INTERNATIONAL EQUITY MARKET INTEGRATION: AN ANALYSIS OF THE ISLAMIC CAPITAL MARKETS

Ruzita Abdul Rahim
Hawati Janor
Mohammed Zain Yusof
Ros Zamzam Sapian
Universiti Kebangsaan Malaysia

ABSTRACT

This study intends to establish new evidence on the allegation that emerging markets tend to be partially integrated at the regional level but remain segmented from the world equity markets. This objective is achieved through investigating the integration between Malaysia and most important players in world equity markets, namely US, UK, Japan and Canada as well as Europe, emerging and developed market on a more regional and global platforms. In this study, Asia Pacific serves the role of Malaysian's regional market. But more importantly, this study could be the first of its kind to establish evidence on stock market integration from the new but highly progressive Islamic stock markets (ISM). This is done by utilizing the Dow Jones Islamic Market indices for the selected markets, from the most recent period of 1999:06 to 2007:06. The analysis of the structure of dynamic linkages among the selected Islamic stock markets utilizes the vector-autoregressive analysis (VAR). The results from the analyses lead to the following conclusions; (i) in general the dynamic interdependence between Malaysian ISM and the other major markets are still weak, (ii) there is a relatively stronger interdependence between ISM of Malaysia and the US than those between Malaysia and other markets including Japan, and (iii) there is some evidence suggesting stronger intra- than inter-regional integration based on the interdependencies between Malaysia and Asia Pacific and World Emerging markets. Overall, the findings imply a great prospect for Malaysian Islamic equity markets to be promoted as a viable investment vehicle for the advanced markets to improve their portfolio diversification.

Keywords: Islamic Capital Markets; Stock Market Integration; International Islamic Portfolio Diversification

Introduction

There seems to be growing interest from academicians, policy makers and investors alike on the integration between financial capital markets and those in emerging markets. One particular explanation is the implication of equity market integration on investment decision such as international diversification and arbitrage opportunities as well as asset pricing. To this point, there are two rather established conclusions regarding the international equity market integration. First is that the close integration tends to be more of a phenomenon for developed markets. Second, while the emerging equity markets seem to remain segmented from the world markets, ample evidences exists suggesting strong intra-regional stock market integrations. While the first conclusion has long historical tracks, the second is only found recently. The fact that studies which purely focus on linkages between emerging markets are still relatively scant (Narayan et al. 2004) is a paradox given the well known facts that these are the markets that have long been known as ones that are capable of offering enormous potential and favorable payoff for various international fund managements (Masih & Masih 1999).

In the mean time, the development of Islamic stock market (ISM) has become an important segment of the broad equity market. The latest report published by Dow Jones in July 2007 is clear evidence on the development in the Islamic equity markets. The history of Islamic equity investment has dated back in 1986 in the US and has been growing ever since to amount to USD6 billion in 2003 (Hayat 2006). The largest equity markets in the Islamic world like Saudi Arabia and the United Arab Emirates are quickly spreading their wings into this segment (Wilson 2007). The same is true for other players of Islamic equity markets in Asia. Specifically for Malaysia, it has been widely acknowledged as one of the major player in Islamic capital markets (Naughton & Naughton 2000; Hayat 2006; Wilson 2007), even though it could be small in generic equity market. In 2003, the market capitalization of Malaysian Islamic equity is reported to reach USD103 billion, accounting for 58 percent of the national equity market (OICU-IOSCO 2004). Despite the growing development of Islamic securities investments, existing literature particularly on the Islamic equity market, is virtually non-existent (Hakim & Rashidian 2004). As far as this study is concerned, no works have been done to investigate specifically on the Islamic segment of an equity market. development in the Islamic equity markets. While most previous studies have focused on the Islamic debt capital, the studies that we find so far on Islamic equity capital are either looking at

the relationship between the Islamic equity market and its broad equity market (Hakim & Rashidian 2004) or relationship among equity markets in Islamic countries such as those markets in the Gulf Cooperation Council (eg. Assaf 2003) and Middle Eastern (Shachmurove 2001).

Examining the integration between emerging markets and the advanced markets is motivated by existing evidence that associate the role of information leadership with the more advanced markets, practically due to the sophistication of information technology and economic influence on the other less developed markets as evidenced by Liu, Pan and Shieh (1998) and Kim (2005). From investment point of view, stock price transmission mechanism implies information in leader market is a significant predictor of stock price movement in the home market. In that regard, the market efficiency depends on its ability to adjust to the leader market information, fully and quickly. On the other side of the coin, inefficient market opens up opportunity for arbitrage while more emphasis should be put on leader markets which may not necessarily be the advanced markets

Specifically for the ISM, the motivation to examine the integration in this market segment separately from the generic equity market integration relates well to the basic requirements in Islamic investment. Investment vehicles that comply to *Shari'a* forbid any element of (i) *riba* or interest, (ii) *gharar* or uncertainty, and (iii) *maisir* or gambling. While debt instruments or *sukuk* have to be carefully structured mainly to encounter its traditionally interest-bearing nature, equity instruments have been approved by the Council of the Islamic Fiqh (CIFA) in 1993 as permissible investment vehicles (Naughton & Naughton 2000) provided that the respective companies pass two basic set of filters (eg., Hakim & Rashidian 2004; El-Gamal 2000; Hayat 2006; OICU-IOSCO 2004):

1. The primary business activities of the company must be legitimate or halal. Companies are considered illegitimate or *haram* if their primary business activities involve;

    *   alcohol,
    *   tobacco,
    *   pork-related products,
    *   conventional financial services (banking, insurance, etc.)
    *   weapons and defense, and/or
    *   entertainment (hotels, casinos/gambling, cinema, pornography, music, etc)

2. The financial management of the company must be free from *riba* (interest) and impurities. Because of the difficulty in monitoring the use of free cash and interest-free debts among the companies, these rules are somewhat compromised by imposing several ratios to screen out companies that exhibit any of the following criteria;
   a. debt to total asset ratio of 33% or more,
   b. impure plus non-operating interest income to revenue ratio of 5% or more, and/or
   c. accounts receivable to total asset ratio of 45% or more.

These set of filters are applied in screening the constituent companies by the *Shari'a* boards of the Dow Jones Islamic Index[1] and FTSE Global Islamic Index Series as well as other *Shari'a* boards of fund management companies in Islamic countries including Malaysia (eg., El-Gamal 2000; Hayat 2006). While the first filter is consistent with the growing trend of "socially responsible" investment in the US (Hakim & Rashidian 2004; Hayat 2006), the second filter further scrutinizes those stocks that can be selected as components in Islamic index. Theoretically, the second filters imply that *Shari'a*-compliant firms are those that exhibit lower financial risks. This proposition is supported by Hakim and Rashidian (2004) who find that the Sharpe ratio (risk per unit of return) is lower for DJIM US than its broader counterpart, Wilshire 5000 Index. This unique characteristic of Islamic equity index is a major motivation for this study to examine the integration among Islamic equity markets separately from the broad equity markets.

Another motivation for this study is its potential contribution to the second and third elements that are prohibited in *Shari'a* investments, namely *gharar* and *maisir* (or *qimar*) which in the perspective of securities investments are intertwined to some extents. In El-Gamal (2000), Professor Mustafa Al-Zarqa' defines, "*Gharar is the sale of probable items whose existence or characteristics are not certain, due to risky nature which makes the trade similar to gambling*". Even though the main concern of *gharar* is on the certainty of product or services being traded, there is also argument on the uncertainty to the future cash flows embedded in the valuation of equity instruments. No instruments can be totally devoid of uncertainty, but those in equity investments could be too big that it

---

[1] Dow Jones Islamic Market indexes differ slightly in the specification of second filter in that they are using 33 percent cut off point for all three ratios. They also impose a third screening test which excludes companies in several inappropriate industries including distillers & vintners, food products, recreational products and many more.

creates skepticism among Muslim investors. In that respect, it is only natural that the risky nature of equity returns becomes an issue that should attract immediate attention given the role of equity investment in Islamic Capital Market (ICM). The stand of this paper is that, as in the case in generic equity markets, some of the ISM uncertainties can be relinquished by understanding the behavior of equity pricing which helps to improve the ability to predict stock returns. One way to accomplish this is by examining how and to what extent stock returns in Malaysian market are integrated with and therefore influenced by the world advanced markets of the US, UK, Canada, and Japan, regional Asia Pacific and Europe markets as well as global developed and emerging markets.

Based on these arguments, it is the objective of this study to examine the stock market integration from the new but highly progressive Islamic capital markets (ICM). It contributes to the existing literature of stock market integration through examining linkages between Malaysian as one and a part of emerging markets and some world most advanced markets and more importantly, this study could be the first of its kind to establish evidence on Islamic stock market integration. More specifically, this study analyzes the short-term structure of dynamic linkages among the selected Islamic stock markets (ISM) using the vector-autoregressive analysis (VAR).

The remaining of this paper is organized as follows. It continues with section 2 which presents a literature review on the stock market integration, with a brief discussion on the recent development on the ISM. Section 3 describes the data and research methodology. Section 5 reports and discusses the results and section 6 presents the conclusions and implications.

Background Studies

Integration in capital markets

The increasing integration in the world equity markets has been associated with the growing importance of financial liberalization and various economic integration mechanisms that have resulted in tremendous improvement in the flows of capital across national borders (Kim, 2005; Narayan et al, 2004). Nonetheless, close integration tends to be more of a phenomenon for developed than emerging equity markets as evidence exists that the latter remains segmented from the world markets. From international portfolio investment viewpoint, the segmentation can work in favor of the markets because theory

posits that optimal diversification effect is obtained by combining assets of less integrated markets (Liu *et al*. 1998). In other words, being segmented from the world equity markets gives emerging markets a sustainable advantage given the existing evidence that integration are strong but confined to intra-regional and less likely with the advanced markets (Masih & Masih 1999; Narayan *et al*. 2004). Given their reputation as investment centers that are capable of offering enormous potential payoff (Masih & Masih 1999; Liu *et al*, 1998; Chancharoenchai & Dibooglu 2006), the emerging markets including Malaysia have better chance to allure excess funds from the advanced markets to develop their equity markets.

Several studies have attempted to link the integration between emerging markets and the advanced markets with the role of information leadership from the more advanced markets, practically due to the sophistication of information technology and economic influence on the other less developed markets. In two related studies on the U.S and four Asian largest markets, Liu *et al*. (1998) and Kim (2005) find evidence consistent with those in earlier studies which in general support the general perceptions that the U.S provides the information leadership. Both studies also report that despite the close economic linkages between Japan and the other Asian market, the spillover from stock market in the former is weak until after the 1997 Asian crisis. From investment point of view, stock price transmission mechanism implies information in leader market is a significant predictor of stock price movement in the home market. In that regard, the market efficiency depends on its ability to adjust to the leader market information, fully and quickly. On the other side of the coin, inefficient market opens up opportunity for arbitrage while more emphasis should be put on leader markets which may not necessarily be the advanced markets.

Development in Islamic Stock Markets (ISM)

The history of Islamic equity investment has dated back in 1986 in the US and has been growing ever since to amount to USD6 billion in 2003 (Hayat 2006). The latest report published by Dow Jones in July 2007 is clear evidence on the development in the Islamic equity markets. In on 4 years, the market capitalization of Islamic stocks that are selected in the Dow Jones Islamic Index (DJI) alone is USD8.9 trillion for DJI US, USD1.5 trillion for DJI UK, USD1.6 trillion for DJI Japan, and USD734 billion for DJI Canada. In addition, the US Islamic equities now contribute to about 60 percent of the DJIM (global index). While the largest equity markets in the Islamic world like Saudi Arabia and the United Arab Emirates are quickly spreading their wings into this segment (Wilson 2007), historical data for these markets are either short or not easily

accessible making academic research practically impossible.

At regional level, the market capitalizations are USD3.8 trillion and USD4.7 trillion for DJI Asia-Pacific and DJI Europe, respectively. The same is true for other players of Islamic equity markets in Asia. Specifically for Malaysia, it has been widely acknowledged as one of the major player in Islamic capital markets (Naughton & Naughton 2000; Hayat 2006; Wilson 2007). Malaysia creates quite a history in Islamic capital world by being first to successfully initiate an Islamic Bond in 1983 (by Malaysian government) and to launch Islamic equity index in 1996 (by RHB Unit Trust Management Bhd) (OICU-IOSCO 2004). In 2003, the market capitalization of Malaysian Islamic equity is reported to reach USD103 billion, accounting for 58 percent of the national equity market (OICU-IOSCO 2004).

Figure 1 Historical performance of the Islamic versus broad stock markets

INDEX PERFOMANCE
DJIM VS. DOW JONES WILSHIRE
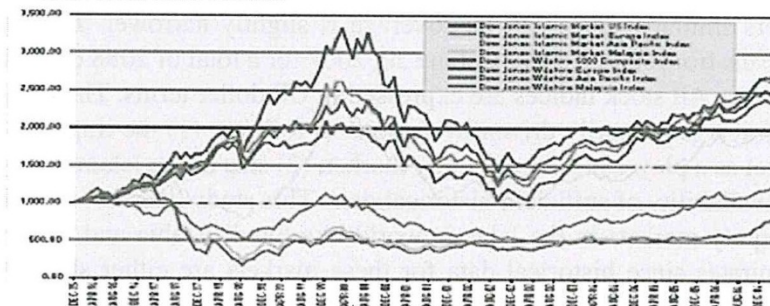
Performance history from Dec. 29, 1995 to Mar. 30, 2007. DJIM was launched February 9, 1999 and the Dow Jones Wilshire Global Index Family was launched October 16, 2006. Index performance data are based on backtesting, i.e., calculations of how the index might have performed prior to launch if it had existed using the same index methodology employed by Dow Jones today. See the disclaimer at the end of this document for more information on backtested data.

Source: Dow Jones Islamic Market Index.
The website is http://www.djindexes.com/mdsidx/index.cfm?event=showIslamicLinks

From investment point of view, the ISM is a progressing segment which offers a great potential to investors who may not necessarily refer to the more than 1.3 billion Muslims around the globe or among those who embrace the "socially responsible investment" (Hakim & Rashidian 2004; Hayat 2006), but also normal investors who will basically grab any opportunity when they see one. Such potential is adequately portrayed by the performance of Islamic equity index relative to their parallel but unrestricted counterparts as shown in Figure 1. Note that for the period of 1995 to 2006, the DJIM of the market or regional indexes almost always outperform the Wilshire index (broad stocks) for the respective market or regional index. These trends of the Islamic versus Wilshire (broad) indexes clearly indicate that investment in Islamic equities has a greater tendency to provide returns which are higher than investment in generic stocks.

Data and Research Methodology

Description of Data

The data consists of daily stock index closing price of Malaysia, four of world major stock markets (Japan, Canada, the UK, and the US), two regional indexes (Asia Pacific and Europe) and two world indexes representing the overall emerging markets (WE) and developed markets (WD). Because the focus of the study is on the Islamic equity market, naturally the choice of indices is Dow Jones Islamic Market Index (DJIM). Since it was launched in February 1999 as the first benchmarks to represent Islamic-compliant portfolios, DJIM remains the most comprehensive family of Islamic market measures with a total of 70 indexes that are created from the Shari'a's compliant stocks of 47 countries. The series include ISM indexes of the most developed including the ISM of the US and Japan to emerging markets including ISM of Malaysia and Pakistan. FTSE also offers similar indices, but its coverage is slightly narrower. The sample period spans from June 1, 1999 to June 30, 2007 for a total of 2088 daily return observations. All stock indices are expressed in US dollar terms. The choice of these markets is primarily driven by reasons as follows: (1) the importance of the market as a player in Islamic equity market; (2) size of the Islamic markets; and (3) availability of sufficient historical data. This study does not include the largest equity markets in the Islamic world like Saudi Arabia and the United Arab Emirates since historical data for these markets are either short or not easily accessible making academic research practically impossible.

Model Specification

This study utilizes Vector Auto Regression (VAR) analysis to trace the dynamic interdependence across daily returns of the Islamic stock market indexes in Malaysia and the major national and world stock market indexes selected in this study. The vector-autoregressive analysis (VAR) developed by Sims (1980) is applied onto an unrestricted reduced form equation system. In this study, the estimated nine-market VAR system encompasses;

$$R_t = \alpha + \sum_{k=1}^{L} \beta_k R_{t-k} + \varepsilon_t$$

where R_t is a 9 x 1 column vector of daily stock index returns, α and β_k are respectively, 9 x 1 and 9 x 9 matrices of coefficients, L is the lag length, and ε_t is a 9 x 1 column vector of serially uncorrelated error terms. The i, jth component of β_k measure the direct effect on the ith market of a change in the return to the

*j*th market in *k* periods. In effect, the *i*th component of ε_t is the innovation of the *i*th market which cannot be predicted from past returns of other markets in the system. In this study, the daily rate of return on stock market index is the relative rate of returns from buying the asset at time *t-1* and selling it at time *t*. Because of differences in time zones, returns at time *t* in the Asian markets and World Emerging markets are matched against the lagged returns of *t-1* in the UK, US, Canada, Europe, and the World Developed markets.

A VAR analysis supports the purpose of this study by providing two important aspects of the structure of dynamic interactions among the national stock markets. The variance decomposition of the *n*-step ahead forecast errors captures the percentage of unexpected variation in one stock market's return accounted for by shocks from other markets in the system. The impulse response captures the speed of adjustment of each market to a shock of another market. If the responses subside toward zero quickly, then the transmissions of information between these markets are relatively efficient. The generalized impulse response functions Pesaran and Shin (1998) are used to avoid variant due to Cholesky ordering.

Empirical Results

Data Preliminaries

Table 1 presents the statistical properties of the return series data. Panel A of Table 1 reveals higher returns are a common attribute of emerging markets. Each Malaysia, Asia Pacific, and World Emerging ISM Index provides an average daily return of 0.04% (equivalent to 14.40% per annum). With an exception of Canada (0.5%, equivalent to 18.00% per annum), other major markets show returns that barely reach 10.00% per annum. More surprisingly are the standard deviations of all indexes of the major markets except the World Developed that are much higher compared to those of the emerging markets. The resulting Sharpe ratio suggests that the risks per unit returns are higher among major markets than those among emerging markets. This characteristic is obviously unique from that found from their broad market indexes counterparts. The risk-return properties of ISM returns in Malaysia, the Asia Pacific and world emerging markets as a whole suggest that emerging market including the Asian region is not only viable investment centers in the broad stock markets, but more so in the Islamic stock market.

Finally, Figure 3 presents the responses of foreign ISM's to shocks in Malaysian ISM. Panel A shows that the responses of US is greater than that of Japan to innovation in Malaysia. This finding, which suggests a closer integration between Malaysia and the US than between Malaysia and Japan, is actually consistent with that found from the broad markets. Despite the geographical distance, the US is actually close to Malaysia (and most Asian countries) in term of trading relationship to an extent that Malaysian currency is pegged to the US dollar after the 1997 crisis. However, it is the integration between Canada and Malaysia that is more interesting. The response of Canada to innovation in Malaysia is surprisingly greater relative to the US and the other major stock markets. This finding suggests that in contrast to the much emphasis put on the integration between Malaysia and these world most advanced markets (i.e., the US and Japan), at least an equal emphasis should also be placed on the role of Canada on the future prospects of Malaysian ISM.

Panel A. Responses of the ith market to innovation in Malaysian Islamic market
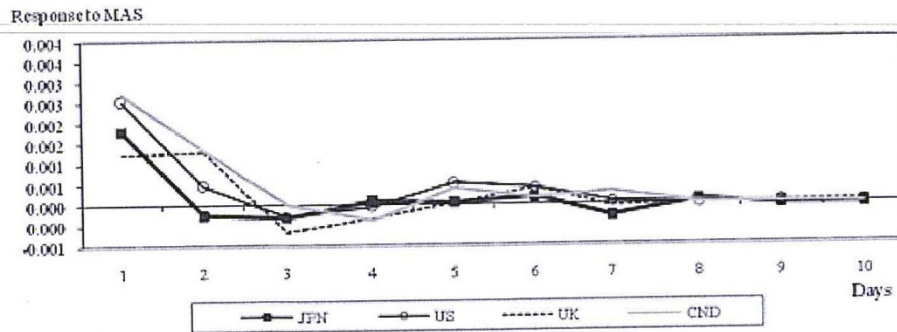
Panel B. Responses of the ith world market to innovation in Malaysian Islamic market
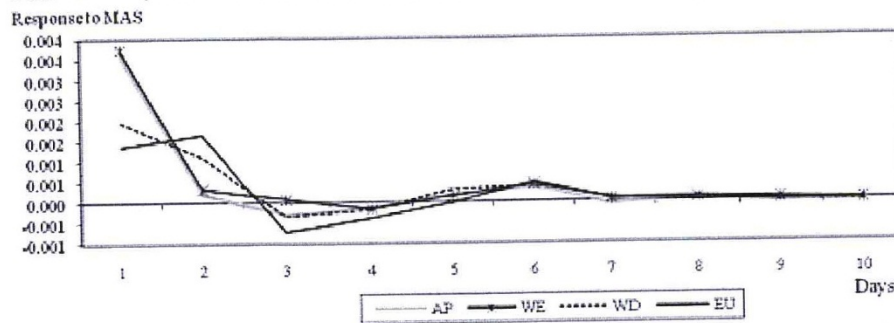

Figure 3 Generalized impulse responses of the ith market to one standard deviation innovations in Malaysian stock market

Panel B of Figure 3 shows that the Asia-Pacific and World Emerging Market have responses that are of greater magnitude compared to those of World Developed and Europe to innovations in Malaysia. This finding suggests that innovations in Malaysian ISM amounts more to the regional and emerging markets than to the developed markets. Coupled with the results in Panel C of Figure 2, it suggests that Malaysian ISM is more integrated with the other markets in the same region and other emerging markets in the world than with other developed markets. Masih and Masih (1999) explain that perhaps the reason for the strong intra-regional dependency is due to the greater share of intra-regional trade and investment within the Asian belt and similarities in the monetary policies adopted by these economies since the 1987 crash.

Conclusions and Implications

This study provides new evidence on significant interdependences between the Islamic stock market in Malaysian and those in several world established equity markets, both at the individual as well as collective levels. The results from the vector auto-regression (VAR) analyses lead to the following conclusions. First is that in general the dynamic interdependence between Malaysian ISM and the other major markets are still weak. The relatively weak interdependencies between the Islamic stock market in Malaysia and the established markets suggests potential benefits to investors in the later to improve their portfolios. Gain from international portfolio diversification is generally predicted in the existence of low interdependence among the returns of different stock indexes because of their tendencies to offset the specific risks.

Portfolio diversification can also be suggested in the case of incomplete market efficiency. As the results in this study show, neither Malaysia nor foreign markets are completely efficient in processing foreign news. The benefit to Malaysia is even greater because for an emerging economy that wishes to attain high and sustainable rates of economic growth, it needs an active stock market to help fuel and finance this growth. The Islamic component of the stock market can serve as a competitive advantage to Malaysia because it targets a segment of the global markets that has not been penetrated by other rivals. In other words, given that these world major markets are characterized as markets with excess investable funds, the weak integration suggests that Malaysia stands a great chance to be the hub of Islamic capital market if it can allure these funds to flow in and invest in its Islamic equity market, either directly in the Shari'a-compliant stocks or indirectly in the Islamic funds which invest in these Islamic equities.

Second, there is a relatively stronger interdependence between ISM of Malaysia and the US than those between Malaysia and other markets including Japan. Notwithstanding the fact that both Japan and the US are critical trading partners for Malaysia, this finding is somewhat consistent with the greater emphasis placed by Malaysia on the US in explaining its business and economics prospects. In the meantime, despite the weak integration between Malaysian and Japan ISM's, there is some evidence suggesting stronger intra- than inter-regional integration based on the interdependencies between Malaysia and Asia Pacific and World Emerging markets. To this end, the results suggest that while Malaysian ISM is weakly integrated with Japan, it is more strongly integrated with the other markets in the region.

Limitation of this study however should not be ignored. This includes the absence of major players in Islamic equity markets particularly the United Arab Emirates and Saudi Arabia in the analysis which has the tendency to change the structure of dynamic interdependence among the equity markets. This is a major setback of this study given the potentially huge investments that these giants may bring into the Malaysian Islamic equity market. Similarly is the exclusion of other Islamic equity markets in Asia such as Singapore which from broad equity market has been shown to exhibit strong integration with Malaysia.

References

Assaf, A. 2003. Transmission of stock price movements: the case of GCC stock Markets. *Review of Middle East Economies and Finance* 1 (2): 171-189.

Chancharoenchai, K. and Dibooglu, S. 2006. Volatility, spillovers and contagion during the Asian crisis: evidence from six Southeast Asian stock markets. *Emerging markets Finance and Trade* 42: 4-17.

El-Gamal, M.A. 2000. *A Basic Guide to Contemporary Islamic Banking and Finance*. http://www.ya-hussain.com/int_col1/Islambnkg [18 July 2007].

Girard, E. and Hassan, M.K. 2005. Faith-based ethical investing: the case of Dow Jones Islamic indexes, (http://www.fma.org/SLC/Papers/Faith-BasedEthicalInvesting.pdf [17 July 2007].

Hakim, S. and Rashidian, M. 2004. Risk and Return of Islamic Stock Market Indexes. A working paper. http://www.mafhoum.com/press4/136E15.pdf [16 July 2007].

Hayat, R. 2006. An empirical assessment of Islamic equity fund returns. Unpublished Thesis (http://www.failaka.com/Library/Articles/ RHayat_IEFReturns_Thesis.pdf [11 July 2007].

Ibrahim, M.H. 2006. Financial integration and international portfolio diversification: US, Japan and ASEAN equity markets. *Journal of Asia-Pacific Business* 7(1): 5-23.

Kim, S.J. 2005. Information leadership in the advanced Asia-Pacific stock markets: Return, volatility, and volume information spillovers from the US and Japan. *Journal of the Japanese International Economies* 19:.338-365.

Liu, Y.A., Pan, M.S. and Shieh, J.C.P. 1998. International transmission of stock price movement: evidence from the US and five Asian-Pacific markets. *Journal of Economics and Finance* 22: 59–69.

Masih, M.M.A. and Masih, R. 1999. Are Asian stock market fluctuations due mainly to intra-regional contagion effects? Evidence based on Asian emerging stock markets', *Pacific Basin Finance Journal* 7: 251–282.

Miyakoshi, T. 2001. Spillovers of Stock Return Volatility to Asian Equity Markets from Japan and the US. *Journal of International Financial Markets, Institutions and Money* 13: 383-399.

Narayan, P., Smyth, R., and Nandha, M. 2004. Interdependence and dynamic linkages between the emerging stock markets of South Asia. Accounting and Finance 44: 419–439.

OICU-IOSCO. 2004. *Report of the Islamic Capital Market Task Force of the International Organization of Securities Commission.* http://www. iosco.org/library/pubdocs/pdf [9 July 2007].

Pesaran, G.C. and Shin, Y. 1998. Generalized impulse response analysis in linear multivariate models. *Economic Letter* 58: 17-29.

Scachmurove, Y. 2001. Dynamic co-movements of stock indices: the emerging Middle Eastern and the United States Markets. A working paper. http:/// www.econ.upenn.edu/centers/CARESS.pdf [11 July 2007].

Sims, C.A. 1980. Microeconomics and reality. *Econometrica* 48: 1-48.

Wilson, R. 2007. Global Islamic capital markets: review of 2006 and Prospects for 2007. SGIA Research Working Papers Series SGIARWP07-05 http://eprints.dur.ac.uk/archive/00000234/01/51831. pdf [9 July 2007].