



The Impact of Global Financial Shocks to Islamic Indices: Speculative Influence or Fundamental Changes?

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Abstract

The ripples of the financial crisis are still being felt over different parts of the world causing much distress to the real economy. The capital market, in particular, took a massive hit during the crisis plummeting to all-time lows. In the footsteps of globalization, a financial shock to the US capital market can cause a spill over effect to other markets, Islamic capital market included. Hence, this paper attempts to address the question whether Islamic indices are affected through fundamental changes or short-term influences by sudden changes in volatility as compared to their conventional counterparts. To empirically analyze this, we apply continuous wavelet technique to identify co-movements between world financial indices and Islamic indices for World, Asia Pacific and Emerging Markets specifically. Covering a time period of 15 years (1997 – 2011), our results confer that Islamic indices in the Asia Pacific and Emerging Market region are partially immune to speculative shocks to global financial services making them a good alternative. Similarly, Islamic indices testified more stable due to their rigid screening criteria.

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Keywords: Islamic Equity Market, Global Crisis, Wavelet, Equity Investments.

1. Introduction

The emergence of a unique capital market, where compliancy to Shariah principles is given priority, is the product of a natural progression in the growth of the Islamic financial services industry. As the strong advancement of Islamic financing is driven by increasing demand, it had become clear that there was a need to address liquidity issues for Islamic banks and other institutions.

Hence, in the 1990s after a major breakthrough in religious rulings regarding capital markets, the world saw the emergence of Islamic equity funds. Since then substantial growth in the Islamic funds industry has pushed it to achieve a 7.6% growth rate, registering up to \$58 billion in 2010 (Ernst & Young, 2011).

The Islamic stock market has captured the interest of not only Muslims but non-Muslim investors as well, who are interested in placing more assets in socially responsible portfolios. This has led to the establishment of Islamic indexes such as Dow Jones Islamic Market Index (DJMI) and FTSE Global Islamic Index Series, which tracks the stocks of corporations whose business and activities are compatible with Islamic law. The development of credible equity benchmarks have become a turning point for the industry as it provides a platform to compare Islamic and conventional indices.

With reference to the global financial crisis of 2007-2009, both the conventional and Islamic indices were affected negatively. However, it can be argued by several, that the Islamic indices offered relatively more stability as they were less volatile and were able to adapt themselves with the market fluctuations and changes. Furthermore, the screening and filtering process of Islamic indices disallowed the presence of conventional stocks and insurance, both of which were affected negatively during the crisis.

Moreover, due to integration of markets globally, the contagion effects of the financial crisis (2007-2009) from one market to another have decreased the diversification benefits that are experienced during good times. In terms of Islamic indices, there are contradictory results on the cointegration among Islamic

stock markets with the world financial crisis, leaving room for more intensive research on the performance of Islamic indices.

Hence, in this paper we attempt to study the correlation between world conventional financial index with fundamental Islamic indices comprising three broad categories, World, Asia Pacific, and Emerging Markets. We further attempt to deduce the impact changes in conventional indices would have on Islamic indices. The authors will be employing continuous wavelet analysis to study the coherence between Islamic and conventional stock indices over a time period of 15 years (January 1997 to December 2011) for the emerging markets and Asia Pacific region in particular.

This paper is apportioned into six sections. Following the introduction, a review of the literature is presented in section 2. The research objectives and motivations of the study are deliberated in section 3. Section 4 describes the methodology, which precedes the empirical results. Lastly, in section 6 the conclusion is presented with a special mention of the limitations and areas for further research improvements.

2. Literature Review

The unparalleled growth of the Islamic capital market has garnered much interest globally, for both Muslims and non-Muslims alike. However, despite the rising attention to this global phenomenon, there are few empirical studies concerning the Islamic stock markets. Leafing through the literature, a small number of studies can be found on the performance of Islamic capital market related investment products. Hence, it is the opinion of the authors that there is no prior research conducted on the coherence of global Islamic and conventional indices using the wavelet technique.

Hakim and Rashidian (2002), in their finding suggest that the unique risk-return characteristics Islamic indices possess and the Shariah screening process do not adversely affect the performance of the Islamic Index. Whereas, Hussein and Omar (2005) also investigating the impact of ethical screening of Islamic indices to their conventional counterparts find that Islamic indices achieve significant abnormal returns to investors over the bullish periods and non-significant risk-adjusted abnormal returns over bearish periods.

In a similar study, applying to the Malaysian stock market, Yusof and Majid (2006) and Albaity and Ahmad (2006) found no significant difference in the risk-adjusted returns as compared to their conventional counterparts. Girard and Hassan (2005) and Beik and Wardhana (2009) support this further having determined that no significant difference between Islamic and non-Islamic indices in regards to performance was present, in other settings.

When discussing volatility of Islamic indices, Charles, Darne and Pop (2010) discovered that during the crisis, both Islamic and conventional indexes were affected to the same degree by variance changes. However, when they tested the indexes over other periods, it was found that the variance was not the same, where Islamic indexes exhibited a slightly higher volatility as compared to their financial counterpart. In contrast, Al-Zoubi and Maghyreh (2007) found Islamic indices to be less risky than the benchmark, attributing it to the profit and loss sharing principle in Islamic finance.

While studying the correlation between indices, Rizvi and Arshad (2012) suggest a low moving correlation between the conventional and Islamic indices substantiating that Islamic index may provide a better alternative for hedging against crisis.

Several researches (Masih and Masih, 2002; Kumar and Mukhopadhyay (2002); Wong, Agarwal and Du, (2005) support the notion that there is a correlation between the various markets globally. They further emphasize that dramatic movements in one equity market can have a powerful impact on different market. The same applies for Islamic indices, where any volatility in major global markets is very likely to influence Islamic indices Majid, Meera and Omar, (2007), Rahman and Sidek, 2011; Siskawati, (2010). However, Karim, Kassim and Arip, (2010), and Yusof and Majid (2007) contradict this, as they failed to find any empirical existence of co-integration among the Islamic indices.

With the abovementioned studies, the present paper attempts to contribute to the literature on the Islamic stock market by undertaking a unique study of how changes in the global financial market affected the Islamic indices by employment of the wavelet technique.

3. Research Objectives

The objective of undertaking this research is to investigate the impact of shocks in conventional finance services to Islamic indices specifically for emerging markets and Asia Pacific. The benefit that it entails is to investigate, and pinpoint if there is a coherent pattern between Islamic indices and conventional financial services. Furthermore, to determine, in case of a coherent pattern, whether financial shocks impact Islamic indices based on contagion effect on short term, or through fundamental changes.

The motivation of this study is to analyze and give some empirical credibility to the phenomena that Asian markets and world emerging markets, over the last decade have reduced their dependence on the western markets and have emerged as a partially independent force. Within these parameters, Islamic capital markets have flourished, and the focus of this research is to understand and identify if Islamic indices in the emerging markets and Asia Pacific are heavily dependent on the world financial shocks. The authors are further motivated to put to rest the argument on Islamic financial principles in equity markets as a safer if not an insulated alternative investment avenue during crisis.

This is a relatively unexplored area of Islamic capital markets in mainstream literature. As per the author's knowledge, no studies are available in the area that explores the relationship between world financial shocks and Islamic indices over varying time scale. These reasons stimulate this study and are a humble attempt at addressing the following research question; 'Do the global financial shocks impact Islamic indices in speculative manner or via fundamental changes in real economy?'

4. Methodology

For this particular research objective, we have utilized a systematic coherence analysis using wavelet. Wavelet Analysis is an import from the field of electrical engineering into economics and finance, and has been utilized via two versions- the discrete wavelet analysis (DWT) and the continuous wavelet analysis (CWT). DWT has been the primary tool of the wavelet family which has been incorporated in economics for almost a decade. Gencay et.al., (2002); Ramsay (2002); Gallegati and Gallegati (2007). It has been very recent in the past couple of years that CWT has emerged in economic papers, primarily focusing on understanding the comovements and interactions of time series data.

The primary reason for using wavelet analysis by the authors is the ability of cross wavelet tools to study comovements of two time series, and in this study's case, between world financial services indices and our focus Islamic indices.

An important aspect to note in wavelet coherence is the difference in terminology from standard economics and finance literature. Wavelet focuses on the term scale instead of frequency with a negative relationship between both. Throughout this paper, any reference to scale would mean a reference to inverse of frequency i.e. low scale is high frequency, while high scale is low frequency.

4.1 Wavelet

A wavelet is a real-valued or a complex-valued function $\psi(\cdot)$ defined over the real axis while fulfilling several conditions. Admissibility condition that allows for reconstruction of a time series from its continuous wavelet transform:

$$C_{\psi} = \int_0^{\infty} \frac{|\Psi(f)|^2}{f} df < \infty,$$

Where $\Psi(f)$ is the Fourier transform of the wavelet $\psi(\cdot)$. The wavelet must have a zero mean to comply with admissibility condition of a wavelet having zero frequency.

$$\int_{-\infty}^{\infty} \psi(t) dt = 0$$

This condition assures that an opposite movement must cancel out any movement from zero so the wavelet looks like a wave. There are different types of wavelets, with every wavelet having some specific

characteristics making it useful for different and unique purposes. In reference to financial market co-movement analysis, mostly the Morlet wavelet has been utilized.

4.2 The continuous wavelet transform

The continuous wavelet transform $W_x(u, s)$ is obtained by projecting the specific wavelet $\psi(\cdot)$ onto the examined time series $x(t) \in L^2(\mathbb{R})$. The continuous wavelet transform is defined as:

$$W_x(u, s) = \int_{-\infty}^{\infty} x(t) \frac{1}{\sqrt{s}} \overline{\psi\left(\frac{t-u}{s}\right)} dt.$$

A key element of wavelet transform is the feature where it can decompose and then subsequently perfectly reconstruct the function $x(t) \in L^2(\mathbb{R})$:

$$x(t) = \frac{1}{C_\psi} \int_0^\infty \left[\int_{-\infty}^\infty W_x(u, s) \psi_{u,s}(t) du \right] \frac{ds}{s^2}, \quad s > 0$$

4.3 Wavelet coherence

Going forward from univariate to cross-wavelet approach the main tool for studying two time series is wavelet coherence. Torrence and Compo, 1998; Grinsted et al., 2004 define it as being for two time series $x(t)$ and $y(t)$ with the continuous wavelet transforms $W_x(u, s)$ and $W_y(u, s)$ by:

$$W_{xy}(u, s) = W_x(u, s) W_y^*(u, s)$$

Where u is a position index and s denotes the scale, symbol $*$ denotes a complex conjugate. Additionally, cross wavelet power is defined as $|W_{xy}(u, s)|$ (Hudgins et al., 1993; Torrence and Compo, 1998). It uncovers areas in time-scale space high common power is present, i.e. it represents the local covariance between the time series at each scale.

The scope of our study covers financial variables and our research question will be addressed via investigating the where the two time series in time-scale space co-move, but does not necessarily have high power wavelet coherence is an essential tool.

The wavelet coherence is a measure of local correlation of the two time series both in time and in scale. Following approach of Torrence and Webster (1999), wavelet coherence is defined as the squared absolute value of the smoothed cross wavelet spectra normalized by the product of the smoothed individual wavelet power spectra of each series where S is a smoothing operator. i.e.

$$R^2(u, s) = \frac{|S(s^{-1} W_{xy}(u, s))|^2}{S(s^{-1} |W_x(u, s)|^2) S(s^{-1} |W_y(u, s)|^2)}$$

The squared wavelet coherence coefficient is in the range $0 \leq R^2(u, s) \leq 1$, values close to a zero represent a weak correlation while values close to one are an evidence of strong correlation. In literature we failed to find any firm theoretical distribution analysis on statistical significance of distribution of wavelet coherence, hence we utilize the 5% statistical significance level determined using Monte Carlo methods.

4.4 Phase Difference

The investigation does not end at the determination of the correlation, but to understand the relationship between the time series we use wavelet coherence phase differences. The phase difference gives details about delays of oscillation (cycles) of the two examined time series. Following Torrence and Webster (1999), we define the wavelet coherence phase difference as:

$$\phi_{xy}(u, s) = \tan^{-1} \left(\frac{\Im\{S(s^{-1}W_{xy}(u, s))\}}{\Re\{S(s^{-1}W_{xy}(u, s))\}} \right)$$

Arrows on the wavelet coherence plots indicate phase. A zero phase difference means that the examined time series move together at a particular scale. Arrows point to the right (left) when the time series are positively (negatively) correlated. Furthermore, arrows pointing up means that the first time series leads the second one by 90° , arrow pointing down indicates that the second time series leads the first one by 90° . For our plots, we observe a mixture of positions.

4.5 Data

In addressing our research question, we utilize four indices for the empirical investigation; firstly, the conventional financial services index (CWFS) is used as the proxy for global financial shocks. Additionally, three other indices are employed here, Islamic World Index (IWRLD) consisting of Global Shariah compliant stocks, Islamic Asia Pacific (IAP) and Islamic World Emerging Markets (IWEM). The two latter indices are specific to the research question as they assist in analyzing the impact of financial shocks to these regions Islamic capital markets. All the sample indices are from Dow Jones Indices family.

Primarily, two reasons contribute towards sticking with Dow Jones Indices, firstly, for the purpose of uniformity' in the underlying universe of stocks and index pricing computation. Secondly, in order to have a harmonized Shariah screening criterion in the Islamic indices. All index providers follow roughly a similar criterion, but with slight variations in cut-offs for different ratios. Sticking with Dow Jones Islamic Indices family provides us this consistency. We have taken daily values of indices, transformed to daily returns for an extended time period of 15 years starting from January 1, 1997 to December 30, 2011; covering 3913 daily observations.

5. Empirical Evidence

5.1 Descriptive Statistics

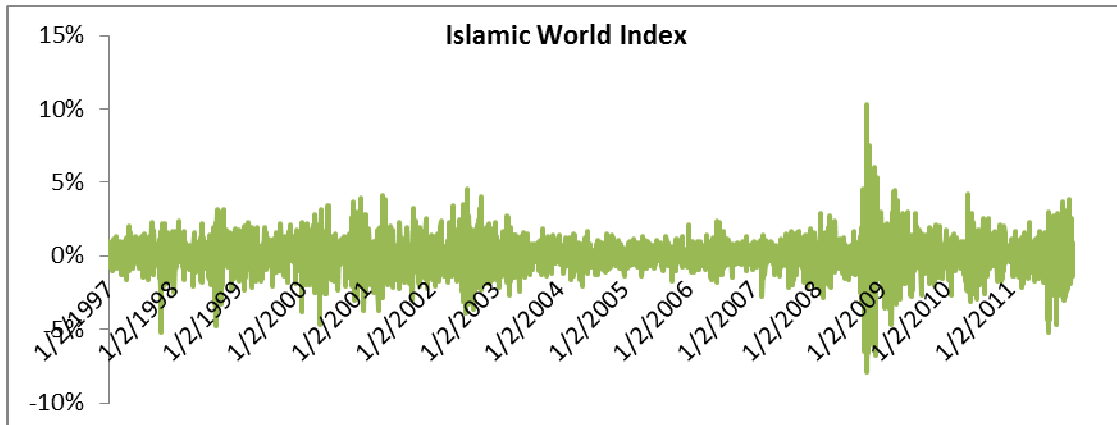
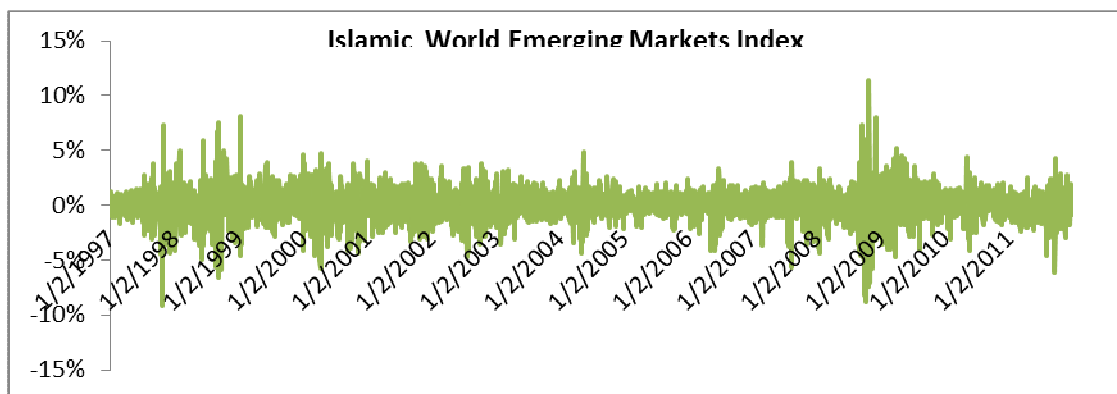
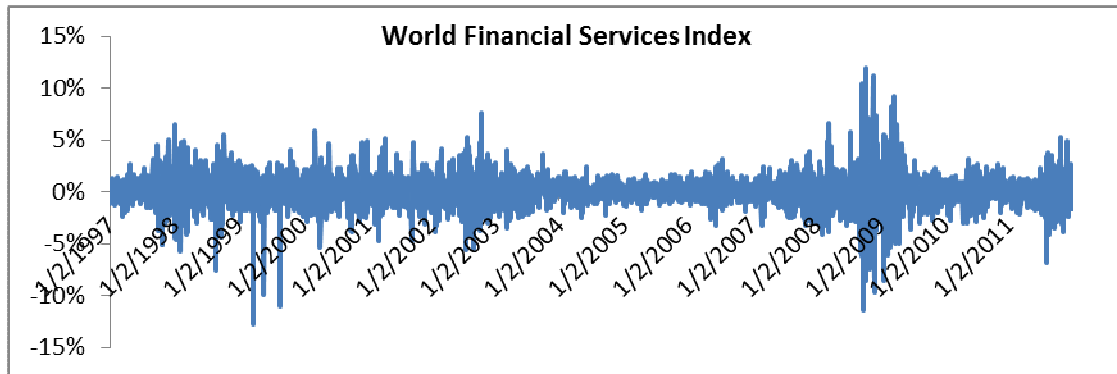
The descriptive statistics for the daily returns of our sample set provides interesting insights. The absolute time independent volatility of the returns, as represented by the standard deviations is relatively similar across, but the return of the Islamic indices over the period is relatively higher with lower kurtosis referring towards thinner tails as compared to the financial index. This in the authors' opinion is primarily due to the credit market squeeze and resultant financial shocks of the recent crisis. Nevertheless, this theory does not hold completely solid since the sample period also covers the 1997 financial crisis in Asia, which forms the dominant underlying universe of the Asia Pacific and Emerging Markets indices.

Table 1. Descriptive Statistics of Variables

	CWFS	IAP	IWEM	IWRLD
Mean	0.0156%	0.0221%	0.0242%	0.0237%
Standard Deviation	0.015707	0.013552	0.01438	0.01121
Kurtosis	7.825601	4.28193	4.758757	6.147995
Skewness	-0.182825	-0.100196	-0.201782	-0.193159

Graphical representation of daily returns of the indices, provide a different perspective than the mere simple statistics table earlier. The simple daily return graphs show, in the financial services index, three main volatile periods. Firstly the stock market crash of 2000, which was primarily caused by corporate corruption scandals and overvalued stocks correction. Following that, we notice high volatility in end of 2002 and 2003, which was an aftermath of the World Trade Center bombings and accounting scandals like Enron and WorldCom followed by global financial meltdown of 2007-2008.

Similar trends are observed in the Islamic World Index, but with lesser volatility overtime, but interestingly in-line with earlier expectations, the Asian financial crisis of 1997, translates into higher volatility for IAP and IWEM.



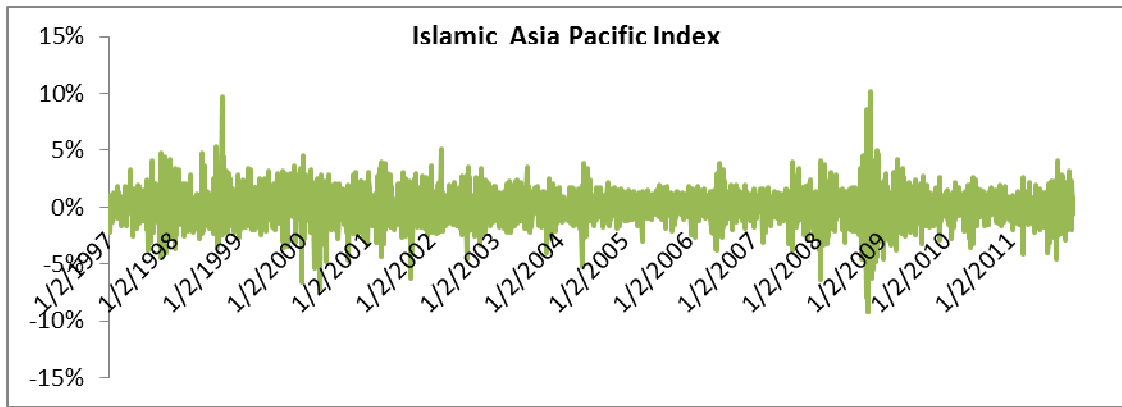


Chart 1: Graphs of daily returns of Conventional and Islamic Indices (1997 – 2011)

The graphical representation of daily returns of the conventional and Islamic indices, provide a different perspective than the mere simple statistics table earlier. These three periods of shocks in financial index represent utmost importance in answering the research question. At the face of these graphs, it seems that all indices followed a similar volatility pattern.

A deeper investigation into the cumulative returns of the four indices reveals that over the sample period, financial index has generally outperformed the Islamic indices. Yet one point of major interest is the fact that minus the 2007 and 2008 financial crisis, the cumulative return graphs do not seem to show any relationship between financial services and Islamic indices in other crisis period. This is the specific angle that our further wavelet coherence will try to analyze, whether there is a short-term lead lag relationship between the world financial shocks and Islamic indices or not.

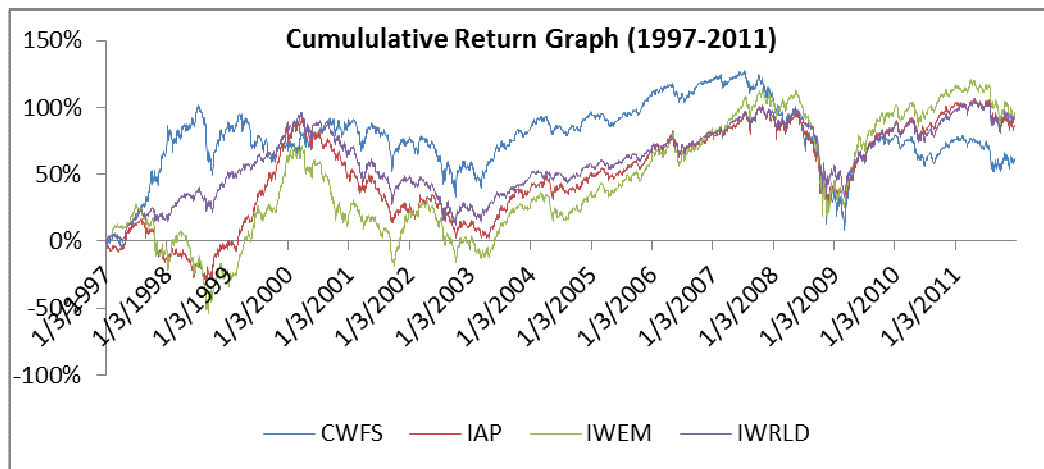


Chart 2: Cumulative Return Graph from 1997 to 2011

5.2 Wavelet Coherence

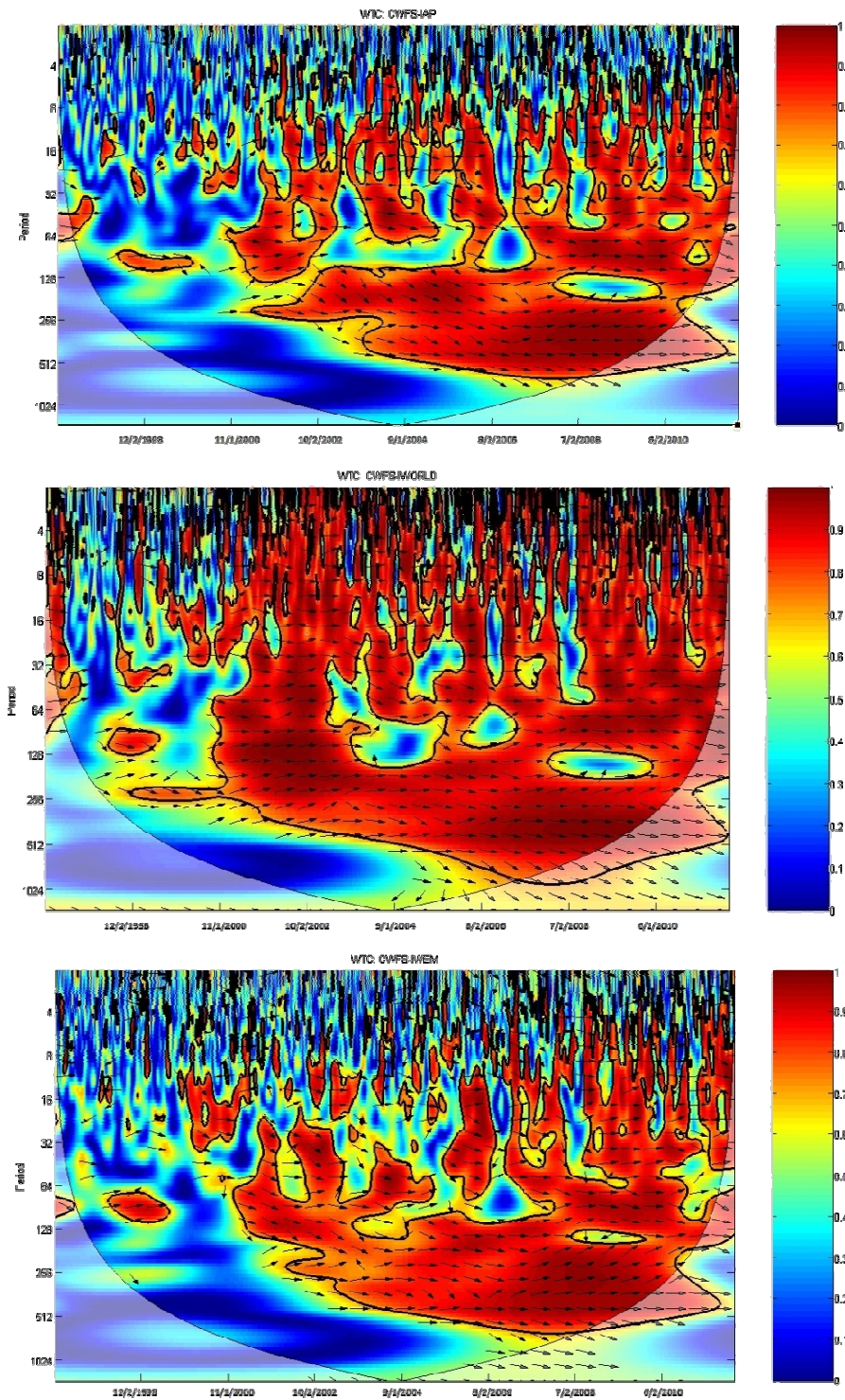


Chart 3: Wavelet Coherence Patterns for Conventional and Islamic World, AP and EM respectively

At this juncture, we cannot make any empirically backed statement in response to our research question. Therefore, we delve into the wavelet coherence pattern. The wavelet coherence chart for

Conventional World Financial Services and Islamic World Index, have produced rather interesting result. Prior to 2000, there does not seem to be very strong coherence, but traces of high coherence are visible over a medium term of 16 to 32 days. Normally this range of scale does not fall under short-term speculative contagion or under higher scale impact via the fundamental changes.

Interestingly, post 2000 there is a very high coherence on the shorter scale of below 4 and on the higher scale as well. This indicates a high interlinking of Islamic World Index on Conventional World Financial Services Index shocks, both on speculative trading and the short-term noise effect as well as any financial shock is translated to IWRLD via the channel of fundamental changes that is visible after 64 days leading to 128 days.

These observations go against the intuitive understanding of the Shariah screening methodology (see Hakim and Rashidan, 2002) which removes all financial services companies from Islamic indices. The reason for this high coherence, in the humble understanding of the authors, is the underlying universe of stocks for both indices being heavily skewed to US market. Owing to this, any shock to financial services, kicks in the herd mentality in US market. Thus, the overall decline in US market, contributed towards this high coherence pattern.

Moving on, to specifically answering our research question focusing on Asia Pacific and Emerging Countries, we need to look at coherence patterns for these two indices with CWFS. Until now, the CWFS and IWRLD have shown counter theory results with strong lead lag relationship with high correlation between the two, with CWFS being the leader.

Analyzing the CWFS and IAP wavelet coherence pattern simultaneously with CWFS and IWEM, one thing that stands out is the lack of high coherence shades in the shorter scale of upto one week. Both coherence patterns are roughly similar so for easier understanding, the authors would explain them together. Although there are some traces here and there, but they are not consistent enough to base a theoretical argument on. In the longer time scale, a key feature is lack of any strong power upto 2000 for both plots.

Although there are slight traces of high power coherence in the 32 to 64 period scale, especially in first quarter of 1998 but the phase difference analysis makes these observations spurious claims since they show IAP and IWEM as the leading index to CWFS. This is counter intuitive because for the past century, financial services hub has been centred in western countries, and this lead lag relationship does not have any strong theoretical or practical foundations. In our opinion, these spurious results for this pre-2000 period are mainly due to the financial crisis which impacted the Far Eastern countries, of Malaysia, Indonesia, Thailand, Singapore, Hong Kong which are all major underlying composite markets for IAP as well as IWEM indices. This financial crisis was not induced due to global factors but rather it was primarily initiated via local currency attacks.

Post 2000, for both plots as earlier mentioned there is no steady high power coherence in the shorter scale, but if we notice the higher scale plot mainly 64 days and more, we see very high power coherence, and phase difference analysis pointing towards a lead lag relationship with CWFS as the leader. This observation intuitively is acceptable, that as financial shocks in the global markets happen, they have a ripple effect that translated into real economy sector via economic slowdown and cost of money increasing, thus inducing higher costs. This influences the real sector organizations, with IWEM and IAP constituent countries are all production based countries with heavy reliance on exports to US and Europe, any economic slowdown influences their economies thus translating into shocks to their equity markets.

6. Conclusion

This paper attempts to answer the question of whether Islamic indices are impacted in a speculative manner or through fundamental changes in real economy. Employing continuous wavelet techniques to world financial index and Islamic indices for World, Asia Pacific and Emerging Markets region, the authors analyzed the comovements of both indices to help achieve the research objective.

Firstly, our research shows evidence of low coherence before 2000 between conventional and Islamic world indices, and higher coherence post 2000 owing to high interlinks between the two and heavy dependence to the US market. Secondly, it was found that Islamic indices Asia Pacific and Emerging Markets are partially immune to speculative shocks in global financial services, being influenced via the real economy channel of financial shocks.

The implications of these findings are positively skewed towards Asia Pacific Islamic indices and World Emerging Markets, as they prove to a good avenue for diversification with exposure in western markets and US. This is so because when the U.S. is in crisis, investors shift their funds to developing or emerging countries' markets to dampen the effect of the crisis on their investments.

Furthermore, the marginalization of financial stocks via Shariah screening provides a positive stability factor to the Islamic indices. Hence, allowing them to follow a similar return pattern as conventional in times of economic growth, and yet in downturns, proving to be a safer alternative.

This research has practical implication in the modern financial landscape where Islamic financial assets have shown steady growth despite the financial turmoil. Our study represents some initial empirical work on the security provided by Shariah compliant funds in the face of financial sector originated crises. In the view of the author's this is plausibly owing to the decoupling of the financial and real sector and Shariah compliant firms find their roots in the real sector. An in-depth future study of transmission of financial sector shocks to Shariah compliant firms through the leverage of the firm is needed for a deeper understanding of this area.

It is important to highlight the limitations of the current paper in order to encourage a better and more robust study in the future. Firstly, the duration of the study encompasses 15 years only whereas a study deliberating several decades would be more intensive. Secondly, this study is focused on World financial indices as a conventional benchmark and was more aligned towards the Asian and Emerging market indices for its Islamic counterpart, limiting the scope of the study. This study can be expanded and findings be tested for validity for other regions and country specific indices using the same methodology.

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