising of lender of last resort and deposit insurance system. This is just part of the country's continuous efforts to ensure healthy growth and bring the industry to greater heights. In Germany, the Federal Financial Supervisory Authority has been supportive of the development of Islamic banking industry by making it easy for interested financial institutions to obtain license dealing with the Islamic banking products, which are said to be compatible with the country's financial rules. At the global front, increasing efforts are directed towards standardization of the industry across national borders. In the specific context of the equity market, many countries have started to establish their own *shari'ah* index through the government-private initiatives. An example of this is the Malaysian *shari'ah* tradeable index known as the FBM *Hijrah Shari'ah* Index which is designed based on the FTSE's global indexing standard. The index is an internationally accepted benchmark intended to increase the Malaysian Islamic capital market's competitiveness and attractiveness to the domestic and global investors (Security Commission, 2007).

The strong growth momentum and escalating interests on the Islamic equity market has called for greater research efforts in this area with the objective of having deeper understanding of this nascent field. Furthermore, there is a pressing need for more recent investigations on the Islamic equity markets in the aftermath of the current economic and financial situation particularly by the investors and policymakers. An area that is highly pertinent but still lack of research is the integration and efficiency of the Islamic equity markets. Compared to the extensive literature on the integration and efficiency of the conventional equity market, the Islamic stock market integration and its related issues have remained largely unexplored. The existing studies have focused mainly on the conventional stock markets with pioneering studies have undertaken thorough examination of integration among the developed stock markets (see, for example, Grubel (1968); Levy and Sarnat (1970); Taylor and Tonk (1989); Campbell and Hamao (1992) on major developed countries; Longin and Solnik (1995) on seven major developed countries over the period 1960-90; Fischer and Palasvirta (1990) on 23 countries including the developed countries; Kasa (1992) on five developed countries; Galagher (1995) on Irish, British and German

stock markets). In the 1990s, there are increasing interests towards the developing countries' stock markets (see for example, Chan et al., 1992; Hung and Cheung, 1995; Ratanapakorn and Sharma, 2002; and Abd. Majid et al., 2008). However, studies on the Islamic stock market integration, albeit increasing, have been very limited. Consequently, the study hopes to contribute towards enriching the literature by providing the latest empirical evidence on the topic of stock market integration in the case of the Islamic stock markets.

Similar to the conventional equity markets, clear understanding on the nature of integration among the Islamic equity markets has several important implications for market strategizing and capital budgeting by the investors as well as planning and supervision by the policymakers. In addition, as the Islamic equity market grows rapidly across the globe, information on the interactions among the markets are well sought after to ensure that suitable and coordinated economic and financial policies are being put in place to nurture the development of this industry. As such, this study is indeed timely and useful. This study is expected to provide important implications on the development of the Islamic equity markets and contribute towards a healthy growth of the Islamic banking and finance industry.

1.2 Objectives of Study

By undertaking a thorough empirical investigation on the integration of selected Islamic stock markets from various regions in the period before and during the 2007 global financial crisis, the study intends to achieve the following objectives:

1. To analyze the potential diversification benefits in the Islamic stock markets in both the developed and developing countries;
2. To assess the impact of the 2007 global financial crisis on the nature of integration among the selected Islamic stock markets;
3. To determine if the level of economic development and geographical factor play important roles in influencing the nature of integration among the selected Islamic stock markets;
4. To include Islamic stock markets which cover wider geographical area, namely Malaysia, Indonesia and Japan from the Asian region, Kuwait and Turkey from the MENA region as well as the US and UK; and
5. To analyze recent data sample so as to account for the latest economic and financial development into the analysis.

1.3 Contributions of Study

This study hopes to contribute to the existing literature in several ways. An area of novelty of the study is that it covers the Islamic stock markets from a wider geographical area, which is currently lacking in the literature. Most of the existing studies on the integration among the Islamic stock markets have been focusing on the Gulf and MENA regions. In contrast, this study covers the Asian, MENA, the US and UK Islamic stock markets.

Second, due to the recent nature of the global financial crisis, this study is among the pioneering studies in analyzing the impact of the 2007 global financial crisis on the Islamic stock market integration. In this regard, the study hopes to shed some lights on the proposed resilience of the Islamic stock market to financial shocks.

Third, as in the case of the conventional stock markets, information about the nature of integration among the Islamic stock markets is of high interest to the equity market participants. Clear understanding about the nature of integration among the stock markets is one of the key determinants of success for investors, fund managers and other market players who are seeking to diversify their investments and make capital budgeting decisions in these markets. The study contributes in providing the inputs in assisting financial analysts making such investment decisions.

Fourth, the study provides important inputs to the policymakers in designing measures to safeguard the health and stability of the Islamic capital markets. Amid the on-going efforts to strengthen the financial infrastructure of the Islamic banking and finance industry, information about the integration among the Islamic financial markets and impact of the financial crisis on the Islamic stock markets is very much sought-after.

1.4 Organization of Study

Having presented the background and objectives of the study, the next chapter discusses the important features of an Islamic equity market. Deeper understanding about the Islamic stock market is enabled by the discussions on the basic characteristics that distinguish the Islamic stock market from its conventional counterpart. The critical role of the *shari'ah* advisory scholars and establishment of the Islamic stock indices are also discussed. The chapter ends with a discussion on some of the major issues in the Islamic stock market.

The third chapter reviews the literature on stock market integration. The chapter starts with various aspects of integration among the conventional stock markets so as to understand the importance of the issue, followed by more detailed aspects of stock market integration such as the methodological and conceptual issues. The rest of the chapter synthesizes the current literature on the Islamic stock markets in order to identify the literature gap that needs attention and further exploration.

Chapter four presents the empirical framework and methods undertaken by the study. It also explains the data issues including the selection of the Islamic stock markets and the sample period.

Chapter five presents and discusses the findings of the study. Finally, chapter six concludes by summarizing the major findings and discussing the implications and policy recommendations that can be drawn from the study. The chapter also highlights the limitations of the study which serve as the avenues for extension of the study in the future.

2. THE ISLAMIC EQUITY MARKET

2.1 Basic Characteristics of Islamic Equity Market

The Islamic equity market is essentially part of a broader Islamic capital market in which the activities being carried-out are guided by the Islamic law or *shari'ah*. The guidelines governing the Islamic capital markets are derived from the main sources of Islam, namely the holy *Quran* and *sunnah* (traditions of Prophet Muhammad). In applying the relevant guidelines to the actual context of the financial market, Islamic scholars undertake a thorough examination of the relevant guidelines from these sources and establish basic principles that govern the rights and obligations of the participants in the Islamic financial markets. Besides the main sources, *ijtihad* (exertion or logical deduction) is also involved in the *shari'ah* rulings. As a result, some differences may occur in the actual applications of the guidelines as defined by the respective *shari'ah* scholars.

Despite the fundamental differences between the Islamic and conventional capital markets, the Islamic capital market is supposed to perform all the useful functions of the conventional capital markets with justice and equitable distribution of benefits. In essence, the basic difference between the conventional and Islamic capital markets is that all the transactions in the Islamic capital market must be free from elements that could result in exploitation and unfair gains, namely usury/interest (*riba*), excessive ambiguity (*gharar*), and gambling (*maysir*). Involvement in prohibited (*haram*) goods and activities such as alcohol, tobacco, pork-related products, and conventional financial services are not allowed. There is also the need to observe the Islamic tax (*zakat*). As such, the Islamic capital market, in essence, is an ideal capital market that promotes efficiency and sharing of equitable benefits by avoiding injustices and greed driven by the "animal spirit" which aims to maximize individual utility in the conventional sense. An objective and deep understanding of the close adherence to the *shari'ah* guidelines would make one able to appreciate the wider objective of ensuring justice and fairness not only to the market participants, but the society at large.

Participants in the Islamic equity market must observe the norms of Islamic ethics which regulate the transactions in the market in general (Ali, 2005). First, the provision of freedom to contract entails that in Islam, the freedom to enter into transactions should be without any element of coercion for either of the parties. It is important to note that the freedom to trade does not imply unchecked freedom. It may be sacrificed when there is a trade-off with other norms requiring specific injunctions. Second, Islam emphasizes the important role of information in the market and release of inaccurate information is

forbidden. The suppression of vital information (*ghish*) could result in the informationally disadvantaged party at the time of entering the contract to annul the contract. Based on the traditions of the Prophet, vital information refers to price information in the market as well as other information relevant for valuation of the commodity. Since it is quite possible that investors may lack information-processing ability and even if all relevant information were made available to them, they would not be in a position to assimilate and interpret these information and take rational investment decisions. Similarly, investors may overreact to information and behave in an irrational way. In both cases, the provision of "unrestricted" public interest (*maslahah mursalah*) which is a valid framework of the Islamic legislation comes into place to protect the investors in a harmonious way that does not conflict the objectives of *shari'ah* (Kamali, 1988).

Third, Islam envisages a free market where prices are determined by genuine market forces. Forces of demand and supply should be free from any synthetic element or interference even by the regulators such as price control and fixation. Any attempts to influence prices by creating artificial shortage of supply (*ihtikar*) or to bid up prices by creating artificial demand are considered unethical according to the Islamic code of ethics. The provision of public interest calls for efforts to curb monopolistic tendencies and avoid the block of free flow of information in the market place (Kamali, 1988). In short, the provision of entitlement to transact at fair prices must be upheld in the Islamic capital market.

Another important aspect in the Islamic capital market is corporate governance which is accountability and integrity of decision making process. In understanding corporate governance across countries, culture and religion must be kept in view. Some scholars have highlighted the relevance of culture to the development of capital markets. Among the scholars that argue for the significance of culture, some have further suggested that recognizing the national cultures is important before embarking on efforts to reform corporate governance.

2.2 Critical Roles of *Shari'ah* Advisory Council

A distinguished feature of the Islamic capital market compared to its conventional counterpart is the central role played by the *Shari'ah* Advisory Council (SAC) in determining the *shari'ah*-compliancy of every aspect of the transactions. In ensuring that all the transactions undertaken in the Islamic capital market are in accordance to the *shari'ah*, the duties of the SAC include screening the investment products, monitoring the actual applications of the transactions, and updating the allowable investment products in view of the dynamic nature of the financial markets. In the context of the Islamic equity market,

determining the *shari'ah*-compliancy of investment in a particular company's stock is of utmost concern since investments are only allowed in *shari'ah*-compliant stocks. While the rulings undertaken by the SAC are confined to the codified laws (*fiqh*), greater emphasis is given to the wider objectives of the *shari'ah* (*maqasid al-shariah*) in interpreting the rules (Siddiqui, 2006). As such, continuous deliberations on a particular issue will take place by a group of *shari'ah* scholars to ensure that the rules of the *shari'ah* are being followed. The tasks shouldered by the SAC are challenging ones given the inter-temporal nature of economics and social values of countries.

In the screening process, the SAC might decide collectively on the type of screening process to be adopted from the several types of screening and purification criteria that are available. Currently, there is no standardization in the screening criteria to be adopted at the global level. Due to lack of standardization, countries use different screening criteria depending on the decisions of the SAC. For example, the SAC of the Securities Commission of Malaysia decided on the screening criteria which are based on the qualitative and quantitative benchmarks. The qualitative benchmark determines the *shari'ah*-compliancy of the core activities which evaluates the status of *shari'ah*-approved securities based on the primary activity of the companies. Involvement of the primary business in *riba*-based financial services; gambling; manufacture of non-*halal* products; conventional insurance; entertainment activities that are non-permissible according to *shari'ah*; manufacture or sale of tobacco-based products or related products; and stock-broking or share-trading in non-*shari'ah* approved securities are not permissible. Meanwhile, the quantitative benchmark sets the level of tolerance for mixed activities. Several benchmarks have been established based on *ijtihad* and if the contributions from non-permissible activities exceeded the benchmark level, the securities of the company will not be classified as *shari'ah*-compliant. Specifically, the five percent benchmark is set for activities that are clearly prohibited such as *riba'*, gambling, and activities derived from liquor and pork; the ten percent benchmark is set for activities that involve the element of *umum balwa* (a prohibited element affecting most people and difficult to avoid) such as contribution of interest income from fixed deposits placed in conventional banks and tobacco-related activities; the 25 percent benchmark is set for activities that are generally permissible according to *shari'ah* and have an element of *maslahah* such as hotel and resort operations, share trading, stock-broking (Securities Commission of Malaysia, 2006).

Meanwhile, Pakistan screening criteria is based on the Meezan Islamic Fund criteria which screens stocks not only for permissibility of the underlying businesses of the company but also apply balance sheet composition benchmarks to validate trading (Ali, 2005). The *shari'ah*-compliant investments would have to meet five criteria which are approved by the Meeezan Islamic Fund's *shari'ah* advisers, namely, business of the investee company must

be *halal*, interest received must not exceed 45 percent of the total assets of the company, net illiquid ratio to total assets should be less than 10 percent, investment in *shari'ah* non-compliant activities should not exceed 33 percent, while income from such activities should not be greater than 5 percent of the gross revenue, and the net liquid assets per share should not be less than the market price of the share.The quantitative constraints determine the tolerable level of mixed contributions from permissible and non-permissible activities towards revenue and profit before tax of a company.

Apart from the above screening criteria, the Dow Jones Islamic Index Screening is another type of screening criteria which is based on primary business activities and acceptable financial ratios. The primary business activities are based on revenue allocation where the business activities of group or sub-group of companies must be screened from non-*halal* activities such as alcohol, tobacco, and pork-related products. Subsequently, the financial ratios of the company are filtered based on the following: debt to asset ratio must not exceed 33 percent, liquid asset ratio to total assets in terms of cash from interest bearing securities must not exceed 33 percent, and ratio of receivables to assets must not be greater than 45 percent. In most cases, the reviewing process takes place on quarterly interval with implementation being done before the start of the new quarter.

2.3 Islamic Stock Market Indices

As in the case of the conventional stock market, a stock index in the Islamic stock market has the same basic function of providing a benchmark or performance measure for a group of companies' stocks in a specific market. The Islamic stock market index is relatively a new phenomenon in the global capital market prompted by the rapid demand for Islamic investment products. In the post-2000 period, almost all major global index companies started to establish their own benchmark indices for the Islamic equity funds.

The first global index series for the Islamic equity funds was established by the FTSE Group, a London-based independent global index provider, in December 1998. The FTSE Global Islamic Index Series (GIIS) is classified based on industry and region. Currently, the FTSE GIIS has 48 regional indices which include the developed, emerging, Asia Pacific and Middle-east indices, and 47 country indices. The index series adopt screening methodology based on the business activity and financial ratios. In particular, companies under the FTSE Global Equity Index Series (large and mid-cap stocks) universe are being filtered through the business activity screening which exclude companies involved in conventional finance, alcohol, pork-related products, entertainment, tobacco, and weapons, arms and defense manufacturing. Subsequently, the companies are filtered through the financial ratios criteria,

namely, debt must be less than 33 percent of total assets; cash and interest bearing items less than 33 percent of total assets; accounts receivables and cash are less than 50 percent of total assets; and total interest and non-compliant activities income should not exceed 5 percent of total revenue. For the country index, the companies will have to go through the country's specific requirements or filters before being classified as *shari'ah*-compliant counters (FTSE, 2009). For example, the FTSE *Shari'ah* Japan 100 Index represents the top 100 *shari'ah*-compliant Japanese companies by market capitalization that meets the *shari'ah* screening process. The top ten companies included in this index are Toyota Motor, Canon, Nintendo, Matsushita Electric Industries, Mitsubishi Corporation, Takeda Pharmaceutical, Mitsui & Co., Komatsu, Nippon Steel, and NTT Docomo. Sector-wise, the companies included in the FTSE *Shari'ah* Japan 100 Index involve in sectors such as oil and gas products; chemicals; industrial metals; construction and materials; general industrials; electronic and electrical equipments; automobile and parts; household goods; pharmaceuticals; real estate; and technology hardware and equipments.

Soon after the establishment of the GIIS by FTSE, in February 1999, another Independent Global Index Company, namely the Dow Jones & Company, launched the Dow Jones Islamic Market World (DJIM World) index series. The DJIM World index was later expanded to include benchmark indices for specific countries, regions, industries and market capitalization ranges (Dow Jones, 2009). Currently, there are 69 country-level DJIM, with the stocks being included going through the process of screening by an independent *shari'ah* advisory board. The screening criteria adopted by DJIM is based the core business screen (acceptable products and business activities) and financial screen (debt levels, and interest income and expenses). The *shari'ah*-compliancy reviewing process of the investment products are being done on an on-going basis with continuous monitoring to ensure continued compliance. In particular, the composition of DJIM is reviewed on quarterly basis and changes are implemented in the subsequent quarter. An example of the DJIM index is the DJIM Malaysia Titans 25 Index which tracks the top 25 Malaysian companies by market capitalization that passed the screening for *shari'ah*-compliant companies. The companies included in the index series are Sime Darby Berhad, IOI Corp Bhd, MISC Berhad, PPB Group Bhd, Kuala Lumpur Kepong Bhd, DIGI.com Bhd, Gamuda Bhd, Telekom Malaysia Bhd, PLUS Expressway Bhd and Petronas Gas Bhd. Sector-wise, about 40 percent of the companies involved in industries/manufacturing, 35 percent in consumer goods and the rests are in telecommunications; oil and gas; basic materials, financials, health care, utilities, and consumer services.

Continuous demand for the Islamic investment products which results in rapid growth of the Islamic equity market globally motivates other major investment fund management companies to also provide the benchmark indices for the Islamic investment products. The

Standard & Poor's (S&P) company launched its S&P Benchmark *Shari'ah* Indices in 2006 by applying the *shari'ah* screening process to three groups of its benchmark indices, namely the S&P 500, S&P Europe 350, and S&P Japan 500. The resulting *shari'ah* benchmark indices are the S&P 500 *Shari'ah*, S&P Europe 350 *Shari'ah*, and S&P Japan 500 *Shari'ah*, respectively. Later, in 2007, the company introduced more regional *shari'ah* indices, namely S&P GCC *Shari'ah* Index and S&P Pan Asia *Shari'ah* Index amid increasing demand for *shari'ah*-compliant investments in these regions. In line with sustained demand for Islamic investment products, further expansions were made resulting in the indices for the global property markets, the Middle East & North Africa (MENA) and the Emerging markets which are all the results of screening the underlying S&P benchmark indices. S&P's *shari'ah*-screening process is undertaken by an independent *Shari'ah* Supervisory Board affiliated with Rating Intelligence Partners (RI), an independent consulting company providing solutions for the global Islamic investment market. The screening criteria are sector-based and accounting based. The accounting screen in particular, focuses on leverage, cash and share of revenues derives from non-compliant activities. As in the case of the other index providers, *shari'ah* screening is being done on a continuous basis, as such the process also include monitoring the components of the indices to ensure continuous compliant to the *shari'ah* requirements. Any changes, whether to add or delete specific component of the index are incorporated on monthly basis upon the advice of the *Shari'ah* Supervisory Board.

Morgan Stanley Capital International Inc. and Barra Inc. (MSCI Barra) launched its MSCI Global Islamic Indices in March 2007, followed by a full global index family in October 2007. Based on the MSCI Islamic Index Series Methodology, securities from the MSCI Country Indices are screened through the business activity and financial ratios criteria to ensure that they are *shari'ah*-compliant and can be included in the MSCI Islamic Index Series. The reviewing process is done by an independent *Shari'ah* Supervisory Board of *Dar Al Istithmar* based on a quarterly basis where the *shari'ah* advisors would issue a *shari'ah*-compliant certification following any adjustments based on the review. The business activity screening ensures that the companies do not involve directly or derive more than 5 percent of their revenues from the prohibited activities which include alcohol; tobacco; pork-related products; conventional financial services; defense/weapons; gambling/casino; music; hotels; cinema; and adult entertainment. Meanwhile, the financial screening sets the following criteria: total debt over total assets should not exceed 33.3 percent; sum of cash and interest-bearing securities over total assets should not exceed 33.3 percent; and accounts receivables over total assets may not exceed 70 percent. In addition, the dividend being paid out by these companies must be purified from interest income. Currently, the MSCI Global Islamic Indices cover 69 developed, emerging, GCC and Arabian markets.

(Please refer to Appendix 1 for more details of the Islamic Indices provided by the global index providers mentioned in this study).

2.4 Issues Arising from Non-Standardization of Islamic Equity Markets

Compared to other segments of the Islamic banking and finance industry, the Islamic capital market has a relatively slow development due to several factors such as lack of confidence in the *shari'ah*-compliancy of the products due to un-standardized screening criteria, lack of generally accepted operational standards, and weak regulatory environment (Securities and Exchange Commission Pakistan Report, 2007). There are also unresolved regulatory issues that might hinders the efficient functioning of the Islamic capital markets such as protection of investors' interest, participation of the Islamic financial institutions in the capital markets, and slow development of the financial infrastructure to support *shari'ah*-conforming market practices. These issues have called for continuous assessments of the Islamic capital markets with the intention to further develop them in line with the Islamic course and growth objectives.

Above all, the lack of standardization has been the main stumbling block for rapid and healthy growth of the Islamic capital markets. There has been deferring opinions on the issue of *shari'ah*-compliancy of the Islamic capital market products due to the complexity of the modern capital markets which feature complex investment instruments and multi-disciplinary and global involvement of companies (Ulrich & Shehab, 2008). To promote growth of the Islamic equity market, the criteria for determining *shari'ah*-compliancy of the stocks need to be improved and unified across jurisdictions. Standardization is also important to the fund managers so as to benefit from economies of scale. Presently, the Islamic capital markets are segmented across countries and regions, thus reducing the effective available size and risk–return spanning possibilities to investors. For example, in the sector screens, one screening criteria eliminates companies with any involvement in non-compliant activities, whereas the other group allows the inclusion of companies whose core business is *halal* but receives a negligible portion of revenue from non-compliant activities. If companies involved only slightly in non-compliant activities are to be excluded, the *shari'ah*-compliant asset universe is reduced greatly in size since businesses such as airlines, hotels and wholesalers, who all sell alcohol, would be considered non-compliant. Also, concerning the threshold values used to measure the liquidity level of companies, a larger threshold dispersion ranging from 33 to 80 percent is found among the different screening guidelines independently from the liquidity rule used (Usmani, 2002).

Another important implication for the different screening methods and its respective ratio value is the lack of confidence in the *shari'ah*-compliancy of the products across national borders. The un-standardized screening methods result in inconsistency in the outcome whereby a company might be considered as permissible based on one method, but non-permissible using the other method. Thus, in terms of defining a company as *haram* owing to the fact that the company is, to a certain extent, engaging in a non-*shari'ah* compliant business is actually subjective. For instance, if a company is generating any revenue from the sales of alcohol it will be excluded from the *shari'ah* approved but if its income from such activities is less than a certain percentage, it becomes permissible. Since the thresholds defined are based on interpretation in the form of *ijtihad* and *shari'ah* statements that are not directly related to capital markets, there is some degree of freedom that scholars might use to specify their quantitative criteria (Wilson, 2004).

In short, the use of different guidelines generally results in different classifications of companies into *shari'ah* approved or not. Such an inconsistency can contribute to insecurity and distrust of Islamic investors and thereby hinders further development of the Islamic capital markets and the attraction of larger investments. In efforts to facilitate flows of Islamic funds across the national borders, standardization of the *shari'ah* rules that apply to global Islamic capital markets is clearly warranted. A clear picture of the operations of the market should be put in place for investors' decisions and education.

Currently, a unification or application of a common standard to determine the *shari'ah*-compliancy of the Islamic capital market products still has a long way to go. The OIC *fiqh* academy provided some guidelines, while the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) *shari'ah* standards clearly state the standard that only deals with contractual form and not regulatory policies and procedures needed for operation in the market. In essence, more is still needed to be done in this regards. Nonetheless, efforts are being taken to address this issue. The setting up of the Islamic Capital Market Task Force of the International Organization of Securities Commissions is a bold effort towards standardization in the various aspects of the Islamic capital market including the screening criteria. The task force which is chaired by the Securities Commission of Malaysia has come up with the *Islamic Capital Market Fact Finding Report* (2004). There are also suggestions to set up an institution for global standardization to simplify the decision on the *shari'ah*-compliance of a financial product to interpret the different *shari'ah* sources and to specify a set of checkable *shari'ah* guidelines, or screens, to be used to distinguish between the set of *shari'ah*-compliant products and those that are not (DeLorenzo, 2000). The existence of a globally accepted standardized screening process for the Islamic stock market would contributed towards increased investors' confidence and healthy growth of the Islamic stock market industry. Therefore, the development of a unified

and standardized screening framework which takes into account the different existing *shari'ah* guidelines and allows a controlled and understandable classification will certainly enrich the credibility and consistency of Islamic equity products. This will bring about a unified standard for *shari'ah* permissibility and approval.

3. LITERATURE REVIEW

This chapter reviews the existing literature on stock market integration, emphasizing on its conceptual understanding as well as its implications on the financial markets and to the policymakers. To ensure relevance to the context of this study, the issue of integration among the stock markets during financial crises is also being assessed. The initial focus of the review is on the conventional stock markets, followed by the Islamic stock markets. By undertaking a thorough review of the literature, this study aims to provide a clear understanding on the issue of stock market integration, the important information that it conveys and its enormous implications on the financial markets.

3.1 Implications of Stock Market Integration

The nature of integration among stock markets conveys several important information for effective market strategizing and policy making. For the industry players, clear understanding about the nature of integration among the stock markets is crucial in setting investment strategy when diversifying in the international stock markets. Meanwhile, for the policymakers, information about the nature of stock market integration provides the relevant input on designing policies to ensure healthy growth of the Islamic financial markets.

First, integration of the stock markets essentially indicates the efficieny of the financial markets. According to the efficient market hypothesis, an efficient financial market is characterized by its ability to adjust rapidly to new information (Fama et al., 1969). Therefore, prices of assets in an efficient financial market are fully reflective of all the available information and as such, are consistent with the economic fundamentals (Beechey et al., 2000). In the context of market integration, theoretically, assets in completely integrated markets have similar expected returns due to the same risks exposure (Bekaert and Harvey, 1995). While complete integration among stock markets indicates efficiency, it also suggests that these markets offer no diversification benefits as the markets' performance tend to be similar. In a risk-return framework, an investor can increase return or reduce risk, or both, by having an investment mix in stock markets which returns are uncorrelated. Thus, the degree of stock market integration suggests the potential portfolio diversification benefits that can be gained by the investors (see, for example, Grubel, 1968; Taylor and Tonk, 1989; Campbell and Hamao, 1992; Fischer and Palasvirta, 1990).

Theoretically, it has been well-established that diversification enables investors to expand their portfolio frontiers (Markowitz, 1952; Tobin 1958). In this regard, knowledge

about stock market integration is one of the key success factors for investors, fund managers and other market players who are seeking to diversify their investments and make capital budgeting decisions in the international stock markets. Investors could benefit from the information about stock market integration to set investment strategies based on the potential benefits that can be gained by diversifying in different stock markets. The seminal work of Grubel (1968) analyzes the stock markets in ten developed countries and shows that a domestic investor (in the New York Stock Exchange) can increase his annual returns by as much as 68 percent while keeping his risk constant by diversifying internationally. The benefits of diversifying in the international stock markets are further emphasized by Levy and Sarnat (1970) which highlight how knowledge about stock market integration helps investors to benefit by diversifying in the emerging markets.

Second, as information about stock market integration implies the capital market efficiency, understanding the extent of the integration is highly relevant in the context of countries aiming for macroeconomic harmonization. In countries aiming for economic integration, investors are able to allocate capital in highly productive market without having to incur high transaction cost. The outcomes of an integrated stock markets bring about by financial sector integration are improved liquidity and increasing economic activities among the member countries. As such, each member country aims for efficient capital market in efforts to attract investors into the market. In the context of economic integration, the stock markets would become increasingly integrated due to efforts to increase financial market integration through measures such as abolishing capital restrictions, lowering transaction costs and improving transmission of information which is commonly part of the efforts towards macroeconomic integration. In short, financial market efficiency is considered as a pre-requisite for macroeconomic harmonization in the regional integration process as it helps to facilitate the real sector integration. For instance, ASEAN's objective to establish the ASEAN Investment Area (AIA) by 2010 would require efforts to increase the efficiency of the financial sector in the region and would result in further integration of the member countries' stock markets (Click and Plummer, 2005).

Third, since stock market integration to a large extent implies financial sector integration, information about stock market integration is particularly relevant to the policymakers in designing policies to safeguard the stability of the financial sector and the economy in general. Careful policy safety-nets can be designed in the context of regional grouping to avoid the vulnerability of the economy to the international financial shocks. The degree of stock markets integration signals the extent of financial sector integration, which reflects the vulnerability of the countries to experience "financial contagion" (Ibrahim, 1999; Tai, 2004). As two stock markets could be highly integrated due to strong economic ties such as trade and investment as well as due to macroeconomic policy harmonization,

adverse development in a financial system could well be transmitted to another - a systemic shock. One such example of the financial contagion was the experience of the developing Asian countries during the financial crisis in 1997/1998. The crisis which started with the de-valuation of the Thai baht was transmitted throughout the region due to the strong trade and investment links among the countries during the period. Therefore, the need to understand clearly the nature of stock markets integration is crucial to the policymakers so as to remain vigilant and undertake pre-emptive measures to prevent the systemic shocks.

3.2 Integration among Conventional Stock Markets

In view of its importance, stock market integration has captured substantial research interests as evidenced by the voluminous studies on various aspects of this topic. Pioneering studies have mainly focused on the stock market integration in the developed countries, particularly the US. Originating with the extension of Markowitz's (1952) modern portfolio analysis by Grubel (1968) on the US market, considerable studies have been undertaken to determine the benefits of international portfolio diversification. Diversification into the developing stock markets is also shown to increase return to the investors as shown by Levy and Sarnat (1970) in their study which includes a larger sample, comprising of both the developed and developing countries' stock markets. Solnik (1974) which focuses on the US, Japan and nine European markets in the period from 1966 to 1971 lends further support to the earlier studies as it finds substantial benefits to be gained by diversifying in the international stock markets.

Later studies on integration among the developed stock markets document increasing international links over time, thus, diminishing the benefits of diversifying in these markets. For example, Taylor and Tonk (1989) focuses on five major stock markets, namely UK, Germany, the Netherlands, Japan and the US in the 1980s and find increased integration, thus lower diversification benefits for investors in these markets due to the continuous efforts of financial sector liberalization in these countries. Similarly, Blackman et al. (1994) show that the gains from international portfolio diversification in the developed markets are actually lower in the 1980s compared to in the 1970s. Hanna et al. (1999) which focus on six developed markets, namely France, Germany, Italy, Japan, Canada, and the UK in the period 1988-1997, find that the returns for the US investors turned out to be lower by diversifying in these markets. More conclusively, Goldstein and Mussa (1993), through their extensive survey on the global stock markets concluded that the international stock markets are becoming increasingly integrated, particularly the major financial centers. In line with the efficient market hypothesis, the increasingly integrated nature among the developed stock markets is mainly attributed to the various financial reform efforts to promote economic

efficiency such as lesser regulatory restrictions and rapid technology improvements which reduce the transaction costs in the financial markets. Due to the declining benefits of diversification in the equity market particularly for the US investors, Eun and Resnick (1994) suggest that bonds should be seriously considered as a hedging mechanism for achieving the benefits of international diversification.

The growing empirical evidences pointing towards increased integration among the developed stock markets, coupled with the rapid economic growth in the developing countries have gradually shifted the research interests on stock market integration to the developing stock markets particularly in the 1990s. The study by Barus (1997) on the founding ASEAN members, namely Indonesia, Malaysia, Thailand, Singapore and the Philippines finds that these markets are segmented, thus providing diversification benefits for the investors. Palac-McMiken (1997) finds that the Indonesian stock market is still providing potential diversification benefits to the investors, but not the rest of the ASEAN member as empirical evidence shows that the markets of other ASEAN members are co-integrated. Other studies such as those by Wongbangpo (2000) and Ibrahim (2000) arrive at similar findings and maintain that there are large potential diversification benefits in the developing stock markets. However, in the post-2000 period, empirical studies have documented increased integration among the developing stock markets with the world's major stock markets. For example, Dunis and Shannon (2005) examine the integration between the emerging markets in South East Asia (Indonesia, the Philippines and Malaysia) and in Central Asia (Korea, Taiwan, China and India) with the developed markets (the United States, the United Kingdom and Japan) and find that all seven emerging markets in South East Asia and Central Asia exhibit greater integration with the Japan stock market rather than with the other two established markets.

Over the years, the empirical methods of assessing segmentation or integration among stock markets have also evolved, largely depending on the aspect of market integration that is of interest. Earlier studies have largely rely on descriptive analysis such as correlations among mean returns (see, for example Grubel, 1968), with the aim of determining the potential diversification benefits for investors in investing in various stock markets. The use of the traditional Fama-McBeth (1973) cross-sectional approach is also common as in Stehle (1977). A strand of studies focusing on stock market integration or segmentation based on the Capital Asset Pricing Model (CAPM), with integration is defined as investors earning similar risk-adjusted expected return on a financial investment in different national markets (see, for example, Kohlhagen, 1983). The CAPM model however, is based on the restrictions that rule out the different impact of national versus global factors on the pricing of assets. The Arbitrage Pricing Theory (APT) is an extension to the CAPM that deals with restrictions on asset pricing. For example, Jorion and Schwartz (1986) suggest the adoption

the APT model as the CAPM is found to be insufficient to explain the integration of the Canadian and US equity markets over the period 1968 to 1982. The study classifies barriers to international investment into “indirect barriers” which are international factors and “legal barriers” which are considered as purely national factors suggest that clear distinction between the national and international factors affecting the pricing of Canadian securities are important determinants affecting market segmentations and must be accounted in the modeling. With the frequent incidences of global financial crisis, the economic aspect of market integration has been compelling to the researchers. As such, more recent studies on stock market integration has been adopting the sophisticated time series econometric approach that determines common stochastic trends among the stock markets (see, for example, Kasa, 1992; Marashdeh and Shrestha, 2010; Abd. Majid et al., 2008).

3.3 Stock Market Integration and Financial Crisis

While most of the studies suggest increasing integration among the global stock markets due to reduced transaction costs in the financial sector, it is important to note that the nature of integration among the stock markets is sensitive to the global financial events, particularly during the “down market”. The study by Bekaert and Harvey (1995) emphasizes that the nature of stock market integration is time-variant. Focusing on twelve emerging stock markets, the study shows that a number of the stock markets are segmented in one part of the sample and become integrated in another sample period. A plausible reason for this observation could be attributed to regulatory changes such as the lifting of capital market restrictions to foreign investors. The study also shows that the degree of stock market integration could very well depend on the global economic and financial shocks. Several studies asses the changes in the nature of stock market integration due to financial crises, aiming at finding evidence of international transmission of financial shocks through the stock markets (see, for example, King et al., 1994; Longin and Solnik, 1995; Karolyi and Stulz, 1996; Solnik et al., 1996; Ramchand and Susmel, 1998; Chesnay and Jondeau, 2001; Ang and Bekaert, 2002). A review of the studies consistently reveals the time-varying aspect of stock market integration and that the nature of stock market integration changes due to the financial crises. Essentially, the stock markets tend to move in unison during a down market, but exhibit low integration during normal times.

The Asian financial crisis 1997 has fuelled the interest on the Asian stock markets, particularly on the impact of the financial crisis on the stock market integration. Generally, the crisis was found to have a deep imprint on the nature of integration among the Asian stock markets. The study by Click and Plummer (2005) finds that the major ASEAN stock markets have becoming increasingly integrated in the post-crisis period compared to the pre-

crisis period. The increased stock market integration is proposed to be facilitated by the on-going efforts to expedite financial market integration and efficiency in the region after being hit by the crisis. Similarly, Abd Majid et al. (2008) examine market integration among five founding ASEAN members, namely Indonesia, Malaysia, the Philippines, Thailand and Singapore and their inter-linkages with two established equity markets, namely the US and Japan for the period before and after the financial crisis. The study documents consistent evidence of greater integration among the ASEAN stock markets and the two major markets particularly in the aftermath of the 1997 financial crisis.

Apart from increasing integration during, financial crisis also gives impact on the direction of causality between stock markets. The study by Cheung et al. (2007) on the integration among the Asian and US markets shows that while the US market is significant in causing the Asian markets in three sub-periods, there is evidence of reverse causality in during the crisis period. In particular, the Asian markets are found to be significant in causing the US market during the crisis period, but not in the pre- and post-crisis periods. Ibrahim (2004) assesses the integration among the ASEAN equity markets together with the US and Japan prior to the 1997 Asian financial crisis and post crisis where the capital controls were imposed. The findings show that there were significant short-run dynamic interactions among ASEAN regional markets through a variety of sample periods. Consistent with the previous findings, the US market appears to be the market that produces the highest volatility transmission effects towards ASEAN market than Japan equity market. Similar findings by Royfaizal et al. (2007) on ASEAN-5+3 countries (Malaysia, Singapore, Thailand, Indonesia, Philippines, Japan, Korea and China) and the US stock market integration during the Asian financial crisis suggest similar findings that the stock markets become increasingly integrated during the crisis. The inclusion of the US stock market into the model has increased the degree of integration among these stock markets, implying that the US stock market does not provide benefits of portfolio diversification for the investors.

Yang et al. (2002) focus on ten Asian, the US and Japan stock markets in the pre, during and post-Asian 1997 financial crisis in efforts to evaluate how the integration among the stock markets are affected by the crisis. In line with the general findings in the literature, the study finds that the integration among the stock markets is stronger during the crisis. The study also documents greater integration in the period after the crisis than before the crisis. During a financial crisis, financial shocks can easily be propagated in highly integrated stock markets in the form of financial contagion, leading to market crash in the crisis-hit countries (Gosh et al., 1999; Sheng and Tu, 2000). Similarly, Jang and Sul (2002) analyze the nature of integration among seven Asian stock markets and further categorized these countries into “direct crisis countries”, namely Thailand, Indonesia and Korea, and “neighboring countries”, namely Japan, Hong Kong, Singapore and Taiwan. The study considers three

sample periods, namely the pre-crisis, during crisis and post-crisis in efforts to study the impact of the Asian crisis on the integration of these countries. The study finds that the financial crisis has a deep impact on the integration of the stock markets whereby drastic increase in integration among the markets was noted during the crisis period. The strong co-movements among the stock markets remained even after the crisis period.

Besides studying the impact of the crisis on the integration of the stock markets, several studies how the dominance effect of the established stock market on the smaller markets changes due to the crisis. The study by Dunis and Shannon (2005) which examines the integration between the emerging markets in South East Asia (Indonesia, the Philippines and Malaysia) and in Central Asia (Korea, Taiwan, China and India) with the established markets (the US, the UK and Japan), find that all seven emerging markets exhibit greater integration with the Japan stock market rather than with the other two established markets. The influence of the US stock market on the emerging economies seems to diminish over more recent years. Consistent with the findings of Dunis and Shannon (2005), the study by Mohd Yusof and Abd. Majid (2006) finds that between the US and Japan stock markets, the latter seems to significantly lead Malaysia's stock market after the 1997 Asian financial crisis. By employing the techniques of co-integration, variance decomposition and impulse response function, the study investigates the dynamic interdependence of Malaysia's stock market in the two established stock markets. The increased integration between the Malaysian and Japanese stock markets could be attributed to the increasing trend of bilateral trade between these two countries over the years.

3.4 Integration among Islamic Stock Markets

While there is a rich literature collection on various aspects of integration among the conventional stock markets, similar studies on the Islamic stock markets are still scarce due to the relatively new nature of the Islamic finance industry compared to its conventional counterpart. However, the growing global presence of the Islamic finance industry has captured the research interest on the Islamic stock markets. Currently, it is encouraging to note that efforts to expand knowledge in this area is rapidly growing amid the increasing interests on the Islamic stock markets particularly in the post-2000 period which is further fuelled by the recent failure of the conventional financial system.

Several studies analyze the nature of integration among the Islamic stock markets within a particular economic grouping, with the common interests of stock markets in the middle-east and Gulf area. For example, Darrat et al. (2000) analyze the major stock markets in the middle-east and north-African countries (MENA), namely Egypt, Morocco and Jordan

and find that these markets are integrated among themselves but not with the major world stock markets. Marashdeh (2005) includes more stock markets in the MENA region, namely Egypt, Jordan, Morocco and Turkey and three developed stock markets, namely the US, UK and Germany. The study applies the ARDL approach on monthly data covering the period from December 1994 to June 2004 and documents similar findings as that of Darrat et al. (2000) that there is integration among the regional stock markets, but segmentation from the developed stock markets. Later, Nauceur et al. (2006) conduct an intensive study of 11 MENA countries over the period from 1979 to 2005 and focus on a more general discussion of the relationship between stock market liberalization and economic growth. While the study fails to find any significant relationship between stock market liberalization and private investment and growth, imposing certain pre-conditions prior to liberalizing the stock market such as less government intervention would reinforce the positive impact of liberalization on stock market development.

There are also scores of empirical analysis on the stock markets in the Gulf countries. Hassan (2003) investigates the long-run relationship of share prices among Kuwait, Bahrain and Oman stock markets and finds that there are potential diversification benefits for investors in this region. Based on the multivariate co-integration analysis, the study finds the existence of long-run relationship between Kuwait and Bahrain stock markets, while the stock market of Oman is exogenous. The study indicates that investors in the Gulf region could benefit by diversifying in these markets and greater efficiency can be achieved by liberalizing the market at least for the GCC nationals. More liberalized stock markets in the GCC countries would go in line with the objective of establishing a single stock market under the proposed Arab Monetary Union. Further financial sector liberalization measures are also needed so as to minimize the adverse affect of oil price shocks since these economies have common dependencies on oil and oil products. In a related study, Bley and Chen (2006) investigate the market dynamics and interactions between members of the GCC countries , namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates over two sub-periods, January 2000 to June 2002, and July 2002 to September 2004. The second sub-period includes January 2003 when the GCC custom union was launched by the GCC leaders. The US and UK stock markets are also included since these are the two major world stock markets. Based on the impulse response functions and variance decomposition analysis, the study finds that the regional stock markets is getting increasingly integrated with each other due to the on-going attempts to synchronize macroeconomic policy in the advent of the economic union and single currency area. These markets, however, are providing potential diversification benefits to the US and UK investors since empirical evidence points towards no integration between these markets and those of the developed countries. A more recent study by Marashdeh and Shrestha (2010) explores the nature of integration among six GCC countries, namely Bahrain, Kuwait, Oman,

Saudi Arabia, Qatar and United Arab Emirates as well as two developed markets of the US and Europe. Employing the ARDL approach to cointegration on monthly stock price indices on more recent data of 2002 to 2009, the study provides empirical evidence of potential portfolio diversification benefits within the GCC region as well as between the GCC and the developed stock markets.

Meanwhile, Shachmurove (2001) studies the dynamic co-movements among the stock indices of the emerging middle-east markets, namely Egypt, Israel, Jordan, Lebanon, Morocco, Oman and Turkey. The study includes the US as the major world stock market. The study employs the VAR and Bayesian VAR models in understanding the dynamic co-movements between these markets on daily data over the period of 22 October 1996 to 30 September 1999. The results show that the dynamic linkages among the stock markets are relatively small, indicating the potential benefits of portfolio diversification in these stock markets. The study implies that the economies could benefit by further liberalizing their stock markets by making their stock markets more accessible to the international investors. This calls for the adaptation of legal and regulatory framework including higher transparency, internal control rules and banning insiders' trading to protect the interest of the international investors. Also, privatization and establishing full currency convertibility would help to increase the attractiveness of these markets to the international investors.

The study by Ceylan and Dogan (2004) focuses on the stock markets of selected OIC countries, namely Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Pakistan and Turkey. With the objective of determining the impact of the September 11, 2001 event on the Islamic stock markets, the study focuses on daily stock markets data over two sub-periods: 31/12/1999 to 10/8/2001 for the pre-September 2001 period and 1/11/2001 to 24/2/2004 for the post-September 11 period. The results based on the co-integration test and dynamic OLS model suggest that these stock markets have become more integrated following the September 2001 incident. The study suggest further exploration in terms of standardization issues, surveillance matters, impediments on fund transfers and settlement of traded instruments to shed some lights in understanding the increased linkages among these stock markets.

Studies focusing on the Islamic stock markets which cover a wider geographical area beyond the MENA and Gulf regions are very few. The study by Abd. Majid et al. (2007) includes the Islamic stock markets from more countries which cover wider geographical area compared to that of Ceylan and Dogan (2004). Focusing on eight Islamic stock markets which can be categorized according to regions, the stock markets included are Turkey, Egypt, Oman and Kuwait (representing the MENA region), while Malaysia, Indonesia, Bangladesh and Pakistan (representing the Asian region). Daily stock markets data for the period

spanning from 1/1/2002 to 31/5/2006 were analyzed based on the methods of co-integration and vector auto-regression. Apart from integration among the developing stock markets, the study also assesses the degree of integration between these markets with the world's three largest stock markets, namely the US, the UK and Japan. The study documents greater integration among the stock markets which are located in the Asian region, i.e., the stock markets of Malaysia, Indonesia, Bangladesh and Pakistan, while the stock markets in the Turkey, Egypt, Oman and Kuwait (countries in the MENA region) are segmented. Based on the findings, the study highlights the importance of geographical proximity as the determining factor in influencing integration with the developed stock markets. In particular, the Islamic stock markets in the Asian region are found to be more responsive to shocks in the Japanese market, while those in the MENA region are more responsive to shocks in the UK market.

At this juncture, it is also relevant to highlight other aspects of research interest on the Islamic stock markets. The study by Hakim and Rashidian (2004) tackles the fundamental issue of how the restrictions in the Islamic stock market index gives impact on performance of the Islamic index compared to the conventional index. In particular, the study compares between the DJIMI and the Wilshire 5000 Index (W5000) in terms of risk and return. The study also aims to determine if the DJIM is less diversified compared to the W5000, how this affects risk and return and the possible correlation that exist between the two indexes. Applying the co-integration and causality tests on daily data spanning from 10/12/199 to 9/4/2002, the results show that there is no link between the DJIMI and the W5000, as well as between the DJIMI and the 3-month T-Bill (as a proxy for the risk-free rate). The results also reveal that, contrary to the W5000, the DJIMI is largely exogenous, that is it is influenced by other factors than the broad market or interest rate. The risk profile of the DJIMI is found to be different from that of the W5000. More importantly, the study documents that the restrictions due to the screening or filtering process have not adversely affect the performance of the DJIMI.

The study by Hussein (2004) arrives at similar findings. The study examines the impact of *shari'ah*-screening on the performance of the Islamic stock market by comparing the performance of the FTSE Global Islamic Index and the DJIM Index with their conventional counterpart indices (FTSE All-World Index and Dow Jones World Index). By dividing the sample into the bull and bear i.e., the first bull period: December 1993-December 2000, the bear period: December 2000-September 2002, and the second bull period: September 2002-December 2004, the study intends to capture the impact of macroeconomic conditions on the returns of the Islamic stock markets relative to the conventional stock markets. Results of the study suggest that the application of the *shari'ah* screens does not have adverse impact on

the Islamic indices performance. The Islamic indices were shown to perform better during the bull market, but underperform the conventional indices during the bear market.

As mentioned earlier, at the moment, empirical studies on the integration of the Islamic stock markets during the 2007 global financial crisis, to the best of our knowledge, has been non-existent. This is largely attributed to the rather recent nature of the global financial crisis. In this regard, this study is regarded as a pioneering study on the impact of the 2007 global financial crisis on the integration of the Islamic stock markets.

4. METHODOLOGY

4.1 Data Description

In analyzing the nature of integration among the Islamic stock markets, seven Islamic stock indices are carefully chosen to be included in the analysis. The Islamic stock markets and their respective indices being selected are as follows:

(i)	Indonesia (INA)	:	Jakarta Islamic Stock Index (JAKIS);
(ii)	Kuwait (KWT)	:	Dow Jones Islamic Index of Kuwait (DJIMKW);
(iii)	Malaysia (MY)	:	Dow Jones Islamic Index of Malaysia (DJIMY);
(iv)	Turkey (TKY)	:	Dow Jones Islamic Index of Turkey (DJIMTR);
(v)	Japan (JAP)	:	Dow Jones Islamic Index of Japan (DJIJ);
(vi)	UK	:	Dow Jones Islamic Index of UK (DJIUK); and
(vii)	US	:	Dow Jones Islamic Index of America (IMUS).

The selection of these stock markets is based on several factors. First, the stock markets cover a wide geographical area which contributes to the novelty of this study. In particular, the stock markets selected represent major Islamic stock markets across the globe, with Indonesia, Malaysia and Japan representing the Asian region, Kuwait and Turkey representing the MENA region, UK representing Europe and lastly, the US representing the American region. In addition, this study covers a greater number of Islamic stock markets compared to the earlier studies on the Islamic stock markets (see for example, Ergun and Mohd Nor, 2009; Hassan, 2003). The stock markets from the countries selected in this study can also be categorized according to the countries' level of development. In particular, Indonesia, Malaysia, Kuwait and Turkey are Islamic stock markets from the developing countries, while Japan, UK and the US are from the developed countries. The developing stock markets can further be categorized based on proximity to major financial centers, where the stock markets of Indonesia and Malaysia are closer to the Japanese market, while Kuwait and Turkey are closer to the UK market. The categorizations would allow the determination if the level of development and geographical factor have significant influence on the responses of these stock markets to the global financial shocks.

Data on weekly closing stock indices of the seven Islamic stock markets are gathered from the *Bloomberg Database* covering the period from January 9, 2005 to January 10, 2010. The selection of the beginning of the sample period is strictly due to data availability for all seven stock indices, while the ending period includes the latest available data at time of the data collection to enable the latest economic and financial development being included

into the analysis. Since the study intends to analyze the impact of the financial crisis on the integration of the stock markets, the period of analysis is being divided into two sample periods: pre-crisis period - from January 9, 2005 to July 22, 2007 and during the crisis period - from July 29, 2007 to January 10, 2010. The date for the during the crisis period is based on the U.S. sub-prime mortgage crisis which started on July 26, 2007 as stated by the existing studies on the 2007 global financial crisis (see for example, Dungey et al., 2008). All these indices are denominated in local currency units, from which the Islamic stock returns for these markets are calculated.

4.2 Methods of Investigations

Apart from the simple descriptive data analysis frequently adopted by studies on stock market integration, this study relies on two major time-series investigation techniques, namely the Auto-Regressive Distributed Lag (ARDL) approach and multi-variate Vector Error Correction Mechanism (VECM) based on the Generalized Method of Moments (GMM). The suitability of these techniques in investigating stock market integration is manifested by several studies which adopted these techniques such as Abd. Majid et al. (2008), Marashdeh and Shrestha (2010), Jang and Sul (2002), just to name a few. The ARDL approach is used to determine the existence of long-run integration among the stock markets, while the multi-variate VECM based on the GMM is adopted to provide a robust analysis of short and long-run dynamic causal linkages among the stock markets. The adoption of the two-step estimation of ARDL approach to cointegration and GMM is suitable for the purpose of this study as the ARDL is able to detect whether the integrated markets exist or not in the sense that there is a tendency of a long-run equilibrium relationship among the markets to move together in the long-run, while allowing for deviations from the short-run equilibrium. On the other hand, the GMM estimation has more flexibility and no stringent assumption as compared to other estimations such as the Ordinary Least Squares (OLS) and Maximum Likelihood (ML). It also has a strong distributional assumption such as error terms, u_t is not necessarily normally distributed (Ogaki, 1993). Thus, the market integration is tested in the first step with the ARDL, whereas the dynamic causal relationships among the markets are estimated simultaneously in the second step based on VECM which is estimated using GMM.

4.2.1 ARDL Bound Testing Approach

To examine the long-run relationship among the markets, this study employs the ARDL bound testing approach to cointegration which involves estimating the conditional error correction version of the ARDL model (Pesaran et al., 2001). The choice of ARDL approach

in this study is based on consideration of cointegration analysis are unbiased and efficient given the fact that, firstly, it can be applied to a small sample size study (Pesaran, et al., 2001) and therefore conducting bounds testing will be appropriate for the present study. Secondly, it estimates the short- and long-run components of the model simultaneously, removing problems associated with omitted variables and autocorrelation. Finally, it can distinguish between dependent and independent variables (Narayan, 2004).

In this study, we estimate the following baseline model:

$$MY_t = \alpha_0 + \alpha_1 INA_t + \alpha_2 TKY_t + \alpha_3 KWT_t + \alpha_4 US_t + \alpha_5 UK_t + \alpha_6 JAP_t + \epsilon_t \quad (1)$$

where *MY, INA, TKY, KWT, US, UK* and *JAP* refer to the Islamic stock markets of Malaysia, Indonesia, Turkey, Kuwait, US, UK and Japan, respectively, and ϵ_t is the error term for the model.

The error correction version of the ARDL framework pertaining to Equation (1) can be reproduced as follows:

$$\Delta MY_t = \delta_0 + \sum_{i=1}^{p} \varepsilon_i \Delta MY_{t-i} + \sum_{i=0}^{p} \phi_i \Delta INA_{t-i} + \sum_{i=0}^{p} \varphi_i TKY_{t-i} + \sum_{i=0}^{p} \gamma_i \Delta KWT_{t-i} + \sum_{i=0}^{p} \mu_i \Delta US_{t-i} + \sum_{i=0}^{p} \nu_i UK_{t-i} + \sum_{i=0}^{p} \pi_i \Delta JAP_{t-i}$$

$$+ \lambda_1 MY_{t-1} + \lambda_2 INA_{t-1} + \lambda_3 TKY_{t-1} + \lambda_4 KWT_{t-1} + \lambda_5 US_{t-1} + \lambda_6 UK_{t-1} + \lambda_7 JAP_{t-1} + u_{1t} \quad (2)$$

In the above equation, the terms with the summation signs represent the error correction dynamic while the second part (term with λs) correspond to the long run relationship. The null of no cointegration in the long run relationship is defined by H_0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = 0$ is tested against the alternative of H_1: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq 0$, by the means of familiar F-test. However, the asymptotic distribution of this F-statistic is non-standard irrespective of whether the variables are *I*(0) or *I*(1). Pesaran et al. (1996) have tabulated two sets of appropriate critical values. One set assumes all variables are *I*(1) and another assumes that they are all *I*(0). This provides a bound covering all possible classifications of the variables into *I*(1) and *I*(0) or even fractionally integrated. If the F-statistic lies above the upper bound level, then the null is rejected, which indicates the existence of cointegration. While if the F-statistic falls below the bound level, the null cannot be rejected, which supporting no cointegration exist. If, however, it falls within the band, the result is inconclusive.

Finally, in order to determine the optimal lag-length incorporated into the model and to select the ARDL model to be estimated, the study employs the Akaike (1974) Information Criterion (AIC) with the maximum lag-length to be considered as 8.

4.2.2 Generalized Method of Moments (GMM)

This study investigates the short- and long-run relationships among five selected Islamic stock market worldwide. In so doing, the study estimates the equation (3) by GMM estimation, where the error correction terms are incorporated in the models. Based on Hung and Cheung's (1995) study on five variables Johansen-Juselius cointegration test, the VECM representation can then be reformulated in a simple matrix form as follows:

$$\begin{bmatrix} \Delta MY \\ \Delta INA \\ \Delta TKY \\ \Delta KWT \\ \Delta US \\ \Delta UK \\ \Delta JAP \end{bmatrix} = \begin{bmatrix} \delta_0 \\ \delta_1 \\ \delta_2 \\ \delta_3 \\ \delta_4 \\ \delta_5 \\ \delta_6 \end{bmatrix} + \sum_{i=1}^{k} \Gamma_i \begin{bmatrix} \Delta MY \\ \Delta INA \\ \Delta TKY \\ \Delta KWT \\ \Delta US \\ \Delta UK \\ \Delta US \end{bmatrix}_{t-k} + \Pi \begin{bmatrix} MY \\ INA \\ TKY \\ KWT \\ US \\ UK \\ JAP \end{bmatrix}_{t-1} + \begin{bmatrix} \nu_0 \\ \nu_1 \\ \nu_2 \\ \nu_3 \\ \nu_4 \\ \nu_5 \\ \nu_6 \end{bmatrix} \qquad (3)$$

Since the Equation (3) considers the possibility of the past level of parameters to have an effect on current changes in other parameters, the lagged values have to be incorporated in the models. In this study, the Akaike (1974) Information Criterion (AIC) is used to determine the lag length incorporation in the entire tests of this study.

It is important to note that for the GMM estimator to be identified; there must be at least as many instrumental variables Z as there are parameters θ. Following Lee and Lee (1997), this study used lags of explanatory variables as the instrumental variables. These variables were opted for use because of the difficulty in finding other instrument variables, as our study utilized daily data and for an extended period. These variables are, however, obvious instruments and in most cases, should be included in the instrumental list. Another important aspect of specifying GMM is the choice of the weighting matrix to yield a consistent and robust estimate. To get a robust estimate to heteroskedasticity and autocorrelation of unknown forms, the covariance matrix of the orthogonality conditions is estimated as suggested by Newey and West (1987) using Barlett estimators,[1] while the lag truncation parameter is estimated as suggested by Newey and West (1994) with a fixed bandwidth,[2] following the study of Heinesen (1995). In addition, the pre-whitening process is run to soak up the correlation in the moment conditions prior to the GMM estimation.

[1] We have also tried the quadratic spectral (QS) kernel estimation as suggested by Andrews (1991); the estimation results are very much the same.
[2] More specifically, it is estimated solely based on the number of observations in the sample. We have also tried bandwidth selection as suggested by Andrews (1991); the estimation results are very much the same.

5. RESULTS AND DISCUSSION

5.1 Basic Descriptions

Figure 1 presents the graphical plots of the seven Islamic stock indices being considered in this study over the whole sample period of 9 January 2005 to 10 January 2010. The Islamic stock indices seemed to be on a stable increasing trend except for several "blips" in April 2006 (due to continuous increase in oil prices) and July 2007 (due to the US sub-prime crisis). In particular, following the decline in July 2007, the Islamic stock markets showed greater volatility with a continuous decline in 2008. There is a clear general decline in the Islamic stock indices in January 2009 as the global financial market remained depressed in the aftermath of the global financial crisis. Despite some signs of recovery, the stock indices have remained below the highest level in 2007.

Table 1 compares the performance of the Islamic stock indices against the conventional benchmark indices for the countries considered in this study. As shown in the table, in the pre-crisis period, the performance of the Islamic stock markets are as comparable to the conventional stock markets. In the crisis period, however, the conventional stock markets were badly affected by the financial crisis. This is reflected by the large declines in the conventional benchmark indices of Kuwait (-43.9 percent), Japan (-37.5 percent), US (-26.1 percent), UK (-11 percent), and Malaysia (-4.6 percent). Despite being negatively affected by the crisis, the conventional stock markets of Indonesia and Turkey continue to record

Figure 1. Plots of Selected Islamic Stock Indices, 9 January 2005 – 10 January 2010

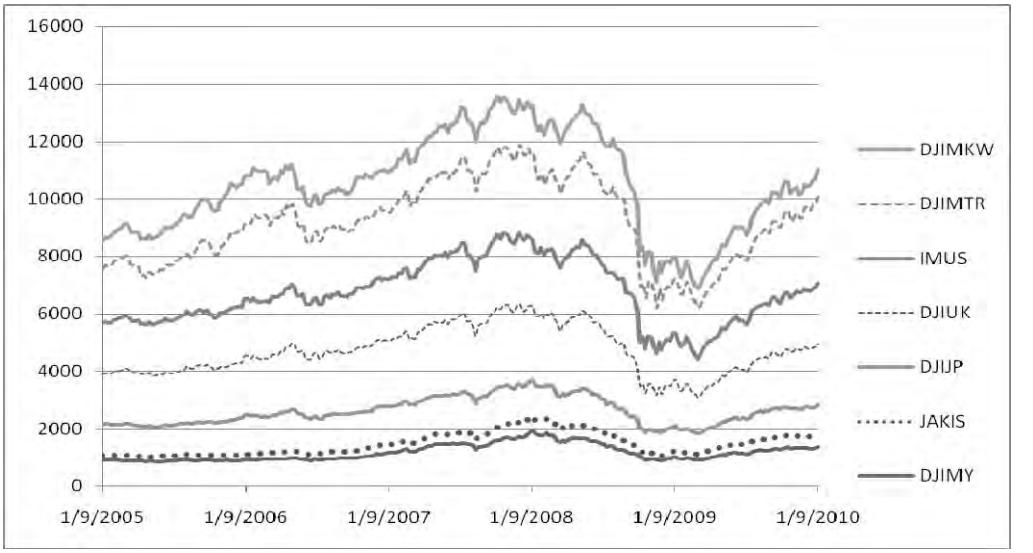

Table 1. Changes in Stock Indices: Conventional Versus Islamic Stock Indices

	Pre-Crisis Period (January 9, 2005 to July 22, 2007)			*During Crisis Period (July 29, 2007 to January 10, 2010)*		
	1/9/05	7/ 22/07	***% Chg***	7/29/07	1/10/10	***% Chg***
Conventional Stock Indices						
Malaysia	916.28	1,382.36	***50.9***	1,355.38	1,292.98	***-4.6***
Indonesia	1,032.53	2,366.4	***129.2***	2,298.41	2,614.37	***13.7***
Turkey	24,221.08	50,832.8	***109.9***	49,699.9	53,830.01	***8.3***
Kuwait	6,442.8	12,411.3	***92.6***	12,491.1	7,011.6	***-43.9***
US	5,905.97	7,437.96	***25.9***	7,095.45	5,243.64	***-26.1***
UK	4,854.1	6,585.2	***35.7***	6,215.2	5,534.24	***-11.0***
Japan	11,433.24	18,157.93	***58.8***	17,283.81	10,798.32	***-37.5***
Islamic Stock Indices						
DJI-MY	902.37	1,516.39	***68.1***	1,479.82	1,368.18	***20.32***
DJI-INA	175.22	394.96	***125.4***	376.59	435.21	***33.69***
DJI-TKY	1,873.91	2,972.08	***58.6***	2,980.35	3,132.21	***38.79***
DJI-KWT	1,008.68	1,721.32	***70.6***	1,724.03	844.19	***-16.80***
DJI-US	1,773.61	2,428.85	***36.9***	2,316.4	2,096.72	***23.65***
DJI-UK	1,739.76	2,695.09	***54.9***	2,494.13	2,133.06	***25.72***
DJI-JAP	1,074.43	1,408.50	***31.1***	1,373.42	1,018.52	***12.68***

Notes: The conventional stock indices are the benchmark indices for the respective countries.

positive return at 13.7 percent and 8.3 percent, respectively. In comparison, while the Islamic stock markets were also adversely affected by the financial crisis, the impact seemed to be not as bad as in the case of the conventional stock indices. All the Islamic stock indices continue to record positive return in the crisis period, except for Kuwait.

5.2 Descriptive Analysis

The descriptive analysis helps to provide preliminary description of the nature and volatility of the stock indices. At the same time, it enables a comparison of the basic performance indicators of the stock indices, allowing an observation of how they fare against each other.

Table 2 provides a summary statistic of the stock returns (i.e., stock prices in first difference) for the selected Islamic stock markets included in this study. In the pre-crisis period, the Islamic stock market in Indonesia has been the most active and profitable, showing the highest average daily returns of 0.7 percent. This is followed by Kuwait at 0.5 percent, Turkey and Malaysia both at 0.4 percent, UK at 0.3 percent, and US and Japan both at 0.2 percent. Obviously, the profitable Islamic stock markets have been in the developing countries, while those in the developed countries have been rather slow. In terms of volatility of return (as reflected by the standard deviation), Turkey recorded the highest volatility at 3.4 percent, recording the highest maximum return of 8.1 percent and largest decline of 10.7 percent. The next most volatile market is Indonesia at 3.1 percent, followed by Kuwait, UK, Japan, Malaysia and the US. In general, market seems to be more volatile in the relatively "thin" market in the developing countries. It can also be observed that the more volatile market has higher average return, particularly in the case of Indonesia. Clearly, this supports the conventional wisdom in finance that "the higher risk, the higher return".

Analyzing the basic indicators during the crisis period show that the Islamic stock markets are not spared from the global financial crisis. Similar to the conventional stock markets, all the Islamic stock markets were also adversely affected by the global financial crisis. This is clearly reflected by the lower and even negative average returns for all the stock markets under review. It can also be observed that the Islamic stock markets in the developing countries performed better than those in the developed countries in the crisis period. Despite the lower return compared to the pre-crisis period, the Indonesian stock market remains the most profitable compared to the rests of the Islamic stock markets with an average positive return, albeit lower, of 0.22 percent, followed by Turkey at 0.1 percent. The rest of the markets recorded an average decline with Kuwait recorded the largest decline at -0.4 percent, followed by Japan at -0.2 percent, the UK-0.06 percent, the US -0.05 percent and Malaysia -0.02 percent. As expected, the volatility (standard deviation) for all the Islamic stock markets is also higher during the crisis period. Similar to the pre-crisis period, the higher return in Indonesia comes with higher risk as the Indonesian stock market recorded the highest standard deviation at 5.4 percent, followed by UK at 4.9 percent, Kuwait 4.4 percent, Turkey 4.2 percent, US 3.5 percent, Malaysia 3.4 percent, and Japan 3.2 percent.

Table 2. Descriptive Statistics of Islamic Stock Indices

	MY	INA	TKY	KWT	US	UK	JAP
Pre-Crisis Period (January 9, 2005 to July 22, 2007)							
Mean	0.0041	0.0067	0.0041	0.0045	0.0025	0.0035	0.0023
Median	0.0039	0.0096	0.0045	0.0057	0.0030	0.0058	0.0016
Max.	0.0531	0.0801	0.0814	0.0848	0.0402	0.0593	0.0647
Min.	-0.0812	-0.0939	-0.1068	-0.0809	-0.0478	-0.0658	-0.0837
Std. Dev.	0.0166	0.0312	0.0339	0.0293	0.0156	0.0209	0.0208
Skewness	-0.8043	-0.4844	-0.7467	-0.0612	-0.3668	-0.3043	-0.2438
Kurtosis	7.5581	3.9035	4.1406	3.4747	3.4705	3.9944	5.2719
During Crisis Period (July 29, 2007 to January 10, 2010)							
Mean	-0.0002	0.0022	0.0013	-0.0045	-0.0005	-0.0006	-0.0020
Median	0.0027	0.0068	0.0043	0.0016	0.0001	0.0003	-0.0009
Max.	0.0761	0.1306	0.1639	0.1830	0.1072	0.1791	0.0616
Min.	-0.1015	-0.2213	-0.1540	-0.1783	-0.1762	-0.2141	-0.1622
Std. Dev.	0.0335	0.0537	0.0419	0.0435	0.0353	0.0486	0.0319
Skewness	-0.3967	-0.7086	-0.1212	-0.3645	-0.6261	-0.3020	-0.9877
Kurtosis	3.1949	4.9449	5.5229	7.5103	7.5921	6.7961	7.0121

5.3 Correlation Analysis

The standard Pearson correlation analysis is used to describe the short-run relations between the movements of the seven Islamic stock markets. Apart from measuring the association between two stock markets, this analysis provides some preliminary idea about the co-movements of the stock markets, enabling comparison being done in the two periods.

Two major observations are worth highlighting from the correlation results shown in Table 3. First, in general, all the Islamic stock markets show strong correlations with each other, except for the Kuwait stock market. Second, as shown by the significant correlation coefficients, the correlations among the stock markets get stronger during the crisis period than the pre-crisis period. In fact, the Kuwaiti stock market which has no significant correlation with any of the stock markets in the pre-crisis period, has significant correlations with almost all the stock markets during the crisis period.

In term of the values of the correlation coefficients, greater values of correlation coefficients can be observed for all correlations during the crisis period compared to the pre-crisis period, indicating a greater strength of correlations among the stock markets in the

crisis period. Focusing on during the crisis period, high values of correlation (greater than 0.6) were recorded between the US-UK (0.822), followed by MY-INA (0.732), TKY-UK (0.660), UK-JAP (0.618) and US-JAP (0.600), suggesting that level of development is a major factor determining strong correlations between the Islamic stock markets. The rest of the stock markets show correlation of lesser than 0.6. Weak correlation coefficients between these stock markets suggest the absence of short-term co-movements among the markets, suggesting the potential benefits of short-term diversification, or speculative activities, in these stock markets.

Table 3. Correlations among Islamic Stock Returns

	MY	INA	TKY	KWT	US	UK	JAP
Pre-Crisis Period (January 9, 2005 to July 22, 2007)							
MY							
INA	0.399***						
TKY	0.280***	0.206**					
KWT	-0.020	-0.136	0.027				
US	0.367***	0.334***	0.433***	-0.005			
UK	0.406***	0.360***	0.402***	0.015	0.748***		
JAP	0.231**	0.380***	0.377***	-0.100	0.561***	0.575***	
During-Crisis Period (July 29, 2007 to January 10, 2010)							
MY							
INA	0.732***						
TKY	0.446***	0.478***					
KWT	0.178**	0.226***	0.195**				
US	0.417***	0.467***	0.581***	0.148*			
UK	0.514***	0.536***	0.660***	0.195**	0.822***		
JAP	0.492***	0.552***	0.515***	0.106	0.600***	0.618***	

Note: *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

5.4 Bi-variate Causality Analysis

While correlation indicates the degree of co-movement and association, it does not explain causality between the stock markets. A more enriching discussion on short-run causality is provided by the Granger causality analysis developed by Granger (1969). The Granger test for causality is a short run analysis on the direction of causality, thus enabling

the determination of which stock market exerts influence on another. The results for the bi-variate Granger causality tests for both periods of analysis are summarized in Table 4.

In the pre-crisis period, the results show that the US Islamic stock market has been influential. During this period, the US stock market is significant in causing the UK, MAL and INA stock markets, as investors take the queue from the US stock market for investment decisions in these markets. Other significant causalities are also recorded from INA to MAL, INA to UK, KWT to TKY and TKY to JAP. The MAL, UK and JAP Islamic stock markets are insignificant in causing any of the stock markets.

Table 4. Summary of Bi-variate Granger Causality Results

Pre-Crisis Period (January 9, 2005 to July 22, 2007)	*During-Crisis Period (July 29, 2007 to January 10, 2010)*
MAL <===== INA	MAL<=====> INA
MAL ===== TKY	MAL ===== TKY
MAL ===== KWT	MAL=====> KWT
MAL <===== US	MAL =====> US
MAL ===== UK	MAL =====> UK
MAL =====JAP	MAL ===== JAP
INA ===== TKY	INA =====> TKY
INA ===== KWT	INA =====> KWT
INA <===== US	INA =====> US
INA =====> UK	INA =====> UK
INA ===== JAP	INA===== JAP
TKY <===== KWT	TKY ===== KWT
TKY ===== US	TKY ===== US
TKY ===== UK	TKY ===== UK
TKY =====> JAP	TKY ===== JAP
KWT ===== US	KWT ===== US
KWT ===== UK	KWT <===== UK
KWT ===== JAP	KWT <===== JAP
US =====> UK	US ===== UK
US ===== JAP	US <===== JAP
UK ===== JAP	UK <===== JAP

Notes: <=====> indicates a bi-directional Granger causality between the stock markets; =====> indicates a uni-directional Granger causality from one stock market to another; and ===== indicates no Granger causality between the stock markets. The causalities are at least significance at 5% level.

During the crisis period, more significant causations are detected, with the US market no longer remained influential as in the pre-crisis period. Significant directions of causality originate from the "non-traditional" stock markets which are not important in causing any of the stock markets in the non-crisis period. In particular, the stock markets of MAL is significant in causing INA, KWT, US and UK; INA is significant in causing MAL, TKY, KWT, US and UK; JAP is significant in causing KWT, US and UK and UK is significant in causing KWT. It can be observed that the developing stock markets are more influential in causing the other stock markets during the crisis period. This finding is in line with the "reverse causality" as documented by Tai (2004) and Yang et al. (2008) that normally happens during the crisis period.

The significant causalities suggest that the stock markets are interrelated in such a way that a decline in a particular stock market results in a decline in the other stock market, thus, the benefits of diversification is lesser in these stock markets. A consistent observation from the correlation analysis is that there are increasing co-movements and causalities during the crisis period than in the pre-crisis period. The result also shows that the stock markets of the developed economies are integrated with each other; and those of the developing economies are integrated among themselves. There are no significant causalities between stock markets of the developed and developing economies, suggesting the benefits of diversification still exists in the two groups of economies. The results based on Granger causality is consistent and lend further support to the earlier results that investors can gain from portfolio diversification by considering both the developed and developing countries Islamic stock market in their investment portfolio.

5.5 ARDL Analysis

For more robust analysis of co-movements among the selected Islamic stock markets, the ARDL analysis is adopted to determine the existence of long-run equilibrium relationship among the stock markets. By estimating the long-run coefficient based on the ARDL approach, the existence of a common long-term trend for the stock markets can be empirically proven by the significant joint F-statistics produced by the estimated equation. The results of the ARDL test for the existence of long run cointegration among the selected Islamic stock markets are summarized in Table 5.

As shown in the table, in the pre-crisis period, the results of the ARDL test show no evidence of any long-run equilibrium relationship among the Islamic stock markets. This is indicated by the insignificant joint F-statistics from the estimation of the stock markets during the period. In the context of portfolio diversification benefits, the result suggests that

in a non-crisis period, there are potential gains by diversifying investment portfolios in these Islamic stock markets.

In contrast, in the crisis period, the results of the ARDL estimations showed the existence of long-run equilibrium relationship among the Islamic stock markets. As shown by the third column of Table 5, the joint F-statistics is significant at the 90 percent upper bound at lag length 3, suggesting that the Islamic stock markets have common equilibrium point in the long run. This result, which is contradictory to the behaviour of the stock markets in the pre-crisis period, suggests that there is no potential diversification benefit in the Islamic stock market during the crisis period.

This study shows that the global financial crisis has a significant impact on the nature of integration of the Islamic stock markets. It has been consistently reported throughout the study that the stock markets are increasingly integrated during the crisis period compared to the non-crisis period. In fact, the findings of this study provides further support to the existing literature that stock markets tend to exhibit increasing integration during crisis period (see, for example, King et al., 1994; Longin and Solnik, 1995; Karolyi and Stulz, 1996; Solnik et al., 1996; Ramchand and Susmel, 1998; Chesnay and Jondeau, 2001; Ang and Bekaert, 2002; Ynag et al., 2002). Apart from providing further empirical support to this view, a novel aspect of this study is that the increasing integration happens for all types of stock markets with the Islamic stock markets are "no exception to the rule".

Table 5. ARDL F-Statistics for Testing Existence of Co-integration

Order of Lag	*Pre-Crisis Period (January 9, 2005 to July 22, 2007)*	*During-Crisis Period (July 29, 2007 to January 10, 2010)*
1	2.337	1.973
2	2.104	1.957
3	1.602	3.463*
4	1.250	2.782
5	1.217	2.044
6	0.730	2.936

Notes: The relevant critical value bounds are taken from Pesaran (2001): (i). Case iii: unrestricted intercept and no trend (number of regressors = 7), they are 2.96 – 4.26 at the 99%; 2.32– 3.50 at the 95%; and 2.03 – 3.13 at the 90% significance levels respectively; and (ii) Case v: unrestricted intercept and unrestricted trend (number of regressors = 7), they are 3.34 – 4.63 at the 99%; 2.69– 383 at the 95%; and 2.38 – 3.45 at the 90% significance levels respectively. * denotes that F-Statistics falls above the 90% upper bound.

At this juncture, it is important to note that the existence of cointegration among the markets does not rule out the possibility of arbitrage profits through diversifying portfolios across these markets in the short-term, which may last for quite a while (Dwyer and Wallace, 1992). Thus, because of varying degrees of business and financial risks of different securities and various security cash flows covarying less than perfectly across the markets (and even within the same country), the diversification benefits in these markets in the long-term may be reduced but are not likely to be fully eliminated in practice.

In addition, the existence of cointegration among the markets also implies a common stochastic trend in those markets (Kasa, 1992; Blackman et al., 1994; Jang and Sul, 2002). Since each Islamic stock price series contains information on the common stochastic trends (which bind all the Islamic stock markets together), the predictability of one Islamic stock prices can be enhanced significantly by utilizing information on the other Islamic stock prices. The presence of common stochastic trends among all these stock markets implies that once new information on a stock price is available prior to other stock prices, the other stock prices will deviate from that trend through a transitory component. Individual prices cannot wander too far away from each other over time (Masih & Masih, 1999).

5.6 Multivariate Analysis using GMM

The next step to the ARDL approach is to explore a more detailed nature of the relationship of the individual Islamic stock markets being considered in this study. As cointegration implies that at least one of the markets react to deviations from the long-run relationship, there is a need to study if the markets correct the disequilibrium. In this context, the Vector Error Correction Model (VECM) based on the GMM estimation is the most appropriate technique since it distinguishes between the short- and long-run dynamic linkages among the stock markets. The existence of the short-run multivariate Granger causalities among the stock markets is indicated by significance of the *F*-statistics through joint tests of lagged differences, while that of the long-run is shown by the significance of the *t*-statistic tests for ECT. The VECM analysis is conducted on the baseline model containing all seven Islamic stock markets for the during the crisis period.

Table 6 provides the results based on the multi-variate VECM analysis for the Islamic stock markets focusing on the period during the crisis. As shown by the table, all the error correction terms (ECTs) are significant for the Islamic stock markets being reviewed. The significant ECTs imply that these markets are interrelated with each other in the long run. The structural similarity of the Islamic stock markets due to the observations of the requirement of *shari'ah* explains the integration of these stock markets over the long run.

Table 6. Results of Multivariate VECM Analysis for During Crisis Period (Model: MAL, INA, TKY, KWT, US, UK, JP)

Dpdt. Var.	Independent Variables [F-stats]							(t-stats)	Diagnostic tests
	ΔMAL	ΔINA	ΔTKY	ΔKWT	ΔUS	ΔUK	ΔJAP	ECT_{t-1}	
ΔMAL	-	18.601*** [0.000]	1.646 [0.169]	3.735*** [0.007]	4.972*** [0.001]	5.017*** [0.001]	2.194* [0.075]	-0.162*** (-4.386)	R^2-adj=0.37 DW=2.43 *J*-stats=0.06
ΔINA	20.989*** [0.000]	-	3.035** [0.021]	2.305* [0.064]	0.304 [0.876]	1.162 [0.332]	2.941** [0.024]	-0.203*** (-4.005)	R^2-adj=0.61 DW=2.07 *J*-stats=0.04
ΔTKY	1.950 [0.108]	2.234* [0.071]	-	3.055** [0.020]	1.207 [0.313]	2.426* [0.053]	1.955 [0.108]	-0.328*** (-4.585)	R^2-adj=0.45 DW=1.99 *J*-stats=0.03
ΔKWT	1.399 [0.241]	1.719 [0.152]	3.349** [0.013]	-	0.544 [0.704]	0.847 [0.499]	2.508** [0.047]	-0.069*** (-2.663)	R^2-adj=0.20 DW=2.19 *J*-stats=0.02
ΔUS	2.463** [0.050]	4.651*** [0.002]	6.312*** [0.000]	6.255*** [0.000]	-	51.753*** [0.000]	6.795* [0.075]	-0.494*** (-5.385)	R^2-adj=0.57 DW= 2.22 *J*-stats=0.06
ΔUK	6.211*** [0.000]	3.015** [0.022]	3.722*** [0.007]	3.082** [0.020]	26.755*** [0.000]	-	3.761*** [0.007]	-0.602*** (-6.811)	R^2-adj=0.72 DW=2.21 *J*-stats=0.04
ΔJAP	2.137* [0.082]	8.511*** [0.000]	1.999 [0.101]	2.314* [0.063]	1.485 [0.212]	3.440** [0.011]	-	-0.208*** [-3.638]	R^2-adj=0.41 DW=2.09 *J*-stats=0.04

Notes: ***, ** and * represent significance at the 1%, 5% and 10% levels, respectively. ECT_{t-1} is derived by normalizing the cointegrating vectors on the dependent variables, producing residual *r*. By imposing restriction on the coefficients of each variable and conducting Wald test, we obtain *F*-statistics for each coefficient in all equations. Figures in the (.) and [.] represent *t*-statistics and probabilities for *F*-statistics, respectively. The optimal lag-length included in the models is based on the Akaike Information Criteria (AIC). DW is Durbin-Watson *d* test for autocorrelation, and *J*-stats is the Hansen's *J*-statistic test for correct specification (over-identifying restrictions) of the model. Lag length is set at 3.

Meanwhile, the short-run causality as indicated by the F-statistics shows that the Islamic stock markets in Malaysia, Indonesia, US and UK have been sensitive to changes in the other stock markets. In particular, the Malaysian stock market is significantly influenced by the Indonesia, Kuwait, US and UK, while the impact of the JAP stock market is somewhat weak. Since the Turkish stock market has no significant influence on the Malaysian stock market, there exist potential portfolio diversification benefits in investing in Malaysian and Turkish stock markets. The Indonesian market is significantly affected by the Islamic stock markets in Malaysia, Turkey and Japan, but not the US, UK and KWT. Similar analysis can be applied that there exists potential diversification benefits in the Indonesia, UK, US and KWT

stock markets. Meanwhile, the US market is significantly affected by all Islamic stock markets, except Japan, indicating potential diversification benefits between Islamic stock markets in US and Japan.

In summary, there are no significant causal relationships in the following pairs of markets: MAL-TKY, INA-KWT, TKY-JP and US-JP. In the crisis period where most stock markets are increasingly integrated with each other, investors can still gain by diversifying their portfolios in these pairs of Islamic stock markets. With regard to the Islamic stock markets of the developed economies, there seems to be strong short- run causalities among the Islamic stock markets in these countries, suggesting that the potential benefits of portfolio diversification among these stock markets are non-existent.

6. CONCLUSIONS

This chapter summarizes the major findings of the study and draw suggestions and recommendations so as to offer the practical applications of the findings to the financial markets. References are made to the objectives mentioned earlier to ensure that the intended objectives are achieved. The chapter ends with the discussions on the limitations of the study which also serve as potential avenues for extension of the study in the future.

6.1 Summary of Major Findings

Motivated by the increasing interests on the Islamic stock markets in the aftermath of the global financial crisis, this study analyzes the impact of the global financial crisis on the integration of selected Islamic stock markets. The study focuses on seven Islamic stock markets selected from various regions and adopts time series analysis of the ARDL and VECM. In the efforts to determine the impact of the global financial crisis on the nature of integration among the Islamic stock markets, the period of analysis is being divided into the pre-crisis and during the crisis periods.

The results based on the descriptive analysis suggest that the Islamic stock markets are not fully sheltered from the global financial crisis. However, in terms of magnitude, it is observed that the impact of the crisis on the Islamic stock markets is not as severe as it is on the conventional stock markets. Similar to the conventional counterparts, all the Islamic stock markets included in the study recorded lower average returns and higher volatility in the crisis period compared to the pre-crisis period. In both periods, it is observed that the Islamic stock markets in the developing countries give higher average returns than those in the developed countries. Despite this, the conventional wisdom of “high risks, high returns” is also applicable to the Islamic stock markets where the markets with higher returns are more volatile, particularly in the relatively “thin” market of the developing countries.

The correlation results generally show that all the Islamic stock markets show strong correlations with each other. The correlations among the Islamic stock markets get stronger during the crisis period than the pre-crisis period as indicated by the greater number of significant correlation coefficients between the stock markets. Higher magnitudes of correlation coefficients are also observed for all correlations during the crisis period compared to the pre-crisis period, indicating greater strength of correlations between the stock markets in the crisis period. Additionally, higher values of correlation coefficients were recorded between stock markets in the same level of economic development, suggesting that

level of development plays an important role in determining the magnitude of correlations between the Islamic stock markets. This finding suggests that investors can gain diversification benefits by diversifying their portfolios in the developed and developing countries Islamic stock markets.

The results of the Granger causality consistently show that there are increasing co-movements and causalities in the crisis period than the pre-crisis period. The crisis is shown to have significant impact on the directions of causalities among the stock markets. More significant causations are detected in the crisis period than the non-crisis period, with the US market no longer as influential as in the non-crisis period. Significant directions of causality originate from the stock markets perceived as "non-influential" which are not important in causing any of the stock markets in the non-crisis period. In particular, the developing stock markets are more influential in causing the other stock markets in the crisis period, with several incidence of "reverse causality" being documented.

The results from the ARDL test show no evidence of long-run equilibrium relationship among the Islamic stock markets in the pre-crisis period, but suggest otherwise in the crisis period. This suggests that there are potential diversification benefits among the Islamic stock markets in the non-crisis period and the diversification benefits diminish during the crisis period. Further investigations based on the VECM analysis on the integration nature of the Islamic stock markets during the crisis suggest that all the Islamic stock markets are inter-related with each other in the long run which can be explained due to the structural similarity bring about by the requirements to observe the *shari'ah*. Despite the significant integration in the long run, there still exist short-run diversification benefits in some of the stock markets. In particular, the Indonesian market is not significantly affected by the Islamic stock markets in the US, UK and Kuwait, suggesting the potential diversification benefits in these markets. Similarly, there are no significant integrations between the Islamic stock markets in US and Japan; Malaysia and Turkey; and Turkey and Japan. In the crisis period where most stock markets are increasingly integrated with each other, investors can still gain by diversifying their portfolios in these pairs of Islamic stock markets. The existence of diversification benefits in these markets suggest that geographical factor is a relevant factor in determining the integration of stock markets in the short run in the crisis period. More specifically, this finding suggests that during the crisis period, investors may find potential diversification benefits by investing in markets in different geographic regions.

6.2 Implications of Study

Since it is shown that the Islamic stock markets are as vulnerable to the global financial

shocks, it is important that the industry players to remain vigilant of the impact of the crisis on their investments in the Islamic stock markets. At the same time, the policymakers need to take pre-emptive steps to minimize the impact of the crisis and ensure stability of the Islamic stock markets. The findings of this study highlight that the general belief that the Islamic financial markets are sheltered from the adverse impact the financial shocks due to its interest-free nature is flawed. In view of this, it is important that the market participants to undertake continuous prudent risk management practices and devise suitable hedging mechanisms so that pre-emptive measures can be taken to safeguard the stability of the Islamic financial markets in times of economic and financial uncertainties. Apart from devising its own risk management techniques to address the financial shocks, perhaps, the Islamic capital market could learn from the best risk management practices of the conventional capital market in addressing the market risks. This is where policy-makers, industry-players, academics and *shari'ah*-scholars need to convene and work together to equip the Islamic capital markets with suitable techniques and tools to mitigate the impact of financial shocks on the Islamic markets. Results of this study highlight the urgency of this endeavor as prudent risk management and best financial practices are relevant and crucial for the both the Islamic and conventional financial markets alike.

The general findings that the Islamic stock markets show no evidence of long-run equilibrium relationship among them in the pre-crisis period, but suggest otherwise in the crisis period is supportive of the time-varying aspect of the stock market integration as suggested by Bekaert and Harvey (1994). Apart from providing further empirical support to this view, a novel aspect of this study is that the increasing integration happens to all types of stock markets, with the Islamic stock markets are "no exception to the rule". The behavior of the Islamic stock markets which show increased integration during the crisis period is consistent with the conventional stock markets as well. This study proves the greater integration among the Islamic stock market consistently through both the correlation and causality tests results. This finding could be of practical importance to the industry players in such a way that it provides some indication regarding the behavior of the Islamic stock market during a crisis. Similarly, the similar behavior of the Islamic stock market during a crisis period is also important to the policymakers, so that they are able to take pre-emptive measures to avoid a wide-scale decline in the Islamic stock market during the global financial crisis.

Apart from increased integration during a financial crisis, the study also shows that there are increasing causations between the Islamic stock markets during the crisis period, which is consistent with the greater integration among them due to the crisis. More importantly, the causality results also reveal significant causations originating from the markets perceived as "non-influential" and several incidence of "reverse causality" being

documented. This is supportive of a recent study by Yoshida (2010) on the behaviour of selected stock markets during the global financial crisis 2010. This finding calls for greater mechanism to reduce the systemic risks being transmitted from one market to another.

In terms of portfolio diversification benefits for the investors, the study highlights the relevance of both the level of economic development and geographical factor in influencing the integration nature among the Islamic stock markets. The study clearly highlights that, in a non-crisis period, investors can gain from portfolio diversification by considering both the developed and developing countries Islamic stock market in their investment portfolios. Meanwhile, in a crisis period, geographical factor is shown to be relevant diversification criteria particularly during the crisis period. As a conclusion, investors who are interested to diversify their portfolio can still gain benefits if they diversify considering the Islamic stock markets across economic grouping such as that in the developed and developing countries as well as markets in different regions, depending on the market condition. This information is relevant and has several important implications for market strategizing and capital budgeting by the investors.

Finally, our evidence of the extent of interdependencies among these markets also has important implications for the macro stabilization policies in each Islamic stock market and also for the financial policies of multinational corporations. The extent of the effectiveness of the macro-economic policies of each stock market in dealing with its stock market imbalances will depend crucially on the extent of financial integration of each market with the rests. Similarly, the extent of integration of each of Islamic stock market has important bearings on financial policies formulation, in which co-integrated Islamic stock markets suggest that there is a need for policy coordination among these markets to mitigate the impacts of financial fluctuations. Greater policy coordination, including the reduction or removal of trade and investment barriers, will be essential if these countries are to exploit the advantages of financial interdependence.

6.3 Limitations and Directions for Future Research

The results of the study have opened a wide variety of possible areas that warrant further research. It is important to highlight that while this study focuses on the importance of the crisis on the market integration of the Islamic stock markets, several other factors might be important in affecting the integration. Among others, the industry mix, direct and indirect investment restrictions, and technological factors might also affect stock market integration. As an extension, future studies should allow for multiple sources of risks, such as foreign exchange risks which could mask themselves through the time-varying integration.

There should also be assessment on the effects of regulatory changes on the equity markets. Another area of possible extension that is not addressed by this study is in explaining why expected returns differ across countries. Future work should include factors that relate capital market restrictions and stage of financial market development as well as economic growth-diversification and efficient equity market.

Since the study is limited to only seven Islamic stock markets, the results of the study are indicative but not conclusive for the Islamic stock market in general. As more data becomes available, the study can be extended to include greater number of Islamic stock markets representing various regions in the world. The utilization of a more representative data set would go a long way in arriving at more reliable generalizations. Also, further empirical studies on the issue can cover broader areas of market integration and use more advanced techniques of estimation to add further to the existing literatures on market integration among the Islamic stock markets worldwide. The approach being adopted in this study can naturally be extended to other developed and developing Islamic stock markets to compare their financial integration dynamics and analyze the consistency of findings across the various groups of Islamic stock markets.

It would be highly relevant if studies on equity market integration incorporate the behaviour and changes of stock market integration over a series of events. In this regard, a possible area for extension is comparing the nature of equity markets integration of the Islamic stock markets during the Asian crisis 1997/1998 and that of the US sub-prime crisis 2007. In doing so, more enriching discussion can be undertaken by analyzing the consistency and new trends arising from the different events. Such endeavor would result in important policy recommendations as well as practical implications for the industry players. Indeed, while there are many studies analyzing the impact of shocks on stock market integration such as the October 1987 stock market crash in the US, NAFTA, Asian financial crisis 1997/1998, to our knowledge, none has performed comparative studies on the behavior of stock markets across these important events in the financial markets.

An important avenue for extension of the study is to develop the risk mitigation issues in the Islamic stock markets, which is currently lacking. Further efforts need to be undertaken in developing the relevant risk mitigation techniques to pre-empt the adverse impact of the global financial crisis on the Islamic stock markets. At this juncture, concerted efforts should be undertaken by the Islamic supervisory institutions such as the Islamic Financial Services Board and the Securities Commission to deal with the impending issues in the Islamic stock markets to reduce uncertainties and improve investor confidence in the Islamic stock markets.

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APPENDIX 1. Islamic Indices Provided by FTSE, Dow Jones, S&P and MSCI

Index Provider	Index	
FTSE: FTSE Global Islamic Index Series –GIIS	Regional Index 1. FTSE Shariah Developed Index 2. FTSE Shariah Developed ex US Index 3. FTSE Shariah Developed ex UK Index 4. FTSE Shariah Developed ex Japan Index 5. FTSE Shariah Developed ex Australia Index 6. FTSE Shariah Developed ex North Am Index 7. FTSE Shariah Developed Europe Index 8. FTSE Shariah Developed Europe ex UK Index 9. FTSE Shariah Eurozone Index 10. FTSE Shariah Developed ex Eurozone Index 11. FTSE Shariah Developed Asia Pacific Index 12. FTSE Shariah North America Index 13. FTSE Shariah Developed Asia Pac ex JP Index 14. FTSE Shariah Emerging Index 15. FTSE Shariah All-World Index 16. FTSE Shariah Emerging Asia Pacific Index 17. FTSE Shariah Emerging Europe Index 18. FTSE Shariah Secondary Emerging Index 19. FTSE Shariah Emerging Latin America Index 20. FTSE Shariah Americas Index 21. FTSE Shariah Asean Index 22. FTSE Shariah Eastern Europe Index 23. FTSE Shariah Europe Asia Pacific Index 24. FTSE Shariah Europe Index 25. FTSE Shariah Europe Ex UK Index 26. FTSE Shariah Europe Ex Eurobloc Index 27. FTSE Shariah Europe Ex Eurobloc Ex UK	Country Index 1. FTSE Shariah Australia Index 2. FTSE Shariah Belgium/Lux Index 3. FTSE Shariah Canada Index 4. FTSE Shariah Denmark Index 5. FTSE Shariah Finland Index 6. FTSE Shariah France Index 7. FTSE Shariah Germany Index 8. FTSE Shariah Greece Index 9. FTSE Shariah Hong Kong Index 10. FTSE Shariah Ireland Index 11. FTSE Shariah Italy Index 12. FTSE Shariah Japan Index 13. FTSE Shariah Netherlands Index 14. FTSE Shariah Norway Index 15. FTSE Shariah New Zealand Index 16. FTSE Shariah Austria Index 17. FTSE Shariah Portugal Index 18. FTSE Shariah Singapore Index 19. FTSE Shariah Spain Index 20. FTSE Shariah Sweden Index 21. FTSE Shariah Switzerland Index 22. FTSE Shariah UK Index 23. FTSE Shariah USA Index 24. FTSE Shariah Argentina Index 25. FTSE Shariah Brazil Index 26. FTSE Shariah Chile Index 27. FTSE Shariah China Index 28. FTSE Shariah Colombia

	28. FTSE Shariah Greater China Index 29. FTSE Shariah Latin America Index 30. FTSE Shariah Middle East & Africa Index 31. FTSE Shariah Asia Pacific Index 32. FTSE Shariah Asia Pacific Ex Japan Index 33. FTSE Shariah Advanced Emerging Index 34. FTSE Shariah All-World Ex S Africa Index 35. FTSE Shariah All-World Ex US Index 36. FTSE Shariah All-World Ex UK Index 37. FTSE Shariah All-World Ex Japan Index 38. FTSE Shariah All-World Ex Eurobloc Index 39. FTSE Shariah All-World Ex Europe Index 40. FTSE Shariah All-World BRIC Index 41. FTSE Shariah Asia Pac ex JP IN PK Index 42. FTSE Shariah Asia Pac ex JP AU NZ 43. FTSE Shariah Asia Pac ex JP IN PK AU NZ 44. FTSE Shariah Developed Europe-APAC Index 45. FTSE Shariah EMEA Index 46. FTSE Shariah Developed EMEA Index 47. FTSE Shariah Emerging EMEA Index 48. FTSE Shariah Nordic Index	Index 29. FTSE Shariah Czech Republic Index 30. FTSE Shariah Egypt Index 31. FTSE Shariah Hungary Index 32. FTSE Shariah India Index 33. FTSE Shariah Indonesia Index 34. FTSE Shariah Malaysia Index 35. FTSE Shariah Morocco Index 36. FTSE Shariah Mexico Index 37. FTSE Shariah Pakistan Index 38. FTSE Shariah Peru Index 39. FTSE Shariah Philippines Index 40. FTSE Shariah Poland Index 41. FTSE Shariah Russia Index 42. FTSE Shariah South Africa Index 43. FTSE Shariah Thailand Index 44. FTSE Shariah Turkey Index 45. FTSE Shariah Taiwan Index 46. FTSE Shariah Israel Index 47. FTSE Shariah Korea Index
Dow Jones: DJ Islamic Market Series - DJIM	1. DJIM DFM Titans 10 Index 2. DJIM Amana Sri Lanka Index 3. DJIM Asia/Pacific Index 4. DJIM Asia/Pacific Titans 25 Index 5. DJIM BRIC Index 6. DJIM Europe Titans 25 Index 7. DJIM GCC Index 8. DJIM Hong Kong Index 9. DJIM India Index 10. DJIM Indonesia Index 11. DJIM Japan Index	

12. DJIM Kuwait Index
13. DJIM Malaysia Index
14. DJIM Philippines Index
15. DJIM Singapore Index
16. DJIM South Korea Index
17. DJIM Sustainability Index
18. DJIM Thailand Index
19. DJIM Taiwan Index
20. DJIM Titans 100 Index
21. DJIM Turkey Index
22. DJIM US Titans 50 Index
23. DJIM World Emerging Markets Index
24. DJIM JS Pakistan Islamic Index
25. DJIM Malaysia 25 Titans Index
26. DJIM China Offshore Hong Kong Index

Standard & Poor's

Major Index

1. S&P 500 Shariah
2. S&P Europe 350 Shariah
3. S&P Japan 500 Shariah

GCC Shariah Index

1. S&P GCC Shariah USD
2. S&P GCC Shariah Investable Index USD
3. S&P Bahrain Shariah Index USD
4. S&P Bahrain Shariah Index BHD
5. S&P Kuwait Shariah Index USD
6. S&P Kuwait Shariah Index KWD
7. S&P Oman Shariah Index USD
8. S&P Oman Shariah Index OMR
9. S&P Qatar Shariah Index USD
10. S&P Qatar Shariah Index QAR
11. S&P Saudi Arabia Shariah Index USD
12. S&P Saudi Arabia Shariah Index SAR
13. S&P UAE Shariah Index USD
14. S&P UAE Shariah Index AED

BRIC Shariah Index

1. S&P BRIC Shariah Index USD
2. S&P BRIC Shariah Index Total Return USD
3. S&P BRIC Shariah Index Net Return USD
4. S&P BRIC Shariah Index Euro
5. S&P BRIC Shariah Index Total Return Euro

	6. S&P BRIC Shariah Index Net Return Euro <u>Pan Asia Shariah Index</u> 1. S&P Pan Asia Shariah Index USD 2. S&P Pan Asia Shariah Index Total Return USD 3. S&P Pan Asia Shariah Index Net Return USD 4. S&P Pan Asia Shariah Index Euro 5. S&P Pan Asia Shariah Index Total Return Euro 6. S&P Pan Asia Shariah Index Net Return Euro
MSCI-Barra: MSCI Global Islamic Indices (as of November 26, 2008)	MSCI GII Developed Markets (23 countries) MSCI GII Emerging Markets (23 countries) MSCI GII GCC Countries (6 countries) MSCI GII ex-GCC Countries (17 countries)

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