Islamic and conventional equity market movements during and after the financial crisis: evidence from the newly launched MSCI Indices

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Abstract

This paper examines the relationship between the Islamic and conventional equity indices by employing the newly launched MSCI Global Islamic Indices which began in 2008. We argue for the case of cointegration supported by fundamental, category and habitat theories, and against cointegration due to the fundamental difference between Islamic and conventional stocks in terms of debt ratio, accounts receivable and interest bearing securities. We find Islamic and conventional equity markets move together despite fundamental differences and given that market microstructure, dividends, capital gains, taxation and governance systems are different across the markets. Almost simultaneous movement of the permanent and cycle components of Islamic and mainstream equity indices has been supported by the application of the Beveridge Nelson (BN) time series decomposition technique. Theoretically, the volatility of Islamic equities should be lower due to their low leverage ratio. Surprisingly, permanent parts of the Islamic indices appear to be more volatile during the crisis period and less volatile during the post-crisis period.

JEL Classification: C32, F15, G01, G15

Key words: MSCI Global Islamic indices, financial crisis, cointegration, time series decomposition.

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1. Introduction

The main objective of the study is to investigate the relationship between Islamic equity indices and conventional equity indices. Although a few studies test the level of integration of Islamic equity markets (e.g, Arouri et al., 2013 and Dania and Malhotra, 2013) in different regions, several questions remain unanswered. Are Islamic and conventional equity markets related during the crisis period and in the post-crisis period? How do the permanent and transitory components of Islamic and conventional equity indices move overtime? Is the US still leading in the Islamic and conventional markets? Who is the closest competitor of the US since the crisis: Japan or BRICS? [4] We address these questions in this paper.

The arguments for stock market cointegration are strong. According to the fundamental theory, comovement in equity prices reflects comovement in fundamental values (Barberis et al., 2005). According to the theory of "fundamentals", stock returns comove due to either correlated changes in cash flows or correlated changes in discount rates. Change in the correlation of discount rates in turn is affected by either information about expected changes in interest rates or correlated changes in assets' rationally perceived risks. Under this view, the only plausible source of price movement is news about aggregate demand (Barberis et al., 2005). Markets for conventional and Islamic securities often interact. The standard theory of portfolio optimization is built on the assumption that different types of securities share common-factor value determinants (Brockman et al., 2010). The trading process may reflect these long-term interactions and may exhibit other dependencies as well. Trades may be correlated for non-informational reasons (Hasbrouk, 2007). A trader buying into a conventional index, for example, will place orders in many Islamic stocks. A trade in a

[4]BRICS stands for Brazil, Russia, India, China and South Africa. BRICS are distinguished by their large, fast-growing economies and significant influence on regional and global affairs; all five are G-20 members. As of 2013, the five BRICS countries represent almost 3 billion people, with a combined nominal GDP of US$16.039 trillion, and an estimated US$4 trillion in combined foreign reserves.

conventional stock, for example, that conveys information about a factor that is also a value determinant of an Islamic stock may move the price of Islamic stock.

The second theory is based on the "category" view of comovement analyzed in Barberis and Shleifer (2003). This theory states that investors first group their assets in different categories such as small-cap stocks, oil industry stocks, Islamic equities and invest accordingly in different categories. If a group of "category" investors are noise traders with correlated sentiment, and if they move funds from one category to another, their coordinated demand will affect the price and returns of assets even though cash flows of these assets are uncorrelated. In contrast to "category" based comovement, Barberis et al. (2005) document the "habitat" view of comovement. This theory assumes that many investors choose to trade only a subset of all available securities in the market. Such preferred habitats may arise because of transaction costs, international trading restrictions or lack of information (Merton, 1987). More generally, this view of comovement predicts that there will be a common factor in the returns of securities that are held and traded by a specific subset of investors. Islamic equities, passed through both qualitative and quantitative screening processes, can be regarded as a subset of listed stocks in the stock exchange in a country. Traders, if they choose to invest in Islamic equities, either because of the investor's religious beliefs or any other pertinent reasons, would be looking at a common factor in both Islamic and conventional markets. This common factor would determine the equilibrium prices in both markets and thus both markets would be cointegrated.

The stock market has interdependent price dynamics among conventional and Islamic stocks, but as the dependencies arise from correlated trade directions, they are inherently temporary. As long as correlation among the error processes of the conventional and Islamic securities is less than one, each price would evolve, at least in part, independently of the other. This means that in the long run, the prices of the two types of stocks would diverge, in

principle without bound (Hasbrouk, 2007). There are many situations, nonetheless, where the prices are so closely linked by economic factors that boundless divergence is not possible. An increasing divergence between conventional and Islamic stock prices would, however, run up against arbitrage. When conventional and Islamic stocks individually follow random walk (formally, "integrated") processes, but there exists a linear combination of these stocks that is stationary, these two variables are said to be cointegrated (for a formal model of cointegration in the context of market microstructure please see Hasbrouk, 1995). The conventional and Islamic stocks are both dominated by random walks. The difference between them is approximately stationary. It implies that they are cointegrated (Engle and Granger, 1987).

There is a noticeable difference between the US, Japan, Canada and BRICS in terms of market microstructure, dividends, capital gains, taxation and governance systems. Although developed markets are more liquid (lower bid-ask spread) than those that are developing (e.g, BRICS) we see a substantial amount of equity investment from developed markets to BRICS.[5] Among other reasons, unfavourable tax policies in the developed markets (e.g., double taxation in the US) and zero or low capital gains taxes in the BRICS countries has led to an increase in the flow of funds to BRICS. The increased flow of funds will increase information dissemination about aggregate demand, fundamentals and preferred habitats among those markets. Despite the differences among markets, all these factors have increased the level of integration among markets (Brockman et. al., 2010 and Hochstotter et al., 2014).

However, there are fundamental differences between the Islamic markets compared to the conventional markets which may make them fragmented. The Islamic financial system prohibits the payment and receipt of interest. It also deals with the Islamic industry screens

[5] In 2013, $1702 billion was invested by the foreign nationals in the BRICS's equity markets (BRICS Joint Statistical Publications, 2014).

that restrict investment in economic activities related to Sharia-forbidden activities. The Islamic industry concentrates its investments in technology, telecommunications, steel, engineering, transportation, health care, utilities, construction and real estate (Abd Rahman, 2010). Islamic equities include real sector investments and exclude investment in financial sectors. Bashir (1983) contrasts the Islamic and conventional financial systems by highlighting that Islamic finance is ownership-based and asset-driven, while the conventional system is interest-based and debt-driven. Theoretically, the volatility of Islamic equities should be lower due to their low leverage ratio.

Arouri et al. (2013) show that Islamic stock markets were less affected during the financial crisis. The application of screening methodologies changes the fundamental structure of Islamic equities from their conventional counterparts. Theoretically, firms are required to pay lower interest because of a lower leverage ratio. Moreover, lower account receivables reduce the possibility of incurring lower bad debt in the asset structure of the firms, which is again another fundamental distinguishing feature of Islamic equities from their conventional counterparts. Islamic equities, because of these unique features, theoretically could be considered as safer than conventional equities in general and during financial turbulence in particular since the requirement of interest payment is minimum for these firms. During a financial crisis, Islamic equity markets should be less volatile because of the lower leverage than their conventional counterparts.

Financial integration in general, and equity market integration in particular, may shrink the diversification benefits of the portfolio managers. Generally, portfolio managers make profitable deals when equity markets are either negatively or weakly correlated. This correlation between equity markets may jump to a high level during financial crises, which may induce portfolio managers to invest in alternative investments such as various commodities, real estate and top graded government securities. Interestingly, the endeavour of

portfolio managers to enjoy diversification benefits from alternative investments may soon disappear because correlation increases between the markets by the continuous investments in alternative assets markets. During financial crises, at one stage, all assets may behave like the market portfolio (James et al., 2012). In this paper, we examine whether Islamic and conventional Indices are related and thus whether Islamic indices behave in the same way as conventional indices.

This rapid growth of Islamic assets[6] prompted several governments and policy makers in a number of developed and developing economies to identify the Islamic financial industry as a key area for investment. Despite that, only a few studies examine the relationship between Islamic and conventional equity markets to assess the possible diversification benefits of portfolio managers. This situation can be explained by the short histories of these indices and by some methodological difficulties due to differences in size and industry-weighting (Fowler and Hope, 2007). With the launch of the MSCI Global Islamic Indices for the same conventional markets it would be easy to include Islamic assets in the portfolio. We take advantage of the relatively new launch of the MSCI Global Islamic Indices to examine the relationship between Islamic and conventional equity markets. In addition to the main issue of integration, our study examines the movement style of the permanent and transitory components of the Islamic and conventional equity indices under review.

We contribute to the literature in the following ways. Firstly, we examine the relationship between Islamic and conventional indices of the same markets. This is possible because of the relatively new launch of the MSCI Global Islamic Indices of the leading markets in January 2008. We show that Islamic and conventional indices are related in spite of applying Shariah screening of conventional equities. Secondly, our study also looks at the

[6] Market value of Islamic financial assets reached around $ 1.6 trillion in 2013 observing a high growth rate of 500% (Hammoudeh et al., 2013) from $1.46 in 2012 (Vizcaino, 2013).

movement style of the permanent and transitory components of the Islamic and conventional equity indices. Thirdly, we examine which market is the most independent after the financial crisis in our sample. Traditionally, the US is the leading market which exerts influence on all the markets and Japan plays a passive role. We investigate whether the BRICS have become a leading market as the growth rates of these economies are very high compared to the US.

By applying Johansen cointegration analysis, we find a statistically significant cointegrating relationship between the Islamic and conventional equity indices in the selected countries. Applying the VECM technique we find three exogenous and two endogenous Islamic equity indices. The exogenous Islamic equity indices are the US Islamic equity index, the BRICS Islamic equity index and the Chinese Islamic equity index. Endogenous Islamic equity indices are the Japanese and the Canadian Islamic equity indices. Surprisingly, permanent parts of the Islamic indices appear to be more volatile during the crisis period and less volatile during the post-crisis period, which indicates the quick recovery process in the Islamic stock markets. It is also observed that volatility of the BRICS Islamic equity index is relatively higher as compared to other Islamic indices of the developed markets. These findings imply that the Islamic indices in BRICS are more risky. While, theoretically, volatility of Islamic indices should be lower because of the lower leverage ratio, we observe that they are higher. Stock screening may also increase the riskiness of the Islamic portfolio. The overall results, in general, indicate the unique supremacy of the United States in both Islamic and conventional equity markets. Results also highlight the growing importance of the BRICS economy in both of these equity markets. Our results imply that the Islamic Indices are not safer during the financial crisis as in Milly and Sultan (2012).

The remainder of the paper is organized as follows: Section two presents differences among the markets and theory for and against cointegration. Section three provides a short literature review. The data and methodology are described in Section four. The results with

their interpretation are furnished in Section five. Finally, the study closes with a conclusion in Section six.

2. Arguments for and against cointegration given the differences among the markets

The markets in this study are different in terms of microstructure, taxation and legal systems compared to the US market. It is natural to ask, given these differences, why one would expect cointegration or not.

The market microstructure, such as the role of information in the price discovery process, asymmetric information, control of liquidity, alternate trading mechanisms and market structure, varies across the globe. The level of liquidity is dissimilar in different markets. One of the measures of liquidity is daily average proportional bid-ask spread which is estimated as: absolute spread divided by mid-quote where mid-quote is equal to (bid-price+ask-price)/2. The lowest to highest average proportional bid ask spread is estimated as: Japan (0.0000202), US (0.001194), Canada (0.001345), Russia (0.001211), China (0.001740), India (0.00390), South Africa (0.006301) and Brazil (0.010105) which shows the liquidity level of these countries. Market microstructure literature, especially commonality in liquidity, has attracted a lot of attention (Chordia, Roll and Subrahmanyam, 2000; Galariotis and Giouvris, 2007, 2008 and 2009). Since the risk level of each market depends on liquidity, investors may use liquidity information as an important indicator to form their portfolios. Therefore, it could increase the degree of liquidity commonality due to correlated trading which stems from various channels such as institutional investments, trade and financial linkages and the inter-banking system. Chordia, Sarkar and Subrahmanyam (2005) examine the interdependence of liquidity between different markets and show that shocks to liquidity in one market can have an impact on the liquidity in another market.

Similar to market microstructure, the taxation system is different among these countries. Taxation is important to investors because it affects their returns from investments. A classical tax system exists in China, Japan and India in which dividend payments are taxed at both the corporate and personal levels and interest payments are tax-deductible corporate expenses. The second is the dividend relief tax system, where dividend payments are taxed at a reduced rate at the personal level. A dividend relief tax system exists in Brazil and the US. Third is the dividend imputation tax system, where corporations can deduct interest payments, but where the domestic shareholders of a corporation receive a tax credit for the taxes paid by the corporation. Canada falls under the imputation system. Although there exists slightly different tax systems in these countries compared to the US, any shock given to the US has an impact on these markets.[7]

In the US, Canada, Japan, Brazil, China, India and Russia the capital gains taxes on the equity investments are 19.1%, 22.54%, 10%, 15%, 0%, 0% and 13%, respectively (Ernst and Young LLP, The 2011 Global Executive, 2011).[8] China and India's capital-gains tax rate is 0%, which is very low by international standards and thus attracts capital. If local investors do not like the tax policy they can invest in a country where tax rates are more favourable. Because of tax arbitrage and falling transactions costs, it is possible to invest in more tax-friendly places. In turn, this will generate more information flow among these countries. This might be another reason to expect cointegration.

The double tax on corporate profits in the US is of significant concern because it distorts a number of economic decisions. First, it discourages capital investment, particularly

[7] Even though US and Chinese markets do not overlap in their opening hours, studies show that US stock markets have had a significant ability to forecast Chinese stock market openings since 2006 (Ye, 2014).

[8] In Japan capital gains derived from the sale of shares are generally taxed at 20% (15% national tax plus 5% local inhabitant tax). If a taxpayer sells certain listed shares through a securities company or bank in Japan, a reduced tax rate of 10% (7% national tax plus 3% local inhabitant tax) applies. Canada allows capital gains to be taxed at half of the normal tax rate, and grants a reduced tax rate on dividends paid by Canadian, but not foreign, corporations.

in the corporate sector. This reduces capital formation generally and leads to the misallocation of investment within the economy. Second, the double tax favours debt over equity financing. Greater reliance on debt financing may leave certain sectors and companies more at risk during periods of economic weakness. Finally, a tax policy that discourages the payment of dividends can affect corporate governance by disrupting important signals dividend payments provide to investors about the financial health of companies. It also favours buybacks as compared to dividends. Double taxation in the US might lead investors to channel their funds to other markets which in turn might disseminate the information from the US to other markets.

The law of the US is largely derived from the common law system of English law. However, American law has diverged greatly from its English ancestor both in terms of substance and procedure. The Canadian legal system has its foundation in the English common law system with some influence from Scots law, inherited from being a former colony of the United Kingdom and later a Commonwealth Realm member of the Commonwealth of Nations. China, Japan and Brazil operate under the civil law system. India maintains a common law legal system. South Africa has a ‘hybrid’ or ‘mixed’ legal system, formed by the interweaving of a number of distinct legal traditions: a civil law system inherited from the Dutch, a common law system inherited from the British. However, the Islamic equities are based on the Islamic legal system of Sharia (Islamic law) and Fiqh (Islamic jurisprudence). Islamic law is one of the three most common legal systems in the world alongside common law and civil law. It is based on both a divine law, derived from the Qur’an and Sunnah, and the rulings of Ulema (jurists), who used the methods of Ijma (consensus), Qiyas (analogical deduction), Ijtihad (research) and Urf (common practice) to produce Fatwā (legal opinions). Despite different legal and governance structures across the

globe, previous studies have found a significant relationship between equity market comovements (Kasa, 1992).

Given the differences among markets, the question arises as to whether or not one should expect cointegration. Several theories have been advocated for cointegration. The first theory is the fundamental theory of cointegration which argues that comovement in equity prices reflects comovement in fundamental values (Barberis et al., 2005). The fundamental value of equities can change either because of changes in firms' expected cash flows or investors' revise their discount rates. According to the theory of "fundamentals", stock returns commove due to either correlated changes in cash flows or correlated changes in discount rates. Either information about expected changes in interest rates in the economy or correlated changes in assets' rationally perceived risks can change the correlation of discount rates. Under the fundamentals-based theory, the only plausible source of price movement is news about aggregate demand (Barberis et al., 2005). Well-informed and less-informed traders, generally, play in the Islamic equity market in the same way as in the conventional market. However, well-informed traders tend to use fundamental and other relevant information from the conventional equity market more efficiently to trade in Islamic equity markets. In other words, there is inherent additional information asymmetry in the Islamic equity market, which information efficient traders' use at the cost of information inefficient traders (Harris, 2003). Eventually, all traders in Islamic equity markets utilize information from conventional equity markets and consequently, both markets tend to move together. This trend can further be explained by the traditional theory of co-movement which is based on the fundamental values of securities.

The second theory is based on the "category" view of comovement analyzed in Barberis and Shleifer (2003). Investors invest in different categories of assets, for example, small-cap stocks, oil industry stocks or junk bonds etc. Noise traders are one category of

investors in such a market. They tend to move funds from one category to another even though the cash flows of these assets are not correlated and their coordinated demand affects the price and returns of assets. This theory explains the possible comovement of the Islamic equity market with the conventional equity market because investors categorize and consider Islamic and conventional stocks differently before making portfolio decisions. Then noise traders in both markets move funds from one market to another affecting the demand, price and returns in both markets. As a consequence, returns in both Islamic and conventional markets would move together.

In comparison to "category" based comovement, Barberis et al. (2005) document the "habitat" view of comovement. According to this theory, many investors choose to trade only a subset of all available securities in the market. Such preferred habitats may arise because of transaction costs, international trading restrictions or lack of information (Merton, 1987). This theory assumes a common factor in the returns of securities held and traded by a specific subset of investors. According to this theory, Islamic equities can be regarded as a subset of the listed stocks in the stock exchange. Traders, interested in Islamic investments (either induced by religious beliefs or influenced by other reasons), would look for a common factor in both Islamic and conventional markets. This common factor, in turn, determines the equilibrium prices in both markets and thus both markets move together.

The standard theory of portfolio optimization assumes that securities in a portfolio share some factors of value determination. Accordingly, these common factors may lead conventional and Islamic equity markets to interact with each other in price determination. Apart from price determination, the trading system may unveil other types of dependencies in these markets. Consequently, traders in different markets may be interconnected for non-informational reasons (Hasbrouk, 2007). Practically, traders dealing with securities in conventional markets may buy and sell securities in Islamic markets and vice versa. This type

of cross trading, for example, may exchange valuable information from conventional to Islamic markets and vice versa. Furthermore, cross inclusion of securities in both Islamic and conventional indexes may contribute to price discovery in both markets.

Interdependent price dynamics in conventional and Islamic stocks are inherently temporary since the dependencies arise from correlated trade directions. The price of each security would evolve independently as long as correlation among the error processes of the conventional and Islamic securities is less than one. As a result, prices of Islamic and conventional securities would deviate from each other in the long run in principle without bound (Hasbrouk, 2007). Meanwhile, there could be situations where boundless divergence may not be possible owing to the close linkage between stock prices and economic variables. An increasing divergence between conventional and Islamic equity prices would, however, enhance arbitrage opportunities for the traders. Islamic and conventional equity markets are said to be cointegrated when Islamic and conventional stocks individually follow the random walk process.[9] While both the conventional and Islamic stock prices follow random walks, the difference between them is approximately stationary; this implies that they are cointegrated (Engle and Granger, 1987).

One of the most important factors in terms of strengthening the linkages between stock markets is the development of communications technology and computerized systems. The development of these systems shortens the time between the initiation and completion of trades; information has become more available and allowed institutions, as well as individuals, worldwide to buy or sell stocks more quickly at lower transaction costs (Rubin and Rubin, 2010). These factors have also had a significant impact on increased capital flow among countries and a more interdependent financial world (Blackman, Holden and Thomas, 1994). Even though other markets are slightly different to the US, the transactions cost has

[9] For a formal model of cointegration in the context of market microstructure please see Hasbrouk (1995).

fallen and information flow has increased, which has created more linkages among the markets.

However, there are differences in Islamic and conventional equities which might lead the Islamic and conventional equity markets to become disintegrated. Any stock has to pass through a two-step screening process in order to qualify as an Islamic stock. Qualitative screening is applied in the first step to identify stocks which are approved in accordance with Islamic Shariah principles. Quantitative screening is subsequently applied on the stocks which have been qualified in the first step. MSCI uses three financial ratios for quantitative screening which are: (a) total debt over total assets, (b) sum of a firm's cash and interest bearing securities over total assets and (c) sum of a firm's accounts receivables and cash over total assets. None of the financial ratios may exceed 33.33% in order to be considered as Islamic stock. The main objective of applying quantitative screening is to discourage the use of debt financing and encourage equity financing since debt financing encourages receipt and payment of interests which is prohibited by Islamic principles. A lower leverage ratio in capital structure requires a firm to pay a lower volume of interest even though dealing with interest is non-permissible in Islam. In spite of Shariah restrictions, Islamic scholars allow the firms to use a minimum level of interest perhaps because of two Islamic rules (a) *Umum Balwa* (which is a prohibited element affecting most people and difficult to avoid) and (b) *Uruf* (custom) from secondary sources of Shariah. The principle of Umum Balwa is applied since it is very difficult to avoid interest from business operations because it has been practiced since ancient times. The principle of Uruf is applied to comply with decades of practice of interest in society. Sudden abandonment of interest may seriously interrupt the economic system in general and business operations in particular. Because of this divergence, there is a possibility that Islamic and conventional markets are not always related.

The Islamic financial system prohibits the payment and receipt of interest. It also deals with the Islamic industry screens that restrict investment in economic activities related to Sharia-forbidden activities. The Islamic industry concentrates its investments in the following industries: technology, telecommunications, steel, engineering, transportation, health care, utilities, construction and real estate (Abd Rahman, 2010). Further, researchers show that Islamic finance is ownership-based and profit driven while the conventional system is debt-based and interest driven (Bashir, 1983). Moreover, Robertson (1990), Usmani (2002) and Iqbal and Mirakhor (2007) discuss the implications of Riba or the premium that must be paid in addition to the repayment of the loan from the borrower to the lender.

The literature also highlights the potential importance of Islamic finance, mainly during the recent global financial crisis. Chapra (2009) postulates that excessive lending, high leverage on the part of the conventional financial system, and the lack of an adequate market discipline have created the background for the global crisis. Islamic finance principles can impose better discipline on the markets and prevent new crises from occurring. Dridi and Hasan (2010) examine and compare the performance of Islamic banks and conventional banks during the recent global financial crisis in terms of the impact of crisis on their profitability, credit and asset growth, and external ratings. They find that crisis impacts the two business models differently. Dewi and Ferdian (2010) further argue that Islamic finance may be a solution to the financial crisis because it forbids the practice of interest. Ahmed (2009) claims that the global financial crisis is a result of misunderstanding and mismanagement of risks at institutional, organizational and product levels. He suggests that if institutions had followed the principles of Islamic finance they would have prevented the current global crisis from occurring. While comparing the impacts of the financial crisis on Islamic and conventional stock markets in three global areas, and finding less negative effects on the former than the latter, Arouri et al. (2013) examine diversified portfolios in which the Islamic stock markets

supplement the conventional markets. They demonstrate that augmented portfolios lead to less systemic risks and generate more significant diversification benefits.

Dividend distribution and capital gains are not only lawful in Islamic finance, but encouraged. However, if the main business of a firm is unlawful (e.g., gambling, pornography, weapons) in terms of Shariah rules, investors are not allowed to invest in such stocks. While capital gains and dividend payment are based on firms' fundamentals, cointegration represents the long run relationship of either firms or stock markets. In spite of fundamental differences between Islamic and conventional firms in terms of governance, legal, financing, payment and return structure, stocks of both types of firms are traded in a similar market structure. Moreover, they co-exist in the same tax environment and are regulated by the same Securities and Exchange Commission in addition to the Shariah advisory board for Islamic firms. Hence, an empirical question arises as to whether Islamic and conventional markets are related or decouple?

3. Literature Review

3.1 Studies investigating the relative performance of Islamic and conventional stock indices.

A recent strand of literature investigates the linkage and causality between Islamic and conventional equity markets to assess the relative portfolio diversification benefits in both markets. Ajmi et al. (2014) applied heteroscedasticity-robust linear Granger causality and nonlinear Granger causality tests on daily data over the period January 4, 1999 to October 8, 2010 to investigate the links between the Islamic and conventional stock markets, and several global economic and financial shocks. The findings of the study show evidence of significant linear and nonlinear causality between the Islamic and conventional stock markets, while the causality flow seems stronger from the Islamic stock market to other markets. This evidence suggests rejecting the hypothesis of decoupling of the Islamic stock market from their

conventional counterparts and thereby reducing the portfolio benefits from diversification in Islamic stock markets. On the other hand, Dania and Malhotra (2013) find evidence of a positive and significant return spillover from conventional stock returns in North America, the European Union, the Far East and Pacific markets to their corresponding Islamic stock returns. Arouri et al. (2013) compare the impacts of the financial crisis on Islamic and conventional stock markets in three global areas and find less negative effects on the former than the latter. The study further demonstrates that augmented (revised) portfolios lead to less systemic risks and generate more significant diversification benefits.

A few recent studies have investigated the relative performances of Islamic and conventional stock indices using different approaches. Using a large international sample of 35 developed and emerging markets, Walkshausl and Lobe (2012) analyze the comparative performances of Islamic and conventional stock indices. The study finds a significantly positive four-factor alpha for the aggregate developed markets region, while there is no compelling evidence of performance differences in robust Sharpe ratio tests and after controlling for market risk. This outperformance stems, however, mainly from the US and is largely attributable to the exclusion of financial stocks in Sharia screened portfolios.

Al-Khazali et al. (2013) applied the stochastic dominance approach on nine Dow Jones Islamic indices (Asia Pacific, Canadian, developed Countries, emerging markets, European, global, Japanese, UK and US indices) and their conventional counterparts in order to investigate whether Islamic stock indices outperform their conventional counterparts. The study finds that all conventional indices stochastically dominate Islamic indices at second and third orders in all markets except for the European market over the periods 1996–2012 and 2001–2006, while the European, US and global Islamic stock indices dominate the conventional ones during the 2007–2012 period. In line with the findings by Al-Khazali et al. (2013), another recent study by Ho et al. (2013) shows that Islamic indices outperformed their

conventional counterparts during crisis periods, however, the results are inconclusive for the non-crisis periods. This study used returns from 12 major global Islamic and conventional indices from eight countries namely the United States, the United Kingdom, Malaysia, Indonesia, Hong Kong, Switzerland, India and France.

Hopener et al. (2011) showed that Islamic funds from the six large Islamic financial centres of the GCC and Malaysia performed competitively and outperformed international equity market benchmarks. Another study on return performance by Albaity and Mudor (2012) found no significant difference between the Islamic and conventional indices during different crisis periods. In contrast, Aka (2009) confirmed that the MSCI Global Islamic Index significantly outperformed its conventional counterpart by over fifteen percent between 2004 and 2009. The study also concluded that the key benefit of Shariah investing is that it is less volatile and less likely to experience large market swings relative to conventional investment. Merdad et al. (2010) also discovered that Islamic funds underperformed conventional funds during overall and bullish periods, but they outperformed conventional funds during bearish and financial crisis periods.

3.2 Studies investigating the relationship between risk and return in Islamic and conventional stock indices.

A few studies have compared the difference in risk and return between Islamic and conventional investment vehicles. For instance, Milly and Sultan (2012), using weekly data over 2000–2009, compare the performance of investing in conventional stocks, Islamic stocks and socially responsible stocks and find that the Islamic stock portfolio generated significantly larger Sharpe ratios. Based on these results, Milly and Sultan (2012) conclude that investing in Islamic stocks may be safer during periods of economic and financial distress.

Kok et al. (2009) find the absence of a long run relationship between Islamic and conventional indices of different regions. In line with the findings of Kok et al. (2009), Hakim and Rashidian (2002) applying cointegration and causality tests, found no long-term relationship between the Dow Jones Islamic Market Index and a diversified conventional index. Using multivariate cointegration analysis, Girard and Hassan (2005) suggest that the Islamic and conventional indices were poorly integrated from 1996 to 2005. Guyot (2011) extended the analysis to cover nine pairs of indices from the same index family and found the same conclusion that supports the absence of cointegration over the long term between Islamic and conventional indices. These findings of the absence of cointegration between Islamic and conventional indices are conducive to improving diversification benefits of portfolio managers. These findings, to some extent, contradict the real-life situation since Islamic indices are basically a subset of the main indices in the markets. The Islamic equity index is created from the main index passing all stocks through qualitative and quantitative screening procedures.

3.3 Studies investigating the risk – return features and portfolio optimization of Shariah-compliant equity funds.

Another strand of studies investigated risk-return features and portfolio optimization of Shariah-compliant equity funds. For instance, Derigs and Marzban (2009) investigate the effects of different strategies to construct Shariah-compliant financial portfolios. The study states that current Shariah-compliant portfolio management differs from the conventional one by sector and financial screening by which the asset universe gets relatively smaller for the Shariah-compliant portfolio management. The study further argues that different Shariah scholars from different schools of thought differ in their opinion regarding the qualitative and quantitative screening process, which leads to significant differences with respect to Shariah compliance.

Hayat and Kraeussl (2011), in their study, use a number of techniques to attain a cross-section of estimated coefficients for systematic risk (beta), risk-adjusted return (alpha), market timing (gamma and theta) and downside risk (relative beta) using excess returns of 145 open-ended Islamic equity funds (IEFs) over the period 2000 to 2009. The study finds an average underperformance of IEFs managers as compared to the Islamic and conventional benchmarks, even before considering management fees. The study also find that locally invested IEFs performed marginally better than the globally invested IEFs, even though overall performance of IEFs was below the mark.

A recent study by Lean and Teng (2013) used MGARCH-DCC and Granger causality tests in order to examine the financial integration of two world leaders (the US and Japan) and two emerging powers (China and India) into the Malaysian stock market. This study used the monthly stock indices from January 1991 to June 2010 of five countries: Malaysia, the US, Japan, China and India. The results of the study show that the financial integration between Malaysia and China started to evolve in April 2004. Strong financial integration between the stock markets in India and Malaysia was observed. In contrast, the volatility spillover effect from the US to Malaysia disappeared, especially in the short term. Nevertheless, the study suggests that in the long run, investors in Malaysia could gain by diversifying their portfolios in China and Japan relative to India and the US.

4. Data and Methodology

4.1 Data sources and Description of the Variables

This study uses ten MSCI Global Islamic and conventional equity indices, five from each group. Each group covers the equity indices of BRICS, China, Japan, the United States and Canada, which are the leading economies in the world in terms of stock market, banking market, industrial production and international trade except BRICS, which consists of the

most dominant emerging markets. A Total of 1174 daily price observations of each of the ten indices collected from DataStream have been used in this study spanning the January 01, 2008 to June 29, 2012 period. It is recommended that relatively longer period data be used in order to address the issue of integration amongst the equity markets. As a matter of fact, the longer the span of data period, the more robust and reliable the result. In spite of this fact, this study, in comparison with other related studies, used relatively shorter period data as the MSCI launched the Islamic equity index for various countries on January 01, 2008. As compensation for this deficiency, this study used daily index prices instead of weekly index prices with a view to increasing the number of observations for analysis.

In addition to ten equity indices, a dummy variable was considered in order to capture the impact of the 2008 global financial crisis on the price movement of the equity indices used in this study. A dummy variable is defined as D = 1 for the crisis period and 0 otherwise in this study. Table 1 below portrays a brief description of the variables used in this study. The study uses a logarithmic value of the equity indices for the entire analysis.

[Insert table 1 here]

Statistical features such as average price, standard deviation, skewness and kurtosis of the variables used in this study are presented in the following Table 2. The largest and the smallest average Islamic equity values are found for Canada and Japan respectively. Surprisingly, Japan leads the conventional equity indices by its highest average value. This result primarily indicates that Japan is less affected by the financial crisis in conventional equity markets during the study period. Standard deviation shows absolute time independent variability of the return, which is largest for the BRICS economy both in Islamic and conventional equity indices indicating the higher level of volatility (riskiness) in the market. Interestingly, Japanese Islamic and conventional equity indices are the least volatile implying the lowest riskiness.

[Insert table 2 here]

Skewness, the third moment of the any distribution, indicates asymmetry of a distribution. Zero skewness indicates to symmetry of a distribution. On the contrary, positive skewness refers to an asymmetric distribution with a larger tail inclined to the right and negative skewness refers to an asymmetric distribution with a larger tail inclined to the left. The above result shows that distribution of all indices is negatively skewed except for the Japanese conventional equity index, which indicates that equity price distributions are not symmetric thus leading to relatively higher variability and risk.

On the other hand, kurtosis, the fourth moment of the distribution, measures the fatness of any distribution relative to normal distribution. Measures of kurtosis describe how concentrated data are around the mean of the distribution. The more peaked or flat the distribution, the less normally distributed the data and vice versa. The kurtosis value is 3.00 for a normal distribution, i.e. the distribution is neither peaked nor flat. A kurtosis value of more than 3.00 indicates leptokurtic (peaked) distribution and the distribution is platykurtic (flat) with a kurtosis value of less than 3.00. Accordingly, the majority of Islamic and conventional equity indices are leptokurtic (peaked) with the exception of the US Islamic and conventional equity indices, which are slightly lower than 3.00 indicating mild flatness of the price distribution. In both cases, prices are not normally distributed and consequently, there exists price variability and higher risk.

4.2 Econometric Modeling

Traditional multivariate regression analysis, which has been widely used to investigate the relationship between variables, suffers from serious limitations because of the non-stationarity nature of most of the macroeconomic and financial variables. With the non-stationary variables, traditional regression provides either a spurious relationship (if the original ‘‘level’’

form of the variables was non-stationary) or a short run relationship (if the variables were ‘‘differenced’’ to make the original variables stationary) (Masih et al., 2010). This study, because of the serious shortcomings of multivariate regression analysis, employs the Johansen multivariate cointegration approach to examine the comparative long run theoretical relationship between Islamic and conventional equity indices amongst the selected markets.

After checking cointegration, this study applies the vector error correction model (VECM) to determine the speed of the short-run adjustment towards long-term equilibrium by the size of the error correction coefficient. VECM also helps to identify the dependent (endogenous) and independent (exogenous) variables (equity indices). In addition, this study also applies the variance decomposition technique to examine the relative exogeneity/endogeneity of the Islamic and conventional equity indices. Finally, this study employs the Multivariate Beveridge-Nelson (BN) decomposition technique in a cointegrating framework in order to decompose the price trends of the Islamic and conventional equity indices into their permanent and transitory parts. Charting of the permanent and transitory parts of the trend would be very much conducive to tracking the price movement style of the indices due to the performance (fundamentals) of the firms in the indices and the temporary shocks in the economy.

4.2.1 Johansen Cointegration and other related tests

The Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) tests are used to check the stationarity of the variables as a starting point of the Johansen cointegration test. The lag length for the time series analysis is determined by choosing the lag length given by the minimum Akaike Information Criteria (AIC) and Schwarz Information Criteria (SBC). The Augmented Dickey-Fuller (ADF) (1979, 1981) test involves the estimation of the following general specification:

$$\Delta X_t = \alpha_0 + \alpha_1 T + \beta X_{t-1} + \sum_{J=1}^{P} \delta_J \Delta X_{t-J} + \varepsilon_t \quad (1)$$

In the ADF equations, Δ represents the difference operator, α_0 represents the constant term, α_1, β and δ_j are coefficients to be estimated. X stands for the variable in question to check stationarity and ε is the residual term.

The Phillips-Perron (PP) (1989) test uses the following Dickey-Fuller (DF) equation and then corrects the standard deviation of "rho (ρ)" of the DF equation for both autocorrelation and heteroscedasticity through the use of the Neway-West procedure (unlike the ADF equation which corrects only autocorrelation):

$$\Delta y_t = \alpha + \rho \delta t - \rho y_{t-1} + \varepsilon_t \quad (2)$$

The critical values for the Phillips-Perron (PP) test are identical to the DF test, and depend on whether the above DF regression equation contains an intercept term or a time trend.

After testing the stationarity of the variables, the Johansen cointegration technique is employed to examine the cointegration of the equity indices under review. Johansen (1988) and Johansen and Juselius (1990) suggested consideration of the vector autoregressive (VAR) model of the following form:

$$\Delta Y_t = C + \sum_{i=1}^{k} \Gamma_i \, \Delta Y_{t-i} + \Pi Y_{t-1} + \varepsilon_t \quad (3)$$

where, Y_t is a vector of non-stationary variables and C is a vector of constant terms. The matrix Γ_i consists of the short run adjustment parameters and matrix Π contains long run equilibrium relationship information between the Y variables. The Π could be decomposed into the product of two $n \times r$ matrix α and β so that $\Pi = \alpha\beta'$, where the β matrix contains r number of cointegration and α represents the speed of adjustment parameters. Johansen (1988) and Johansen & Juselius (1990) developed two statistics to identify the number of

cointegrating vectors, which are Trace statistic(λ_{Trace}) and the maximum Eigen value statistic (λ_{Max}). These two statistics can be expressed as follows:

$$\lambda_{Trace} = -T \sum_{i=r+1}^{N} \ln (1 - \hat{\lambda}_i) \quad (4)$$

and,

$$\lambda_{Max} = -Tln\left(1 - \hat{\lambda}_{r+1}\right) \quad (5)$$

Where, λ_i is the estimated value of the *ith* characteristics root obtained from the estimated parameter matrix Π and T is the number of usable observations. The λ_{Max} statistic tests the null hypothesis that there are at least r cointegrating vectors as against the alternative of (r+1) cointegrating vectors.

The presence of cointegration indicates that there exists a theoretical relationship among the variables and they are in equilibrium in the long run in spite of short-run deviation from each other. Masih et al. (2010) stated that a test of cointegration can also be considered as a test of the extent of the level of arbitrage activity in the long term. Cointegration implies that these variables are interdependent and highly integrated (as if they are constituents of one integrated market). Cointegration also implies that each variable contains information for the prediction of other variables. Moreover, the evidence of cointegration has implications for portfolio diversification by the investors. The possibility of abnormal gain through portfolio diversification is limited in the long run in a cointegrated market.

The presence of cointegration, however, cannot express the direction of Granger causality between the variables as to which variable is leading and which variable is lagging (i.e. which variable is exogenous and which variable is endogenous) (Masih et al., 2010). The Vector Error Correction Model (VECM) is applied to determine the endogeneity/exogeneity of the variables. The error correction term (ECT) stands for the long term relations among the

variables. At least one of the ECT terms should be significant for the validity of the cointegrating relationship among the variables in the long term. If the error correction term is insignificant, the corresponding dependent variable is 'exogenous'. On the contrary, if the error correction term is significant, the corresponding dependent variable is 'endogenous'. This study estimates the Vector Error Correction Model (VECM) after finding cointegration among the indices. The VECM implies that changes in the dependent variable are a function of the level of disequilibrium in the cointegrating relationship, i.e. the departure from the long run equilibrium as well as changes in other explanatory variables. For intensive analysis, the generalized (reduced) form of VECM is derived as follows:

$$\Delta Y_t = C + \Pi Y_{t-k} + \sum_{i=1}^{k-1} \Gamma_i \, \Delta Y_{t-i} + \varepsilon_t \qquad (6)$$

In equation (7), ΔY_t is the vector of first differences of the variables. The long run parameter matrix, Π with r cointegrating vectors$(1 \leq r \leq 5)$, Π has a rank of r and can be decomposed as $\Pi = \alpha\beta'$, both α and β are $5 \times r$ matrices. The β matrix contains the parameters in the cointegrating relationships and the α matrix contains the adjustment coefficients which measure the strength of the cointegrating vectors in the VECM. Following estimation of VECM, this study performs a variance decomposition technique to break down the variance of the forecast error for each variable into proportions attributable to each variable in the model, including its own. The variable which is explained mostly by its own past is the most leading variable.

4.2.2 Beveridge Nelson (BN) time series decomposition

Analysis of a time series is associated with the decomposition of a time series into a set of interpretable components. Traditionally, a time series can be decomposed as follows:

$$y_t = M_t + C_t + S_t + I_t \quad (7)$$

Where, M_t, C_t ,S_t & $I_t$denote the trend, cyclical, seasonal and irregular component of a time series *y* respectively at time *t.*

A more recent decomposition is that by Beveridge and Nelson (1981) who proposed that a time series can be partitioned into stationary (temporary/transitory) and non-stationary (permanent) components. Formally, they tailor the permanent and temporary decomposition to the stochastic properties of the data. The permanent component was always composed of a random walk with the same rate of drift as in the original data. In addition, the permanent component also comprised a disturbance term proportional to that of the original data. The transitory component represents the predictable part of the data, and was expected to dissipate as the series tends to move to its permanent level as stated by Silva (2007). He also pointed out that there are two different formulations to measure the trend and cyclical components, one is the ARIMA specification which is advocated by Beveridge and Nelson (1981), and the other is the structural time series approach advocated (amongst others) by Harvey and Jaeger (1993). The results from these two procedures are typically very different. The ARIMA specification commonly yields a dominant trend whereas the structural time series generates a dominant cycle. In recent times, there has been an attempt to reconcile these two approaches by Morley et al. (2003) and Proietti (2002), who concluded that any structural time series model has an ARIMA representation, but not vice-versa.

The derivation of the Multivariate BN decomposition starts by stating the Wald decomposition for a vector of time series integrated of order one, which is:

$$\Delta y_t = \mu + C(L)\epsilon_t \quad (8)$$

where, $C(0) = I_N$and $\sum_{j=1}^{\infty} j\left|C_j\right| < \infty$. If we assume $\mu = 0$ for simplicity, equation (8) can be rewritten as follows:

$$\Delta y_t = C(1)\epsilon_t + \Delta \mathrm{C}^{*}\,(\mathrm{L})\epsilon_{\mathrm{t}} \quad (9)$$

where, $C_i^* = -\sum_{j>i}^{\infty} C_j$ for all $i$and $C_0^* = I_N - C(1)$. Integrating both sides of equation (9) provides the following:

$$y_t = C(1)\sum_{s=0}^{\infty} \epsilon_{t-s} + C^*(L)\epsilon_t \quad (10)$$

Equation (10) represents the multivariate BN decomposition, where the first and the second terms denote the permanent (trend) and the temporary (cyclical) components of a time series respectively. In the presence of a cointegrating relationship (meaning if a common trend exists), $C(1)$ will be of reduced rank. Specifically, the rank of *C*(1) will equal *k*, where $k < N$ and *C*(1) can be expressed in the following form:

$$C(1) = \gamma\delta' \quad (11)$$

where, γ and δ are both of rank k. The common trend Beveridge-Nelson-Stock-Watson (BNSW) decomposition can be expressed as follows:

$$y_t = \gamma\tau_t + C_t \quad (12)$$

where, τ_t and C_t represent the trend and cycle components at time t. The trend component τ_t can be expressed as follows:

$$\tau_t = b + \tau_{t-1} + \delta'\epsilon_t \quad (13)$$

Repeated back substitution of equation (13) yields the following:

$$\tau_t = \delta'\sum_{s=0}^{\infty} \epsilon_t \quad (14)$$

Substituting equation (14) into equation (12), we get the following expression:

$$y_t = \gamma\delta'\sum_{s=0}^{\infty} \epsilon_{t-s} + C^*(L)\epsilon_t \quad (15)$$

Equation (15) is the common trend specification of the BN decomposition, which Watson (1994) refers to as the common trend representation of the cointegrated system.

5. Empirical Results

5.1 Unit Root tests

This study applies Augmented Dicky Fuller (ADF) and Phillips Perron (PP) unit root tests with intercept and, intercept and linear trend to check the stationarity of the Islamic and conventional equity indices. Table 3 summarizes the unit root test results:

[Insert Table 3 here]

Both tests assume null hypothesis of non-stationarity against the alternative hypothesis of stationarity. Stationarity of the variables necessitates accurate and efficient prediction of the future. The above test results conclude that all variables are non-stationary at level and stationary at first difference, implying that the variables are integrated of order one, that is, *I(1).*

5.2 Johansen Cointegration test

The study employed the standard Johansen cointegration test in order to check the cointegration between the Islamic and conventional equity indices of the concerned markets undertaken by the study. Besides, the study also checked cointegration among the Islamic and conventional equity indices separately. In both cases, cointegration was checked with a VAR order of 2, which was determined by the appropriate lag length criteria of Akaike's Information Criterion (AIC) and Schwartz's Bayesian Criterion (SBC). Panels A and B of Table 4 report the cointegration test results (represented by maximum eigenvalue and trace statistic) between the Islamic and conventional equity indexes in BRIC, China, Japan, the US and Canada.

[Insert Table 4 here]

There exists a statistically significant cointegrating relationship among the *I(1)* variables if the calculated either maximum eigenvalue or trace statistic is larger than either 95% or 90% critical value. If the calculated maximum eigenvalue (or trace) statistic is larger

than either 95% or 90% critical value, we reject the null hypothesis (H_0): r = 0 against the alternative hypothesis (H_1): r =1, which indicates presence of one statistically significant cointegrating relationship among the variables. Accordingly, this study finds one statistically significant cointegrating relationship between the Islamic and conventional equity indices in BRICS, China, Japan, the US and Canada. Applying the same criteria, this study finds three statistically significant cointegrating relationships amongst the selected Islamic equity indices. In addition, the study further finds the same number of cointegrating relationships among the conventional indices from the same economies. This result indicates a dominance of conventional stock markets over the Islamic stock markets (as Islamic stocks comprise a subset of the total stocks in the markets) in the markets under review and as a consequence, Islamic equity markets seem to follow the conventional equity markets.

The relationship among the variables is not spurious when they are cointegrated. This implies that there is a theoretical relationship among the selected equity indices and they are in equilibrium in the long run even though their movement may deviate from each other in the short run. Evidence of a cointegrating relationship implies that there exists a common force that creates equilibrium among Islamic and conventional equity indices in the long term. This long run theoretical relationship also states that these Islamic and conventional indices are highly integrated and tends to form a common market where gain from arbitrage activity would be insignificant. Each Islamic and/or conventional index contains information to predict another Islamic and/or conventional index when they are cointegrated. The possibility of abnormal gain from portfolio diversification would be at a minimum when the assets (Islamic and conventional indices) are cointegrated. By the same token, multinational firms should prudently formulate their investment policies while investing across the countries.

5.3 Vector Error Correction Model (VECM)

The presence of cointegration, however, does not indicate the direction of Granger causality between the variables in terms of which variable is leading and which variable is lagging, i.e. which variable is exogenous and which variables is endogenous. This study applied the vector error correction modeling technique in order to precisely identify the exogenous (independent) and endogenous (dependent) variables. Panels A and B of Table 5 summarize the VECM results for Islamic and conventional equity indices respectively in the markets under review.

[Insert Table 5 here]

The result reports three coefficients of three error correction terms for each Islamic and conventional equity index since the study finds three statistically significant cointegrating relationships among the Islamic and conventional indexes.

The study assumes one cointegrating relationship among the Islamic indices of BRICS, China and the US. The coefficients of error correction terms of BRICS are insignificant, which indicates that the BRICS Islamic equity index is independent (exogenous) of other indexes in the cointegrating relationship. As for the conventional index, the coefficients of the first and second error correction terms of BRICS are insignificant indicating independency of BRICS in the conventional equity market as well. These results document BRICS equity markets as a driving force in the short run.

We assume another cointegrating relationship among the Islamic equity indices of Japan, China and the US. The coefficients of second and third error correction terms of the Japanese Islamic equity index are significant. On the other hand, the coefficient of the second error correction term of the Japanese conventional equity index is significant. These results address that the Japanese equity index is dependent (endogenous) on other equity indices in both the Islamic and conventional markets. This finding is not surprising since the Japanese

economy is bank-based not equity market-based. However, other economies in the cointegrating relationship are equity market-based. Moreover, the US equity market may inherently exert influence on the Japanese equity market in terms of return and risk.

The coefficients of first and third error correction terms of the Canadian Islamic equity index are also significant, which indicates that the Canadian Islamic equity index is also dependent (endogenous) on other Islamic indexes in the third cointegrating relationship among the Islamic indexes of Canada, China and the US. Surprisingly, as for the conventional equity market, the Canadian equity index is found to be independent (exogenous) of other indices in the relationship. This result, even though contradictory, indicates that the Canadian equity market is independent of the Chinese equity market but not of the US equity market.

The coefficients of all three error correction terms of both US Islamic and conventional equity indices are found to be insignificant, which implies that both US Islamic and conventional equity indexes are independent (exogenous) of other Islamic and conventional equity indices in all three cointegrating relationships. These results address the overall leadership of the US Islamic and conventional equity markets over other concerned markets. Similarly, analysis shows that the coefficients of first and third error correction terms of the Chinese Islamic equity market are insignificant, which also indicates that the Chinese Islamic equity market is independent in the first and third cointegrating relationships. However, with regard to the conventional markets, the Chinese equity index is found to be independent only in the third cointegrating relationship and dependent on other conventional indices in the first and second cointegrating relationships. This is not surprising since the Chinese Islamic equity index is a subset of the major equity index in China. These results indicate better performance of the Chinese equity market next to the US equity market. Moreover, the significant role of Chinese equity markets, both Islamic and conventional, in

the global economy mirrors the high growth rate (around 7.5% p.a. [10]) of the Chinese economy in the world.

Significance of the error correction terms of Japanese (both Islamic and conventional) and Canadian Islamic indexes also implies that the deviation of the variables (represented by the error correction terms) has a significant feedback effect on the Japanese (both Islamic and conventional) and Canadian Islamic indices that bears the burden of short-run adjustment to bring about long-term equilibrium. In addition, the error correction model helps to distinguish between the short-term and long-term Granger causality. The coefficient of error correction term also indicates the speed of short-run adjustment to bring about the long-term equilibrium. The coefficient of the second error correction term of the Japanese Islamic index is 0.1006, which states that disequilibrium in the price of the Japanese Islamic index tends to be corrected by 10.06 percent daily. It also indicates that if the long-run equilibrium among the Islamic indices taken into account is disturbed by any shocks, it would take about 10(=1/0.10006) days to restore the equilibrium. Similarly, the coefficient of the second error correction term of the Japanese conventional index is 0.07597, which states that disequilibrium in the price of the Japanese conventional index tends to be corrected by 7.60 percent daily. In addition, any deviation (caused by any shock) from the long run equilibrium among the conventional indices would be corrected in approximately 13 days. This result tends to imply a relatively higher efficiency of the Islamic equity index as compared to the conventional equity index in the Japanese stock market. The coefficient of the third error correction term of the Canadian Islamic index is 0.067198, which states that daily correction in the Canadian Islamic index is about 6.72 percent in case of any disequilibrium. Moreover, any deviation (caused by any shock) from the long run equilibrium among the Islamic indices

[10] www.bloomberg.com

would be corrected in approximately 15 days. Overall, the results show that between Japanese and Canadian Islamic equity indices, Japan would be more efficient in terms of restoring equilibrium (price correction) as compared to Canada during the study period. This occurrence may be due to the higher information absorbing capacity of the Japanese equity market. Finally, the analysis also reports the effect of the 2008 financial crisis in both the Islamic and conventional equity markets as evidenced by the significant coefficient of dummy variables.

5.4 Variance Decomposition

Vector error correction models, although they tend to indicate dependency/independency, are unable to ascertain the relative degree of dependency/independency of the variables. This study employs a variance decomposition technique in order to perform a comparative analysis of the relative degree of dependency/independency of the concerned Islamic and conventional equity indices. The results of the comparative variance decomposition analysis are summarized in Table 6. The relative dependency or independency of a variable can be recognized by the proportion of the variance explained by its own past. We recognize the most exogenous or endogenous variable by looking at the proportion of the variable explained by its own past. The variable that is explained mostly by its own past, as compared to other variables, is supposed to be the most exogenous or least endogenous variable.

[Insert Table 6 here]

This study, applying the VECM technique, finds three independent (exogenous) and two dependent (endogenous) Islamic equity indices. For Islamic equity markets, the independent indexes are from the US, BRICS and China. In contrast, the dependent Islamic indexes are from Japan and Canada. The results of the study further indicate that the Japanese conventional equity index is the only dependent market among the conventional indexes.

The above result states that around 42 percent of the forecast error variance of the US Islamic index is explained by its own shocks on the 50th day. On the contrary, it is around 48 percent for the US conventional equity index. This result implies that the conventional equity index is more independent than the Islamic equity index in the United States stock market. Compared to the US, around 33 percent of the forecast error variance of the BRICS Islamic equity index is explained by its own shocks on day 50 and for the BRICS conventional index, it is around 31 percent. Therefore, the BRICS Islamic equity index is slightly more independent than the BRICS conventional index. Lastly, around 27 percent of the forecast error variance of the Chinese Islamic equity index is explained by its own shocks on the 50th day, which is slightly more than 25 percent in the case of the Chinese conventional equity index. Interestingly, the Chinese Islamic equity index, like the BRICS Islamic equity index, seems to be slightly more independent than the conventional index. This comparative analysis connotes that both US Islamic and conventional equity indices are leaders in influencing all other equity indices both in the Islamic and conventional markets. As a consequence, there is a high possibility of transmitting any economic shock or crisis from the US equity market to other equity markets. This finding, in fact, supports the evidence of contagion in Asian and European equity markets due to the 2008 subprime crisis that originated in the United States. With regard to conventional equity markets, around 46 percent of the forecast error variance of the Canadian conventional index is explained by its own shock, which makes the Canadian conventional index the second most leading index next the US conventional equity index. This result also indicates the relative influence of the Canadian equity market over the Asian equity markets. Finally, both Japanese Islamic and conventional equity indexes seem to be followers of other independent indexes as evidenced by the VECM and variance decomposition analysis.

5.5 Beveridge Nelson Time Series decomposition

The multivariate Beveridge-Nelson procedure allows the extraction of a permanent component and a transitory component (cycle) from a non-stationary series. The permanent component is the non-stationary part and the transitory (cycle) component is the stationary part of the time series. The permanent term contains a disturbance term proportional to that of the original data. On the contrary, the transitory component represents the predictable part of the data, which should be the main concern for the accurate forecast of a variable. Therefore, we should look for underlying stationary processes in terms of identifiable economic fundamentals, ideally with a clear basis in the theory. Then we need to identify the predictive power of such stationary processes for the underlying variables. The transitory components are then simply projections from current values of the underlying stationary processes, and the trends themselves effectively drop out as whatever is left over. The nature of both trends and transitory components must thus depend directly on nature, and predictive power, of the fundamental stationary processes (Garratt, Robertson and Wright, 2004).

Precise prediction of stock prices and returns is the most important part of stock market investment and that is why movement of the cycle (transitory) parts of stock prices is highly significant. Figures 1.0 and 2.0 portray the comparative movement of the cycle parts of both Islamic and conventional equity indices. The figure shows that the cycle parts of all the Islamic indices are moving almost together except the BRICS Islamic index, which is flatter than the other Islamic indices over the study period, thus indicating less volatility (stable return) and more accurate predictability of the BRICS Islamic equity market. Simultaneous movement also could be observed for the cycle parts of the conventional equity indices as well. Interestingly, the cycle parts of the conventional indices experience relatively higher volatility and downturn during the crisis period (September 2008 to January 2009) as compared to the Islamic equity indices. Generally, careful evaluation of the above

comparative analysis asserts that the permanent (non-stationary) and cycle (stationary) components of the concerned Islamic and conventional equity indices are moving in the same fashion and they are integrated in the long term.

[Insert Figure 1 and 2 here]

Figures 3.0 and 4.0 represent a comparative picture of movement of the permanent (non-stationary) parts of the Islamic indices and the conventional indices. Looking at the figures, it is easily noticeable that the permanent parts of all the indices (Islamic and conventional) are almost moving together, which may indicate that Islamic equity markets are following their conventional counterparts. Moreover, all indices experience a downturn during the last quarter of 2008, which further strengthens the effect of the 2008 financial crisis in both Islamic and conventional equity markets.

[Insert Figure 3 and 4 here]

Surprisingly, permanent parts of the Islamic indices appear to be more volatile during the crisis period (September 2008 to January 2009) and less volatile during the post-crisis period, which indicates the quick recovery process in the Islamic stock markets. It is also observed that volatility of the BRICS Islamic equity index is relatively higher as compared to other Islamic indices of the developed markets. This higher volatility brings higher returns in the BRICS economy as well, which addresses the growing significance of the BRICS stock markets. The permanent parts of the conventional equity indices observe almost the same process like the Islamic equity indices, even though they look relatively flatter, indicating less volatility with possibly lower return.

6. Conclusion

This paper applies the time series techniques to examine the comparative integration scenario of major Islamic and conventional equity markets. In order to perform this analysis, this study uses five major MSCI Global Islamic indices and MSCI conventional indices of the BRICS, China, Japan, Canada and the United States. Furthermore, in order to examine integration among the permanent (non-stationary) and transitory (stationary) components of the selected Islamic and conventional equity indices, this study applied the Beveridge-Nelson time series decomposition technique within a cointegrating framework.

The findings of this study suggest three statistically significant cointegrating relationships among the five major Islamic equity indices. The same number of cointegrating relationships has been observed among the conventional indices. We evaluated the comparative integration status of the Islamic and conventional equity markets based on the three relationships: BRICS, China and US equity indices; Japan, China and US equity indices; Canada, China and US equity indices. These relationships are considered based on the economic relations and significance of these economies in the global market. Based on the stated relationships, analysis found three independent (exogenous) and two dependent (endogenous) Islamic equity indices representing Islamic equity markets.

The results suggest that the US Islamic equity index is the leader among the three independent indices thus indicating the higher probability of dissipating any exogenous shocks from the US Islamic equity market to other Islamic equity markets. In terms of independency, the BRICS and Chinese Islamic equity markets are positioned after the US, which also signifies the leadership role played by these two economies in the Islamic stock markets. The same analysis suggests that Japanese and Canadian Islamic indices are dependent (endogenous) on other independent indices. Hence, in the case of any exogenous shocks, the Japanese and Canadian Islamic equity markets bear the burden of short-run

adjustment to bring about long-run equilibrium in the Islamic markets. Surprisingly, in the conventional equity markets, the Canadian equity index is suggested as the second most independent (exogenous) index after the US conventional equity index. The only dependent (endogenous) index is the Japanese conventional equity index as advocated by the analysis results.

The overall results, in general, demonstrate the supremacy of the United States in both Islamic and conventional equity markets. This driving role of the US equity markets has significant efficacy in determining the price, return and risk behaviour in other markets. Good news (bad news) in the US equity markets results in good news (bad news) in other markets. The results also highlight the growing importance of the BRICS economy in both Islamic and conventional equity markets. Moreover, the impact of the 2008 financial crisis on both the Islamic and conventional equity markets is also supported by the results of the study. Finally, Beveridge-Nelson time series decomposition analysis supports the cointegrating relationships in the concerned Islamic and conventional equity markets by portraying the simultaneous movement of the permanent and cycle components of the indices.

The findings of this study have several implications for investors and policy makers in general and portfolio managers in particular. Since both the markets are cointegrated, the opportunity to gain abnormal profits tends to be less in the long run, which could be less attractive to the portfolio managers and investors. However, there could be a short-term gain from the arbitrage activities in both the Islamic and conventional equity markets even though the abnormal gains from portfolio diversification tend to disappear in the long term. In addition to portfolio managers, policy makers should be cautious and prudent when markets are cointegrated. Empirical evidence over the last two decades tends to suggest that capital mobility is concentrated within a few countries and it is challenging for the smaller economies to get easy access to the international capital market when markets are cointegrated.

Furthermore, market integration may be conducive to transmitting economic volatility and capital market turbulence from one economy to another more rapidly. Consequently, the efficacy of market integration would be financial crisis, bank runs and overall economic vulnerability in cointegrated economies. This issue can easily be realized by the havoc of the 2008 global financial crisis that engulfed all major markets in the world. Above all, policy makers should be aware that Islamic equities are a subset of conventional equities after applying a filtering process and therefore, the size of the Islamic stock market is still much smaller than the conventional stock market despite the rapid growth of Islamic stock markets. However, cointegration of the equity markets is not without benefits. Most important is the exploitation of the economies of scale that allows small and medium sized firms in the economy to gain better access to broader financial and capital markets. Thus, risk sharing is prevalent in the cointegrated equity markets. Decomposition of the Islamic and conventional equity indices into their permanent and transitory components would be of much interest to the portfolio managers and policy makers given the distinct movement pattern of the permanent and transitory components.

This study tends to provide a few suggestions based on the implications of equity market cointegration. Financial and stock market integration may bring more potential benefits in terms of co-operation when economies are at a similar stage of growth and development, which is advocated by the growing performance of the BRICS Islamic and conventional equity Indices as the BRICS economies are more or less at the same stage of development. In addition, the portfolio managers may prefer to invest in the BRICS Islamic and conventional indices in order to obtain a better risk return profile of their portfolios. Finally, policy makers should take the results of the study into account while formulating policies in the concerned Islamic equity markets in order to move towards resilient, robust and competitive Islamic capital markets vis-à-vis the conventional equity markets globally.

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Table 1: Variables used in the study

Variable	Explanation
LBRCIS	Logarithmic price of BRIC Islamic equity index
LWBRC	Logarithmic price of BRIC conventional equity index
LCHIS	Logarithmic price of Chinese Islamic equity index
LCHI	Logarithmic price of Chinese conventional equity index
LJPIS	Logarithmic price of Japanese Islamic equity index
LJP	Logarithmic price of Japanese conventional equity index
LUSIS	Logarithmic price of US Islamic equity index
LUS	Logarithmic price of US conventional equity index
LCAIS	Logarithmic price of Canadian Islamic equity index
LCA	Logarithmic price of Canadian conventional equity index
DUM	Dummy Variable as a proxy for 2008 financial crisis

Table 2: Descriptive Statistics

Variables	Mean	Maximum	Minimum	St. Dev.	Skewness	Kurtosis
LBRCIS	2.985	3.213	2.668	0.103	-0.455	3.378
LCHIS	3.010	3.198	2.689	0.083	-0.955	3.950
LJPIS	2.869	2.989	2.683	0.055	-0.738	3.700
LUSIS	2.943	3.027	2.752	0.063	-0.780	2.645
LCAIS	3.195	3.328	2.916	0.087	-1.203	3.889
LWBRC	2.474	2.646	2.131	0.103	-1.157	3.841
LCHI	1.763	1.928	1.434	0.080	-1.240	4.196
LJP	3.357	3.493	3.198	0.052	0.374	3.439
LUS	3.040	3.143	2.809	0.070	-0.901	2.989
LCA	2.981	3.153	2.674	0.090	-0.817	3.469

This table represents the descriptive statistics of the sample logarithmic equity index prices over 2008-2012 periods. LBRICIS, LCHIS, LJPIS, LUSIS, LCAIS stands for logarithmic Islamic index prices from BRIC, China, Japan, US, Canada, respectively. LWBRIC, LCHI, LJP,LUS, LCA represents conventional Index returns from BRIC, China, Japan, US, Canada, respectively.

Table 3: Summary of Unit Root Tests

	P - values			
	Intercept		Intercept & Linear Trend	
Variables	ADF	PP	ADF	PP
LBRCIS	0.1612	0.2153	0.4378	0.5312
LWBRC	0.2371	0.2906	0.4947	0.5661
LCHIS	0.0731	0.0901	0.1701	0.2024
LCHI	0.0995	0.1206	0.2368	0.2758
LJPIS	0.1294	0.1116	0.3409	0.3105
LJP	0.0755	0.0833	0.3096	0.3136
LUSIS	0.5359	0.4907	0.4296	0.3842
LUS	0.4135	0.4254	0.3828	0.3775
LCAIS	0.3360	0.3659	0.5505	0.5832
LCA	0.2805	0.3040	0.5643	0.5941
Δ LBRCIS	0.0000	0.0000	0.0000	0.0000
Δ LWBRC	0.0000	0.0000	0.0000	0.0000
Δ LCHIS	0.0000	0.0000	0.0000	0.0000
Δ LCHI	0.0000	0.0000	0.0000	0.0000
Δ LJPIS	0.0000	0.0000	0.0000	0.0000
Δ LJP	0.0000	0.0000	0.0000	0.0000
ΔLUSIS	0.0000	0.0000	0.0000	0.0000
ΔLUS	0.0000	0.0000	0.0000	0.0000
ΔLCAIS	0.0000	0.0000	0.0000	0.0000
ΔLCA	0.0000	0.0000	0.0000	0.0000

This table shows Augmented Dicky Fuller (ADF) and Phillips Perron (PP) unit root tests results of the sample logarithmic prices of Islamic and conventional equities. Both ADF and PP tests are applied with intercept and intercept and linear trend to check the stationarity. LBRICIS, LCHIS, LJPIS, LUSIS, LCAIS stands for logarithmic Islamic index prices from BRIC, China, Japan, US, Canada, respectively. LWBRIC, LCHI, LJP, LUS, LCA represents conventional Index prices from BRIC, China, Japan, US, Canada, respectively. Δ LBRCIS, Δ LCHIS, Δ LJPIS, ΔLUSIS and ΔLCAIS stand for first difference of the of the Islamic equity prices, while Δ LWBRC, Δ LCHI, Δ LJP, ΔLUS and ΔLCA represent first difference of the of the conventional equity prices.

Table 4: Johansen Maximum Likelihood results for Cointegration

	H_0	H_1	Eigenvalue	95% critical	90% critical
Panel A: Cointegration LR Test Based on Maximum Eigenvalue					
BRIC	R = 0	R = 1	17.24	19.22	17.18
	R <= 1	R = 2	1.72	12.39	10.55
China	R = 0	R = 1	17.53	19.22	17.18
	R <= 1	R = 2	1.68	12.39	10.55
Japan	R = 0	R = 1	19.28	19.22	17.18
	R <= 1	R = 2	5.98	12.39	10.55
US	R = 0	R >= 1	26.83	25.77	23.08
	R <= 1	R >= 2	11.56	12.39	10.55
Canada	R = 0	R >= 1	41.83	25.77	23.08
	R <= 1	R >= 2	19.73	12.39	10.55
All Islamic Indices	R = 0	R = 1	67.77	37.86	35.04
	R <= 1	R = 2	29.26	31.79	29.13
	R<= 2	R = 3	27.60	25.42	23.10
All Conventional Indices	R = 0	R = 1	54.38	37.86	35.04
	R <= 1	R = 2	41.34	31.79	29.13
	R<= 2	R = 3	26.58	25.42	23.10
Panel B: Cointegration LR Test Based on Trace Stochastic Matrix					
	H_0	H_1	Eigenvalue	95% critical	90% critical
BRIC	R = 0	R>= 1	18.96	25.77	23.08
	R <= 1	R >= 2	1.72	12.39	10.55
China	R = 0	R >= 1	19.21	25.77	23.08
	R <= 1	R >= 2	1.68	12.39	10.55
Japan	R = 0	R >= 1	25.26	25.77	23.08
	R <= 1	R >= 2	5.98	12.39	10.55
US	R = 0	R >= 1	26.83	25.77	23.08
	R <= 1	R >= 2	11.56	12.39	10.55
Canada	R = 0	R >= 1	41.83	25.77	23.08
	R <= 1	R >= 2	19.73	12.39	10.55
All Islamic Indices	R = 0	R>= 1	150.07	87.17	82.88
	R <= 1	R>= 2	82.29	63.00	59.16
	R<= 2	R>= 3	53.03	42.34	39.34
All Conventional Indices	R = 0	R>= 1	145.18	87.17	82.88
	R <= 1	R>= 2	90.80	63.00	59.16
	R<= 2	R>= 3	49.46	42.34	39.34

Panel A of the above table shows Johansen cointegration test results between Islamic and conventional equity index prices of BRIC, China, Japan, US and Canada represented by maximum eigenvalue statistic. Panel B of the above table shows Johansen cointegration test results between Islamic and conventional equity index prices of BRIC, China, Japan, US and Canada represented by trace statistic. Both panels A and B further report cointegration test results (maximum eigenvalue and trace statistic) of all conventional index prices and Islamic index prices of the countries under review.

Table 5: Vector Error Correction Estimates

Error Correction Term (ECT) and Dummy	Coefficient	T-ratio	P-value	Exogenous/Endogenous
Panel A: All Islamic				
Dependent Variable: ΔLBRICS				
ECT (-1)	-.017060	-.82112	0.412	Exogenous
ECT (-2)	-.027910	-1.2632	0.207	Exogenous
ECT (-3)	.019860	1.0266	0.305	Exogenous
DUMMY	-.8581E-3	-1.0713	0.284	
Dependent Variable: ΔLCHIS				
ECT (-1)	.019565	.94048	0.347	Exogenous
ECT (-2)	-.047195	-2.1333	0.033	Endogenous
ECT (-3)	.026552	1.3707	0.171	Exogenous
DUMMY	-.2436E-3	-.30374	0.761	
Dependent Variable: ΔLJPIS				
ECT (-1)	-.7406E-3	-.053417	0.957	Exogenous
ECT (-2)	-.10006	-6.7871	0.000	Endogenous
ECT (-3)	.033741	2.6138	0.009	Endogenous
DUMMY	-.0012823	-2.3992	0.017	
Dependent Variable: ΔLUSIS				
ECT (-1)	.017223	1.1053	0.269	Exogenous
ECT (-2)	.012523	.75575	0.450	Exogenous
ECT (-3)	-.025181	-1.7355	0.083	Exogenous
DUMMY	.3850E-4	.064080	0.949	
Dependent Variable: ΔLCAIS				
ECT (-1)	.047120	2.3572	0.019	Endogenous
ECT (-2)	.038128	1.7936	0.073	Exogenous
ECT (-3)	-.067198	-3.6102	0.000	Endogenous
DUMMY	.0011289	1.4648	0.143	
Panel B: All Conventional				
Dependent Variable: ΔLWBRC				
ECT (-1)	-.027740	1.2268	0.220	Exogenous
ECT (-2)	-.034158	1.9095	0.056	Exogenous
ECT (-3)	.041257	3.6733	0.000	Endogenous
DUMMY	-.0032456	3.2825	0.001	
Dependent Variable: ΔLCHI				
ECT (-1)	.048726	2.0618	0.039	Endogenous
ECT (-2)	-.043263	2.3139	0.021	Endogenous
ECT (-3)	.014558	1.2402	0.215	Exogenous
DUMMY	-.7342E-3	0.71051	0.478	
Dependent Variable: ΔLJP				
ECT (-1)	.0068220	.42587	0.670	Exogenous
ECT (-2)	-.075969	5.9944	0.000	Endogenous
ECT (-3)	.012678	1.5933	0.111	Exogenous
DUMMY	.3742E-3	0.53425	0.593	
Dependent Variable: ΔLUS				
ECT (-1)	.0020016	.099765	0.921	Exogenous
ECT (-2)	.0020331	.12809	0.898	Exogenous
ECT (-3)	.012953	1.2997	0.194	Exogenous
DUMMY	-.0020746	2.3647	0.018	
Dependent Variable: ΔCA				
ECT (-1)	-.0059978	0.21384	0.831	Exogenous
ECT (-2)	.023786	1.0720	0.284	Exogenous
ECT (-3)	.0039526	0.28371	0.777	Exogenous
DUMMY	-.0014679	1.1969	0.232	

Vector error correction modeling (VECM) results of each Islamic and conventional equity index price is reported in above table. The result reports three coefficients of three error

correction terms [ECT (-1), ECT (-2) and ECT (-3)] for each Islamic and conventional equity index price as dependent variable since the study found three statistically significant cointegrating relationships among the selected Islamic and conventional equity indices. Δ LBRCIS, Δ LCHIS, Δ LJPIS, ΔLUSIS and ΔLCAIS stand for first difference of the of the Islamic equity prices, while Δ LWBRC, Δ LCHI, Δ LJP, ΔLUS and ΔLCA represent first difference of the of the conventional equity prices.

Table 6: Generalized Variance Decomposition Analysis

		Percentage of Forecast Variance Explained by Innovations in:				
		LBRICS	LCHIS	LJPIS	LUSIS	LCAIS
Panel A: Islamic Indices						
Day: 50	ΔLBRICS	**0.3302**	0.1778	0.0773	0.2069	0.2078
Day: 50	ΔLCHIS	0.3395	**0.2712**	0.0109	0.1909	0.1875
Day: 50	ΔLJPIS	0.2889	0.1706	**0.0749**	0.2418	0.2238
Day: 50	ΔLUSIS	0.2525	0.1024	0.0071	**0.4187**	0.2193
Day: 50	ΔLCAIS	0.3066	0.1397	0.0199	0.2591	**0.2747**
Panel B: Conventional Indices						
Day: 50	ΔLWBRC	**0.3098**	0.1416	0.0132	0.1871	0.3484
Day: 50	ΔLCHI	0.3395	**0.2551**	0.0109	0.1368	0.2576
Day: 50	ΔLJP	0.2075	0.0741	**0.1164**	0.2754	0.3266
Day: 50	ΔLUS	0.1754	0.0252	0.0088	**0.4778**	0.3128
Day: 50	ΔLCA	0.2090	0.0572	0.0394	0.2312	**0.4632**

Panels A and B of the above table reports Generalized variance decomposition (VDC) analysis results of each Islamic and conventional equity index prices in order to identify the relative dependency or independency of each index, which can be recognized by the proportion of the variance explained by its own past. Most endogenous or exogenous equity index can be recognized by the proportion of the variable explained by its own past.

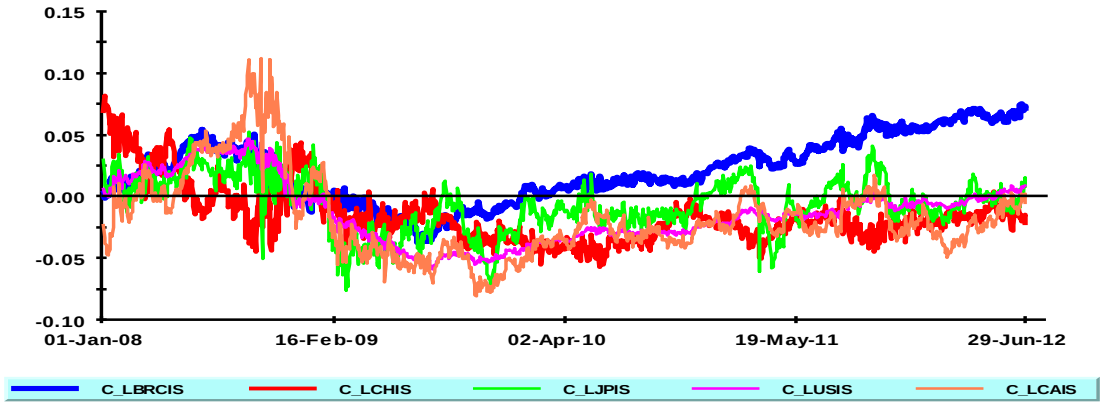

Figure 1.0 movement of cycle (transitory) components of all Islamic equity index prices over the period under review(C_LBRCIS, C_LCHIS, C_LJPIS, C_LUSIS and C_LCAIS stand for cycle components of Islamic index prices of BRIC, China, Japan, United States and Canada respectively).

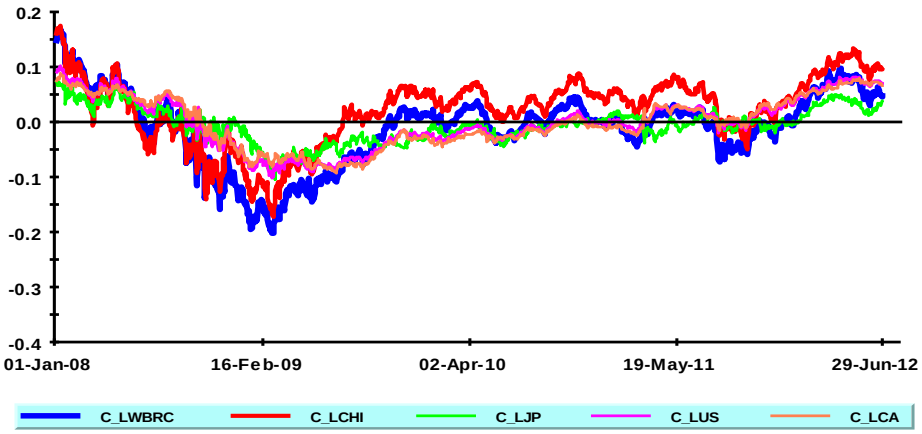

Figure 2.0 movement of cycle (transitory) components of all conventional equity index prices over the period under review(C_LBRC, C_LCHI, C_LJP, C_LUS and C_LCA stand for cycle components of conventional index prices of BRIC, China, Japan, United States and Canada respectively).

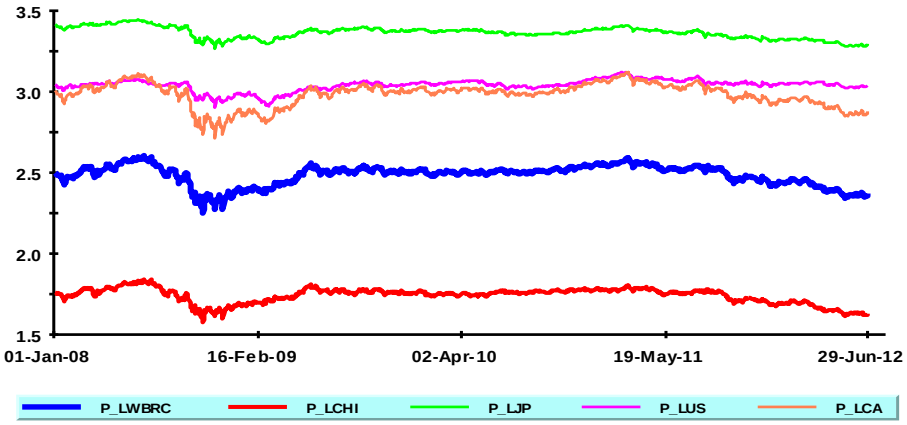

Figure 3.0 movement of permanent components of all conventional equity index prices over the period under review(P_LBRC, P_LCHI, P_LJP, P_LUS and P_LCA stand for permanent components of conventional index prices of BRIC, China, Japan, United States and Canada respectively).

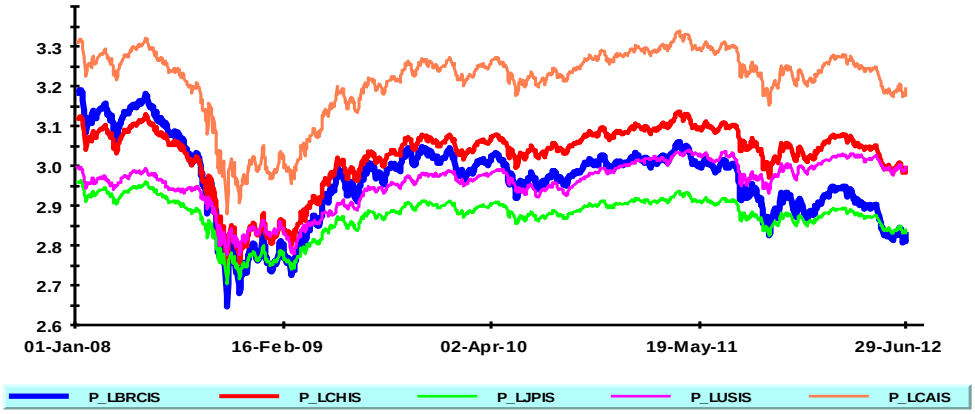

Figure 4.0 movement of permanent components of all Islamic equity index prices over the period under review(P_LBRCIS, P_LCHIS, P_LJPIS, P_LUSIS and P_LCAIS stand for permanent components of Islamic index prices of BRIC, China, Japan, United States and Canada respectively).