

**Volatility between Conventional and Islamic
Stock Market:
Evidence from Quantile Regression Analysis.**

By

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MASTER OF SCIENCE IN MANAGEMENT SCIENCES

(FINANCE)



**DEPARTMENT OF MANAGEMENT SCIENCES CAPITAL
UNIVERSITY OF SCIENCE AND TECHNOLOGY
ISLAMABAD**

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Dedication

Dedicated from core of my heart to my beloved parents Mr. & Mrs. Abdul Kareem.

STATEMENT BY CANDIDATE

This thesis includes no material which has been already accepted for the award of any other degree or diploma in any university and confirms that to be the best of our knowledge the thesis includes no material previously published or written by another person, except where due references is made in the text of the thesis.

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All the praises are for the Allah Almighty; the most beneficent and the most merciful; who granted man with knowledge. All salutations are upon the Prophet (P.B.U.H.) whose teachings enlighten my thought and thrive my ambitions.

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Table of Contents

Chapter 1. Introduction	
1. Introduction	1
1.2 Research Questions	5
1.3 Research Objectives	5
1.4 Significance of the study	6
1.5 Organization of Study	6
Chapter 2. Literature Review	
Literature Review	7
Chapter 3. Data and Methodology	
3. Data and Methodology	25
3.1 Data	25
3.2 Methodology	25
Chapter 4. Results & Discussion	
4. Results & Discussion	29
4.1 Results	33
4.2 Discussion	49
Chapter 5. Conclusion	
5. Conclusion	50
References	53

Abstract

This study investigates the degree and extent of volatility interdependence between Islamic and conventional stock market represented by using the Dow Jones indices for the period spanning from Dec 1, 2008 to Dec 31, 2016. By using GARCH(1,1) conditional volatility series are generated then further used the Quantile regression approach on volatility series to check the financial markets interdependence. Study find the greater evidence of significant volatility transmission from conventional markets to Islamic stock markets and also same magnitude of spillover transmit from Islamic to Conventional markets. This study uses three quantiles levels low volatility (0.05), Mean (0.5) and high volatility (0.95). The results show that there is interdependence among stock markets on all three quantile levels. Accordingly, the structure of interdependence is asymmetric for both Islamic and conventional stock markets. The findings added the insights for government policy makers, investors and as well as for managerial purposes.

Keywords: Conventional stock market; Islamic stock market; Quantile regression

Chapter 1

Introduction

Over the last two decades stock market has developed rapidly as new investment instrument and these investments haven't solely extended with in the money market and conventional market but also in the developing Islamic markets. The introduction of Islamic indices has witnessed by the global capital market from over the past decade. Islamic finance is presently suffering growth crossways the planet and become a lot of challenger of the traditional financial set-up. Countries which were affected by crises provide new funding streams to improve their economies and provoke the awareness of wide range of investors. Indeed, once the oil crises of the 70s, Muslim monetary merchandise were created to soak up the huge provide of capital returning from loaded investor's which the holders of petrodollars were.

Researchers have taken interest on Islamic financial markets due to rapid growth of investments in the Islamic financial markets. Since last five years Sharia based principles followed by the market have grown 500% and reach at \$1.6 trillion in 2013 according to research of Hammoudeh (2013) from \$1.46 trillion in 2012 according to researcher Vizcano (2013). Islamic finance had identified as a key global investment area in the world for Government and policy makers. In 2013 the president of the World Bank strongly supports Islamic finance at 5th Izmir Economic congress. In the same year in London the British prime minister announced to incorporate new index on London Stock Exchange and also make strategies to issue Islamic bonds known as sukuks (Islamic bonds) by the UK Government. In 2015 the Government of Dubai also declared its support toward Islamic finance.

Dubai, London and Kuala Lumpur are competing for dominance as the Islamic finance center. The deputy prime minister for financial and economic affairs of the Republic of Turkey enforced the importance of Sukuk financing current account deficit, as Turkey is one of the most growing emerging market. Due to Global financial crises it was found that the conventional stock market can transmit risk towards Islamic stock market which is the base line of our research to check that interdependence between them.

There are many ways which shows the difference between conventional and Islamic

markets. Conventional market prefers value and small-cap stock whereas Islamic stock is in favor of growth and mid cap stocks. Another thing which shows the difference between Islamic and conventional market is about Islamic finance system which complies with specific Sharia code. According to Islamic sharia the investment should be permitted in stocks whose firms should not be involve in Haram (prohibited) activities which includes lending, gambling, production of tobacco or alcohol, conventional financial services, entertainment or weaponry. Moreover in sharia based investment there is a prohibition of investment in companies which held high interest bearing debts, trade debt more than their face value or receive interest and other impure income (Rehman, 2010).

There is also a ban on investments in derivative financial instruments in accordance with sharia codes that do not have any underlying tranches that include the forward option, futures and interest rates, as well as public debt. This means that the Islamic financial system that protects against risk does not allow for financial protection instruments. Another researcher's opinion shows that by increasing the risk and instability in the financial markets, the Islamic financial system can offer a buffer against it. During normal times and at the time of global financial crises (2008) in terms of volatility, the Islamic stock market is different from the conventional market (Nazlioglu, 2015).

Islamic investors are very selective in investing in Islamic indices, as global index providers demonstrate and modeled these new indices in a different way to consider the expectations of regulators in the Islamic and conventional markets. Significant investment research and Sharia-based indexes have been made due to their fair nature and the sharing of benefits. According to the world financial industry, Islamic investments are growing rapidly because they produce good returns and rely on desirable ethical precepts, as investors want in Islamic countries.

Alternative diversification in conventional and Islamic instruments could benefit from investments in global capital markets. Investment in multiple indices is the most effective and simple way to improve performance, most investors says that investing in Islam is more transparent and low risk. However, there is doubt about the ability of Islamic indices to exercise better or as the conventional asset market

due to the low potential for diversification, the minimum size of investment options compared to the conventional market and the higher costs the Islamic portfolio suggests that these investments have a lower yield than conventional ones (Ho, 2014).

After global financial crises among Islamic investment and conventional ones have difference in the characteristics of risk and return (Abdullah et al., 2007). The Islamic investment products for example Islamic bonds (Sukuks), Islamic stock market indices, exchange traded Islamic funds, launch of Islamic interbank benchmark rate (IIBR) and Islamic insurance (Takaful) have growing demand and popularity in Islamic finance after global financial crises. Specially, the reliance structure among the Islamic stock indices and conventional stock indices with the occurrence of major risk factors is not well understood, specifically during the bull and bear market periods.

In addition to banking, Islamic finance has been extended to money market activities, fund management and portfolio management. Islamic primary index "Muslim index with a social conscience" was launched in 1998. Since then, Islamic indexes have expanded, and as a result, Islamic index investors propose these days a good variant of sharia law indices.

The recent craving for Islamic finance is explained by the fact that some establishments are very insensitive to Islamic money in the 2008 currency crisis (Boumediene and Caby, 2009). Therefore, many market participants have seen the commodity of Islamic money as various investment vehicles for typical goods. In fact, over the past two decades, this sector has experienced massive growth rates currently being computed between ten and V-J Day (Brack, 2007, McKenzie, 2011).

Despite the exceptional growth of Islamic finance attributable to several factors, in particular the inflow of petrodollars and excess liquidity in the Gulf countries, studies on Muslim finances have gained ground recently, especially after the impact of the monetary policy crisis. In fact, a serious part of monetary literature was curious to analyze the performance of Muslim indices to ask whether Muslims or indices were far less profitable than typical rates (Hussein, 2004; Hakim and Rashidian, 2002). Mainly address the variations in risk and characteristics of Muslim and even typical investment (Dewandaru et al, 2015, Abul Basher et al, 2014, Milly and Grand Turk, 2012, Hayat and Kraussl, 2011, Abdullah et al., 2007).

Even so, the literature remains limited to the likely transmission between these markets (in terms of volatility). In addition, the results are very divergent and so far no agreement has been reached. It should be noted that research to quantify and examine the volatility and risks of predominantly Muslim financial assets together with the transmission of volatility and contagion are terribly rare. In fact, few studies have attempted to capture the dynamics of Muslim stock markets. This field of analysis is of great interest as it provides the tools to support investment calls in very strange new monetary products. In fact, investment choices are made following the market valuation.

Because of its compliance with Sharia principles, the Islamic financial system provides a buffer to increase the risk and instability in the conventional financial market. In addition, there is strong motivation for some investors to have confidence in investing in these Islamic investments. Therefore, the question of whether the Islamic index can be considered immune from unexpected variations of global conventional indices and yet questionable element would be the risk factor without the prevailing consensus. Therefore, the main objective of the study is to make a clear and homogeneous picture of the structural dependence of these influential risk factors and global indices.

Findings is vital for portfolio managers and investors as they who hold Islamic assets need to know how their assets volatilities are linked with other conventional assets, so that they can make the necessary asset choice and diverse their risk management and investment strategies accordingly. With the increase of Muslim population there is intensifying the interest in Islamic finance not only in Muslims communities but also in non-Muslim communities.

In 2008 the world stock market were crashed and global financial crises were faced due to financial contagion. United states were the first which were hit by the real estate market, and all emerging markets were affected by crises of US stock market. Ahlgren and Antell (2009) study suggest that during financial crises the most important features of globalization transmit the information across markets from one market to another if the fundamental economies are dissimilar.

To achieve this objective this study use the methodology that is adopted is based on relevant empirical techniques. The volatility of numerous stock indices are measured by using a standard GARCH technique that has always been very relevant to measure

volatility, especially for high frequency data (Ramlall, 2010;2006; Bollerslev et al. 1994). Interdependence analysis has been carried out by applying the QR technique to one of the most important econometric tools in the treatment of data characterized by the appearance of nonlinearity.

Due to rapid growth of investment in Islamic finance the transmission of volatilities also present in Dow Jones Index and in Emerging Islamic index and in Islamic countries. Our study will examine this transmission of volatilities among Dow Jones conventional and Islamic index including Europe, Gulf corporation council (GCC), Pakistan (KSE) , Kuwait (KU), Turkey (TUR), United Kingdom (UK), United States (USA) and World emerging markets (W) by using standard GARCH model. Our research is divided in five sections first introduction including the context and objective of the study, second is literature review, third is methodology and data , fourth is about results and empirical analysis description and fifth is conclusion in which the results will be discussed.

1.2 Research Questions

- Whether the interdependencies exist or not in terms of volatility between and Islamic stock and conventional stock markets?
- Is volatility effect more intense from conventional stock market to Islamic stock market?
- Is volatility effect is intense from Islamic stock market to conventional stock market?

1.3 Research Objectives

- To investigate the volatility interdependencies between Islamic stock markets and conventional stock markets.
- To analyze the intensity of volatility from conventional stock market to Islamic stock market
- To analyze the intensity of volatility from Islamic stock market to conventional stock market.

1.4 Significance of the study

Due to rapid increase of investment in Islamic finance the focus of research attempt to study the transmission of volatility in Dow Jones conventional index and in the Islamic index in emerging countries. This study will prove useful material to new investors in emerging stock markets, since it shows that Islamic index are favorable to create an effective portfolio investment.

These countries index includes Europe, Gulf corporation council (GCC), Pakistan (KSE), Kuwait (KU), Turkey (TUR), United Kingdom (UK), United States (USA) and World emerging markets (W) by using standard GARCH model quartile regression approach. This study is helpful for investors, economic policy makers and academia. Investors can formulate effective approaches against volatilities of conventional and Islamic stock markets. Investors would able to manage effective portfolios in the selected countries of our study to enhance their investment stock returns. For economic policy makers, they help to understand about the information of returns and volatility of Islamic and conventional stock markets so that they make policy easily to avoid contagious of spillover, So that new Policies may be formulated and implemented to manage the volatilities of stock markets. For academia purpose this study is also helpful to the researchers to have insight about the volatility spillover in Islamic stock market indices and extend literature in the field of this research domain.

1.5 Organization of Study

This study contains five sections. First is Introduction, which explains the basic idea of this study, objectives, research questions, back ground of the study and significance of study. The second section is Literature Review, in which this study explores by all this by reviewing previous studies. Third section is Research Methodology, in which all the variables name, data collection methods and methodology includes. Fourth section is Results & Analyses contains the results tables and results analyses and discussion. Fifth and last section of this study is Conclusion in which the final remarks are conclude by reviewing the results and compare it with previous studies.

Chapter 02

Literature Review

2.1 Literature Review

Financial markets have emerged in recent years as a solid weakness for crises that have spread across sectors in the business sector and have sparked economic depression. Consequently, the related financial project denoted the development of the Islamic backbone industry, which is essentially the view of Shari'a's standards, as another elective speculation capable of withstanding the financial crisis more efficient than the traditional partners and giving a response to global financial specialists trying to secure their companies against financial notions.

Muslim finances are not as unfathomable as those that manage socially reliable indexes. Precious archives for Muslims as dangerous in addition to their regular partners will be accepted due to the absence of sweeteners (Albaity and Ahmad, 2008). Additionally, these registrations may be additional productive partners to normality, with accompanying media organizations adopting monetary channel criteria and linked extra cash (and Hussein Omran 2005, Atta 2000).

In addition to banking, Muslim finance has been extended to money market activities, as well as fund management and portfolio management. Muslim primary index "Muslim index with a social conscience" was launched in 1998. Since then, the variability of Muslim indexes stretched out and, accordingly, the Islamic index investors proposed these days a series of jurisprudence indices.

Despite the significant expansion of Muslim finance due to many factors, in particular the influx of petrodollars and, therefore, the surpluses in the Gulf countries.

In fact, a significant monetary literature was fascinated by analyzing the Muslims' performance to ask whether Muslims or additional indices were less profitable than the standard rates (Hussein, 2004, Hakim and Rashidian, 2002).

They in the main direction of risk variation and characteristics come from Muslim participation and therefore standard (Dewandaru et al, 2015; Abul Basher et al, 2014 Milly and Grand Turk, 2012; Hayat and Kraussl, 2011, Abdullah et al. 2007).

Hassan et al. (2005) to compare the return on investment of the Associate's moral portfolio in Nursing Muslims from a standard reference portfolio. The results indicate that the application of Muslim moral screens has substantially no negative effect on the performance of the investment by the nursing assistant.

Hoepner et al. (2011) analyzed both the monetary yield and the type of investment of 265 common Muslim stock funds in twenty countries. The authors realize that Muslim fashion investment funds are somewhat supported by growth stocks that funds from most Muslim economies show a clear preference for small capitalizations.

Girard and Kabir (2008) compared variations interacting between Muslims and non-Islamic indices and realize that Muslim indices are oriented towards growth and capitalization, while conventional indices are compared with added value and concentrated capital.

Forte and Beste (2007) see whether Islamic investment funds such as faith-based investments (ie FTSE Muslims) will be enclosed in the category of socially responsible investment funds, or they would befittingly arranged in a very separate family investment. The results show that Muslim investment shows distinctive portfolios in terms of the profile of the political economy, compared to traditional indices and SRIs. As already mentioned above, literature explores together the potential importance of Muslim finance, particularly during the recent global currency crisis.

Dridi and Hasan (2010) examines and compares the performances of Islamic banks and conventional banks during the recent world monetary crisis in terms of the impact of the crisis on their earnings, credit and external growth and ratings. These authors realize that the two business models are differently influenced by the crisis. Dewi and Ferdian (2010) jointly argue that Muslim finance will be a response to the monetary crisis because of the ban on Riba's observation.

Ahmed (2009) states that the global monetary crisis has revealed misunderstandings and risk management at institutional, structural and product levels. This author suggests together that if establishments, organizations, and products follow the principles of Muslim finance would prevent the current global crisis from occurring.

Arouri et al. (2013) are pursuing a special approach. while looking at the impact of the currency's monetary and standard Islamic currency markets in 3 global areas and the search for fewer adverse effects in the first and the second, examining the distributed portfolios in which it markets Islamic values complement the traditional markets. They show that portfolio growth leads to less general risks and generates further benefits of lifelong diversification.

Hussein Omran (2005) compare the performance of Dow Jones Muslims to their regular peers over a period of 1996-2003 and realize that indices show Muslims, statistically and economically, an abnormal positive vitality arrived at the total and for which the sub-period from January 1996 to March 2000 shows statistically insignificant negative results

from Gregorian calendar month 2000 to July 2003. Using CAPM, Hussein (2004) finds that the FTSE world Muslim Index performs still because the FTSE world standard index over the amount of 1996–2003. However, the FTSE world Muslim Index yields abnormal returns statistically within the securities industry amount (July 1996 to March 2000) and it underperforms the FTSE world standard index within the market amount (April 2000 to August 2003).

Islamic index doesn't correlate with either Wilshire 5000 or the 3 month Treasury-bill. They conjointly show that the changes within the Moslem index don't seem to be caused by the Wilshire 5000 or the 3 month Treasury-bill. Their results indicate that the Moslem index is influenced by factors freelance from the broad market or interest rates Hakim and Rashidian (2004).

Annur et al. (1997) consider the execution of thirty one Malaysian common finances that ar for the foremost half Moslem from 1990 to 1995 and realize empiric confirmation that these Malaysian assets outflank the KLCI benchmark amid that amount.

Hakim and Rashidian (2002) utilize both co integration tests to look at the linkages between the Islamic value list and each of the U.S. Wilshire 5000 record and the U.S. three-month Treasury charge. They demonstrate that the Islamic record isn't corresponded with and not caused by either the U.S. Wilshire 5000 record or the U.S. three-month Treasury charge.

Long-run connection between the Islamic markets in Malaysia and main macroeconomic aspects (i.e., cash supply, trade rates, financing costs, the mechanical generation record, and the Federal assets rate) utilizing the autoregressive appropriated slack (ARDL) show. Their outcomes demonstrate that the trade rates, cash supply, loan costs and the Federal assets rate fundamentally influence the KLSI, proposing that these factors appear to be appropriate focuses for the administration to concentrate on to settle the Islamic securities exchange and to energize more capital inflows into the market. Abdul Majid and Yusof (2009).

Abdul Karim et al. (2012) look at the impact of subprime contract crises on Islamic managing an account financing and Islamic securities exchange in Malaysia over the period 2000-2011. They locate that both the Islamic keeping money financing and securities exchange factors are co integrated with a few macroeconomic factors (expansion, genuine conversion scale, loan costs and monetary action as spoke to by the mechanical generation file) both earlier and amid the crises time frame.

The harms on Islamic markets 2008-2009 GFC are less critical than on the regular files of the three noteworthy areas Europe, the United States and the World. Jawadi et al. (2014).

The part of the traditional securities and sukuk declaration on investor riches in six Islamic money related markets and report that the market response is negative for the declarations of sukuk before the period 2004-2006 and amid the 2007-2009 worldwide financial crises. Besides, it is discovered that market response is sure for the declaration identified with ordinary security issuance before the crises time frame and negative amid and after the 2010-2012 crises periods Alam et al. (2013).

Islamic archives are more numerous than their usual Dotcom partners and world crisis times, but the results are uncertain for times of crisis. These findings are made clear by the traditional view of companies consistent with Sharia, which offer speculators the most prevalent risk options in the midst of the crisis Ho, (2014).

The dynamic links between four noted Islamic archives and their comparison between the conventional lists of North American, European Union, Far East and Pacific countries. They discover the confirmation of positive and significant breaks from traditional markets to their comparable Islamic markets Dania and Malhotra (2013).

Using the stochastic predominance strategy, Al-Khazali et al. (2014) investigate whether Islamic stocks outweigh common shares lists by fighting nine Islamic archives of Dow Jones with their usual Dow Jones partners. The exact test shows that all regular files stoically exceed Islamic files in second and third orders, except on the European market. As far as possible, the European archives, from the United States, UU. And the rest of the Islamic world governs the common partners in the 2007-2012 period. In addition, the results show that Islamic records surpass their usual partners in the midst of the global money crises currently underway.

The ability to predict financial market yields for Dow Jones Islamic Market (Djim) and the Dow Jones Industrial Average (DJIA) lists using non-parametric redundancy. The results reveal a measurement point limit from the DJIA list and the Djim list. This consistency is really huge, with only one month in advance Djim's case, twelve weeks later for DJIA Alvarez-Diaz et al. (2014)

Overall, it seems that Djim's capacity is a bit higher than the DJIA. Additionally, Majdoub and Mansour (2014) analyze contingent relations on the EE window. UU. It is a sample of five developing Islamic markets (Turkey, Indonesia, Pakistan, Qatar and Malaysia), using three GARCH multivariate models (BEKK, CCC and DCC). Report on the proximity of fragile relationships that change over time between the United States. In addition, these Islamic advertising development values are still unclear confirm that the backups announcing the United States. UU. Islamic overflow in the development of market value.

The Shari'ah Advisory Board (SAB) is the highest specialist who gives the rules and the addresses where Islamic organizations enjoy pleasing interest should be based on Islamic exchange standards that refers to how Muamalat. consistency test indicated in the understanding of a moral constraint arrangement and changeover. There are two expansive Shari'ah standards: the telematic parts in which commercial stores are controlled in order to ensure that they are involved with any friendly Shari Shari (some of them are: generation of pork and alcoholic for human use; contracts of financial betting related to curious, relating to funding, advertising / media including explicit entertainment, snuff and the exchange of gold and silver in financial organizations granted place When rebel business is expelled from the system registry,

remaining organizations are checked from those based on accounting consistency from related shielded financial indices.

Some of the consistency estimates that organizations should be set to include: the obligation value should be less than 33%, the value of the credit must be less than 49%, the financial value and the value of the securities should be less than 33%. Likewise, resilient revenue is eligible as an unreasonable income if that certain limit in form: a maximum of 5% is permitted (Ho et al, 2011, 2012.).

In recent decades, global finance linked to the Islamic market has accumulated a great deal of strength to attract universal capital flows of Muslim and non-Muslim speculators, and favorite lists are global Islamic lists, for example, FTSE, Djim and MSCI. In addition, the advancement of Islamic capital markets in families and the world markets continues to show positive patterns. This is halfway through the improvement of the Islamic nation, which continues to move rapidly with the accumulation of oil wealth. Money will have to be secured and accumulated as financial specialists seek appropriate Shari'a risk sharing options incorporated in lists of others that can be rebel. With the advances in the world's major monetary approaches, the Islamic capital market has continued to show remarkable growth with increasingly attractive elements for people who remember them as appropriate options. This has also pushed people from advertising to continue introducing new elements and administrations while updating existing ones to better meet the requirements of financial and customer specialists. The Islamic Share Register, for example, the DJIM and the Global Islamic FTSE Index included only companies that traded in organizations wholly according to the Shari'a Islamic rules.

In addition, according to Dharani and Natarajan (2011), the Islamic index includes coherent actions of the Shari'ah which provide core focal points for being socially reliable and morally healthy.

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Hassan and Girard (2011) alludes to McKinsey's consulting company report and management infer that the back is another Islamic power in the financial mall since this specialized advertising potential is attracting speculators. The current increase in liquidity in the Middle East capital markets is bringing both national and global cash supervisors to take advantage of this market by offering acceptable Shari'a assets. Many financial organizations (such as Citibank, Barclays, Morgan Stanley, Merrill Lynch and HSBC) offer related elements of Islamic finance, while the New York Stock Exchange and London promoted Islamic readiness to attract their Islamic finance specialists. Looking ahead, the financial market expects to incorporate important shariety-based registries in the coming decades, provided by numerous global organizations to provide Islamic support and Islamic capital. In addition, there are numerous Islamic archives presented by traditional and new homes of risk working in the Islamic pathway in different nations of the world.

Li (2007) also used the GARCH model to examine the relationship between equity markets in China, Hong Kong and the United States. The results show that there is no relationship between the stock markets of China and the United States. But there is a weak volatility relationship between China and Hong Kong.

The ARCH / GARCH model and the variance causal test to investigate the economic relationship between the MENA stock and the international and regional markets. The results provide evidence of problems on the MENA market. According to the results, the Saudi stock market is the main stock market of MENA. Egypt also brings countries in non-GCC stock markets and MENA shares have a strong financial relationship with the US, UK and France Neaime (2012) markets.

Vector auto-regression and different multivariate GARCH Model to dissect the instability overflows among the United States, the European Union and the BRIC stock markets and shows that the BRICs have turned out to be all the more universally incorporated and that infection is further substantiated since the United States economic crises Bekiros (2013).

The multivariate progression of profits for different national stocks. Contingent mean of market returns are demonstrated utilizing a VAR determination while their restrictive differences are displayed by a multivariate GARCH. Furthermore, there is practically unidirectional transmission of unpredictability from the US stocks to different stocks Bensafta and Semedo (2011) .

Transmission of volatility is also measured by stochastic volatility models between the stock markets. But the GARCH models are considered as more reliable to market transmission. Many studies are used to investigate the relationship by these types of models. In So et al. (1997) used stochastic volatility model to analyse the volatility transmission in 7 Asian equity markets. And the result shows that there is volatility transmission in these markets. Wongswan (2006) also used this SV (stochastic volatility model) to investigate the return of US, Korea, Japan and Thailand.

Mean and volatility is also measured by Markov switching regime models. Edwards and Susmel (2001) applied a bivariate SWARCH and Result shows that that high unpredictability has a tendency to be connected to global emergencies. Edwards and Susmel (2003) also used this technique to investigate the volatility transmission between stocks.

According to Lee et al. (2004) used VAR and EGARCH model to investigate the volatility and return of Asia and USA markets and found the volatility spillover between USA and Asia. Hamao (1990) investigate the short term relationship of

volatility spillover between USA, UK and Tokyo. Shiller et al. (1991) reported that Japanese market members are affected to invest in US. Bennett and Kelleher (1988) and Hamao, et al. (1990) argued that USA returns are the cause of volatility spillover between the major stocks.

Rivas et al. (2006), investigate the response of US stock to EU stock by using VAR model, and argued that changing depends on the investment portion from EU to US. Furthermore, Hunter (2003) investigated the interdependence of developing stocks of Mexico, Chile and Argentina by using B-B nonparametric causality test. Cakan and Ozdemir (2007) also used this methodology to investigate the links between UK, Franc, US and Japan and find out that there is strong relationship between USA and other countries.

According to Kanas (1998) and Koutmos and Booth (1995) the process of interdependence between main financial stock markets are increased after the financial crises Oct. 1987. Yilmaz (2010), Chiang (2007), Boubaker and Jaghoubi (2011) and Zhou et al (2012) argued that the financial crises of Asia 1997, volatility is increased in this period among Asian Financial markets.

Karolyi and Stulz (1996) investigated that why stock markets move side by side. And the result showed that macroeconomic declaration and shocks in the stock exchanges and treasury bills markets had no quantifiable possessions on the co-movements between the USA and Japan Financial market. But they argued that shocks in wide market based indices, such as S&P 500 and Nikkei Stock Average, impacted both the determination and power of the relationship. The main focus of financial literature to investigate the relationship of main financial stock markets.

furthermore, Eun and Shim (1989) argued that the USA financial market influenced by 9 other financial markets globally and Hamao et al (1990) argued that the significantly transmission of volatility from USA financial stock market to UK and Japan financial stock markets, from UK to USA and Japan financial stock market but no transmission from Japan financial stock market to USA and UK financial stock markets. However, after some time the study of Bae and Karoly (1994), the argued that there is strong volatility transmission between USA and Japan financial stock market.

The EU region provides lot of financial literature on volatility transmission among the main financial stock markets. Kanas (1998) argued that there is significant impact of between France and Germany, France and UK, and volatility effects from U.K to Germany. moreover, Billio and Pelizzon (2003) and Bartram et al (2007) studied whether the opening of the Euro improved the interdependence among the Euro zone's financial stocks. Billio and Pelizzon (2003) investigated that the impact of the Germany financial stock improved in EU domain after the Euro launched and Bartram et al (2007) studied a market dependence increase in major EU financial stock markets in the result of the Euro introduce. Lot of literature has been counted on the regional financial stock markets interdependence. The results of these studies showed that the geographically closed to one another have strong relationship.

Janakirmanan and Lamba (1998) perceived that financial stock markets in the Pacific-Basin domain impact each other and Al-Deehani and Moosa (2006) watched huge relationship among three main financial stock markets in the Middle East. Janakirmanan and Lamba (1998) recommended that their discoveries were identified with home inclination, while Al-Deehani and Moosa (2006) contended that the expanded relationship among the nations in their review was because of the foundation of a typical exchanging stage that encouraged cross-fringe venture. Besides, Johansson and Ljungwall (2008) saw short-run dynamic linkages among the Greater China's securities exchanges, regardless of huge administrative hindrances that constrained cross-outskirt ventures, and recommended geographic vicinity as a conceivable clarification.

Interdependencies are measured in either the long-run, by and large as far as co integration, or in the short-run, for the most part as far as short-run dynamic linkages. The idea of co integration was initially presented in fundamental work by Granger (1981). Granger (1981) proposes that if all factors of a vector time arrangement prepare display a unit root, there might exist of direct mixes without a unit root, and the presence of straight mixes can, thusly, be deciphered as a sign of long-run co coordination connections between the factors of the vector time arrangement handle.

Times arrangement are said to be co-integrated on the off chance that they display a comparable to stochastic float. For the most part three strategies, including the Engle-

Granger two-stage technique, the Phillips Ouliaris co mix test, and the Johansen trial of co integration, are utilized to test for co incorporation. The Johansen trial of co mix, created by Johansen (1988) and (1991), is favored by financial specialists since this test just incorporates one stage of estimation and takes into account a few co integrating connections.

According to Ghosh et al (1999) there is co-movement of some financial markets with Japan stock market, some with USA market. Jhnson and Soenen (2002) studied the degree of relationship of twelve Asia pacific stocks with Japan and find out that China, New Zealand and Australia are strong relationship with Japan stock market. Moreover, Alaganar and Bhar (2002) studied about volatility between Australia and USA stock. The results suggest that there is significant flow of information from USA to Australia. Worthington and Higgs (2004) also find out the volatility among 9 Asia stocks.

Many researchers conducted study on china stock market and its relationship with Australia stock exchange. The correlation of risk and volatility is one of the most important to work on volatility. So, according to Baele (2005) it is necessary to collect information about market for investors, policy makers, etc. Engle and Ng (1993) investigate the news effect on Japan's stock market. He found that the news has a significant effect on volatility, bad news effect more than good news. This behavior also studied by DeSantis and Imrohoroglu (1997) and Dornbusch et al.(2000). Pan and Hsueh (1998) investigate the transmission of news internationally and found that the global markets are much interdependent. Some researchers use volatility to investigate the risk about asset (Merton 1980). For example, Kanas (1998) work on this approach, and found the volatility movement among London, Parries and Frankfurt.

Karolyiand Stulz (1996) studied to determine the volatility effect. The developments which potentially affect first or second minutes can be arranged into nearby (peculiar), territorial (from a neighboring nation) or worldwide (from abroad) news. Moreover, volatilities may respond in a hilter kilter way to such stuns, so that positive and negative stuns can have an alternate effect. The determination of the stuns is likewise a vital normal for the transmission procedure, as stuns might be momentary or they may continue for quite a while (Scheicher, 2001).

Many researchers focused on world developed stock markets like USA, G7, Canada, Japan & UK. Bekaret and Wu (2000) and Hamao et al.(1990) studied on Japan and USA volatility and found that there are transmission of volatility between USA stock market to Japan stock market. As opposed to the consequences of most reviews, Lin et al.(1994), and McAleer and Veiga (2005) found that both the USA and Japan markets encounter positive and huge overflows from the other market. That is, cross-nations' association in returns and volatilities exist. Lin's et al.(1994) comes about propose that daytime returns in New York or Tokyo can altogether impact the overnight returns in the other market, while there is no proof of slacked return overflows from New York daytime to Tokyo daytime and the other way around.

EV-VAR method is used by Booth (1997) to investigated the transmission of volatility among UK, USA and Japan. And found that there is from USA to UK market the Japan stock market followed by USA stock market. USAN and UK financial stock market hove impact on Japan financial stock market. They also used the GARCH method on the USA stock market. GARCH model is also used by Karolyi (1995) to investigate the volatility and return of USA and Toronto stocks. And found that the size and steadiness of return developments that start in both markets and that transmit to different markets depend vitally on how cross-advertise flow in unpredictability are demonstrated. A similar methods are additionally utilized by Baele (2005) and find out that both Euripon union and USA stuns' overflow force has expanded generously over the 1990s because of globalization and in addition provincial combination.

Financial literature also interested in developing stock markets to investigate the transmission of stocks in Asian and European stock markets. Bala and Premaratne (2003) investigated the volatility transmission among USA, UK, Japan and Hong Kong by GARCH model. And the results show that the Singapore financial stock market has high volatility to USA, UK, Japan and Hong Kong. Shields (1997) also use GARCH method to study the return of Budapest and Warsaw markets. Scheicher (2001) used VAR method to conduced study on volatility among Check Republic, Polan and Hungry. The results suggest that EU big stock markets are influenced by western stocks ad Hungary and Poland as well.

De Santis and Imrohorglu (1997), Aggaraval et al.(1999) and Bekaert and Harvey (1997) studied volatility in Asian, and Latin American markets, Mediterranean and Asia. The primary review investigates the powers that decide why unpredictability is diverse in different developing markets. It observes that more open economies as far as world exchange have fundamentally brought down volatilities. Also, their outcomes recommend that unpredictability is emphatically impacted by world figures completely incorporated markets, while it is more probable affected by nearby considers divided capital markets. Aggaraval et al. (1999) found out that times of high unpredictability in these developing markets are connected with imperative occasions in every nation as opposed to worldwide occasions. Bekaert and Harvey's (1997) and De Santis and Imrohorglu's (1997) thinks about bolster the centrality of stuns transmitting starting with one market then onto the next.

By using EGARCH and GARCH method Leon et al. (2000) studied the unsystematic risk on Tobago and Trinidad Financial markets to estimates return and volatility. They found that the return for financial companies react more than market and volatility create more affects.

Kim and Langrin (1996) took note of that as controls on capital developments, including repatriation of the venture continues, is casual, it gets to be distinctly less demanding for outside and local speculators to move resources into and out of these little developing markets. The creators utilize GARCH models to analyze the subject of whether there is expanded instability overflow from created markets to the securities exchanges of Trinidad and Tobago and Jamaica therefore of the progression of their outside trade markets. The outcomes propose that unpredictability overflows expanded after the advancement of the trade showcase in Jamaica, yet not for Trinidad. The purpose behind this was contended to be that the obstructions to passage to the share trading system in Jamaica were all the more restricting that in Trinidad.

Global portfolio enhancement is advantageous just if comes back from worldwide securities exchanges are not fundamentally corresponded (Harrison and Moore 2009). Bekaert (1995) found that the developing business sector returns are higher, and more unsurprising, with higher instability that created markets and connections with created markets were low, in this manner speaking to appealing supporting open doors for

speculators in created markets. Securities exchange co movement likewise gives a measure of the level of market incorporation between the nations (Kim and Langrin 1996). Strategy creators are likewise keen on whether securities exchanges display co development on the grounds that in a universe of progressively changed capital streams, the level of securities exchange co development can affect on the solidness of the global financial related framework (Harrison and Moore 2009). At last, investigating value instability can give showcase members an evaluation of the hazard connected with different financial items and consequently encourage their valuation alongside the advancement of various supporting methods (Ng, 2000).

According to Ross (1989) the presence of unpredictability spillover suggests that one huge stun expands the volatilities in its own advantage or market, as well as in different resources or markets also. Unpredictability and its progressions flag the stream and entry of new data. On the off chance that data comes in bunches, resource returns or costs may display instability regardless of the possibility that the market impeccably and momentarily acclimates to the news. Consequently, contemplate on instability overflow can help seeing how data is transmitted crosswise over value markets. As a result, current writing has progressively centered around the overflow impact and instability (Beirne, et.al., 2010; Like Kim, 2009; Park, et.al., 2010; Mukherjee and Mishra, 2010; Kumar and Pandey, 2011 among others). A critical issue in resource allotment and hazard administration is whether financial related markets turn out to be more reliant amid monetary emergencies. This issue has obtained awesome significance among scholastics and professionals, particularly since the presence of a few developing business sector emergencies of the 1990s (Kenourgios and Padhi, 2012). Until then, monetary emergencies models were created as to emergencies as occasions happening in individual nations. Nonetheless, those emergencies scenes centered the experimental research around the examination of virus impacts and the between provincial or intercontinental nature of the stuns.

Causality in change tests that are presented by Cheung and Hong (2001), Ng (1996), and Hafner and Herwartz (2006) are utilized every now and again with a specific end goal to decide the heading of instability overflows. Alaganar and Bahr (2003), Neaime (2006) and Köseoğlu and Çevik (2013) utilized Cheung and Ng and Hong causality in change tests to examine unpredictability overflows between various

financial markets. Be that as it may, there are restricted reviews that examine instability overflows with Hafner-Herwartz causality in difference test. Some of them are made by Görmüş (2012), Nazlıoğlu et al. (2013) and Nazlıoğlu et al. (2015).

There are literature that inspect the unpredictability overflows between Turkish stock. Korkmaz and Çevik, (2009), Taşdemir and Aslan, (2009), Adıgüzel et al. and Okur and Çevik, (2013) utilized causality in fluctuation tests in their reviews. In the light of studies in the writing, it is felt that it will be helpful for speculators to investigate changing instability overflows between Turkish securities exchange segment lists inside the setting of financial crises.

According to Kumar and Pundey (2011) analysts have led examines on instability overflow between the US and other developing markets and decided a unidirectional transmission of unpredictability from the US to alternate nations. This finding shows up very natural and backings our theory. Al-Zeaud and Alshbiel (2012) expressed that scientists have analyzed unpredictability overflows amongst develop and developing markets and established that develop markets do in fact impact the restrictive differences and returns of other territorial markets. Chittedi (2007) utilized a Granger Causality test and reasoned that the created markets of the US, Japan and France have an impact on the creating business sector of India. However there was no proof that the created markets affected the other BRIC countries.

Kenourgios (2007) inspected the connections between the created markets of the US and UK with the developing BRIC markets and found an expansion in the relationships and volatilities amid crises periods instead of stable circumstances. Bhar and Nikolova (2009) dissected the cooperation of the BRIC countries with whatever remains of the world. Their examination reasons that India shows the most elevated territorial and worldwide relationship, trailed by Brazil, Russia and ultimately China. As far as anyone is concerned there are no different investigates that widely concentrate on overflow virus from the created to the developing markets of the BRIC countries.

The Johansen trial of co integration has been connected in a few reviews, including Richards (1995), Niarchos et al (1999), Johansson and Ljungwall, (2008), and Badhani (2009). Richards (1995) utilizing the Johansen trial of co-integration to

examine whether there exist long - run connections among the Japanese, the US, and a few European securities exchanges. The reason for the review was to exactly test the productive market hypothesis, which recommends that co-integration is probably not going to be watched. Richards (1995) found no confirmation of co integration and contended that every list arrangement incorporates nation particular segments which make them carry on diversely after some time. Niarchos et al (1999), Johansson and Ljungwall, (2008), and Badhani (2009) utilized the Johansen trial of combination to look at the long-run relationship between the Greek and the U.S securities exchange, the securities exchanges in Greater China, and the Indian and the U.S stock exchange, individually. None of these reviews discovered supporting proof of co joining.

Engle (1982), in a fundamental work, built up an auto ARCH strategy to catch monetary circumstances arrangement endogenous instability overflows. The ARCH technique was later summed up by Bollerslev (1986) to the summed up ARCH GARCH philosophy, which likewise permitted the strategy to catch the industriousness of the endogenous instability overflows.

The ARCH and GARCH structure were created to represent serial relationship in the arrival and mistake term of univariate time arrangement. Since much writing has shown that monetary return arrangement move together crosswise over business sectors, Bauwens et al (2006), among others, contend that multivariate augmentations of the univariate structures are more suitable to inspect the conduct of financial time arrangement. The general multivariate GARCH (MGARCH) is, in any case, considered excessively adaptable for most issues and thusly four option models have been created. In that capacity is the element restrictive relationship (DCC) MGARCH display, presented by Engle (2002).

The DCC-MGARCH demonstrate, a change of the consistent conditional connection (CCC) MGARCH show, permits the contingent covariance framework of the needy factors to take after a dynamic representation and the contingent intend to take after a vector autoregressive (VAR)representation. The unwinding of the supposition of consistent contingent connection empowers the model to catch the all around watched marvel of instability grouping, which implies that times of extensive swings arbitrarily succeed times of little swings, and the other way around. Therefore, the model empowers estimation of time-differing instability relationships. In addition, the

VAR representation empowers an estimation of mean overflows since the model fits a multivariate time-arrangement relapse of every needy variable on slacks of itself and on slacks of the various ward factors.

A paper by Billio et al (2010) experimentally explored the interconnectedness among stock establishments utilizing monthly data. They discover insurance agencies, intermediaries, banks, and multifaceted investments have turned out to be very interrelated over the previous decade. Commercial banks and back up plans are assessed to have a more noteworthy effect on flexible investments and venture banks than the other way around. Their systemic hazard measures contain prescient energy to recognize financial crises periods.

Boyson, Stahel, and Stulz (2010) used Quantile regression (QR) approach to investigate in order to analyze conditional variables. In the same way, Chan et al. (2006) and Billio et al. (2009) suggest an administration changing structure to assess the probabilities of changing to a "systemic risk administration". The joint circulation of hedge stock investments returns is examined by Brown and Spitzer (2006) who measure the reliance structure between multifaceted investments procedures utilizing copulae. While the initial two reviews appraise the impacts on state probabilities as opposed to the extent of the overflow impacts, the last review gives assessments on the tail-reliance structure without exhibiting experimental appraisals of the size of potential hazard overflows.

A few researches also give proof of risk in the insurance sector. Allen and Gale (2005) said that the significant development in the exchange of credit hazard crosswise over segments of the financial framework has prompted a move in hazard from the managing an account division to the protection area. Fenn and Cole (1994) explore the disease impacts among life coverage organizations when real insurance agencies report noteworthy composes downs of their portfolios. Negative riches impacts on shareholders of other insurance agencies are appeared to be especially solid if the compose downs allude to garbage bonds or business contracts. In a strong leveraged partnership investment, have gain considerable attention of contagion, risk transmission process between different institutions and possible change of systematic risk in stock (Bernanke, 2006).

Lin et al. (1994) argued that instability and returns of two value markets might be connected because of close exchange and venture interface, developing financial market combination, universal resource estimating models, and market infection. Volatility spillover in global financial stocks have been recorded a “Meter Ahowr” Engle et al. (1990) and Ito (1992). Roll (1989) and Hamao (1991) stated that the relationship between financial markets have been increased after the financial crises 1987. As indicated by Hamao et al. (1991), in number relationship among financial stocks could generally change speculator discernments concerning the significance of remote monetary news, thereby for all time expanding the connection in stock returns and unpredictability crosswise over business sectors.

Following are the hypothesis of this study:

H1: The financial interdependence exists among Conventional and Islamic stock markets.

H2: The financial interdependence exist among Islamic and Conventional stock market.

Chapter 3

3.1 Data and Methodology

Analysis specially contains Global Islamic Indices namely: the DJIM Index and conventional counterparts, Emerging Markets Index, Kuwait Index, Gulf Cooperation Council (GCC), United State Index, United Kingdom Index, DJ Europe Index, Turkey Indices, Pakistan KSE. This study use daily data from Dec. 01, 2008 to Dec 31, 2016,using the GARCH model to measure the volatility between all Islamic and Conventional stock markets.

Table 3.2 Indices Symbols

Country Name	Conventional symbols	Islamic Symbols
Europe (EU)	REU (A1)	REUISL (B1)
GCC	RGCC (A2)	RGCCISL (B2)
Pakistan (KSE)	RKSE (A3)	RKSEISL (B3)
Kuwait (KU)	RKU (A4)	RKUISL (B4)
Turkey (TUR)	RTUR (A5)	RTURISL (B5)
United Kingdom (UK)	RUK (A6)	RUKISL (B6)
United States (USA)	RUSA (A7)	RUSAISL (B7)
World emerging markets (W)	RW (A8)	RWISL (B8)

3.3Methodology

In examining financial literature, the larger part of past studies which explore the interdependencies between a few variables are based on econometric techniques established for the most part on the relationship coefficients. QR is an augmentation of the least squares estimation of the contingent intend to an accumulation of models for various restrictive quantile capacities. Contrasted with standard straight relapse methods which compress the normal connection between an arrangement of

repressors and the result variable in light of the restrictive mean capacity which gives just an incomplete perspective of the relationship, the QR gives that probability. All the more accurately, it gives a more point by point picture than exemplary straight relapse, as it concentrates on the whole contingent dissemination of the needy variable, not just on its mean (Koenker,2005).

Without a doubt, as the middle relapse estimator limits the symmetrically weighted aggregate of total blunders to assess the restrictive middle (quantile) work, other contingent quantile capacities are evaluated by limiting an unevenly weighted total of total mistakes, where the weights are elements of the quantile of intrigue. Additionally, QR system gives data on the normal reliance and also the upper and lower tail reliance. In this manner, quantile relapse is strong to the nearness of exceptions Through monetary writing, QR demonstrated its pertinence to some sort of financial and budgetary information, for example, truncated and edited ward variable results with fat-followed circulations, nonlinear models (Haultfoeuille and Givord, 2014).

That why, a few examinations in past decades have received this strategy to break down a few ranges of connected econometrics and back. In financial term, applications incorporate examinations of wage structure (Buchinsky and Leslie, 2010), profit versatility (Eide and Showalter, 1999; Buchinsky and Hunt, 1999), instructive fulfillment (Eide and Showalter, 1998). This method is likewise utilized as a part of the money related division, particularly to solve the issues identified with the Value at Risk and choice evaluating (Engle and Manganelli, 2004; Morillo, 2000), and to demonstrate the reliance of financial factors and to think about the structure and level of reliance (Chuang et al. 2009).

Following equation is used for quantile regression:

$$Qy(\tau | x) = \inf \{b | Fy(b | x) \geq \tau\} = \sum_k \omega_k(\tau) \alpha_k = \alpha \omega(\tau)$$

Where y is a dependent variable that is assumed to be linearly dependent on x vector an $f_y(b/x)$ is the conditional distribution function of y given x. The x vector is composed by all conditional volatility series generated by AR(1)- GARCH (1,1) model. In QR equation $\omega(\tau)$, $\tau \in [0,1]$ represent the QR coefficient which can determine the

relationship between vector κ and τ^{th} conditional quantile of y . The value of $\omega(\tau)$ determine the complete dependence of y

3.4 Descriptive statistic

Descriptive statistic provide a summary of all variables according to the following measures mean, median, mode, kurtosis, minimum, maximum, skewness, variances and Jarque bera. Mean shows central tendency of the data. Positive and negative values are checked by Skewness. Std. deviation is use to check the descriptive values, high volatility shows high descriptive values. Kurtoses check peakness and flatness of the data and normality is checked by jarque bera. Negative skewness demonstrates a conveyance with a hilter kilter tail reaching out toward more negative esteems. Positive skewness shows a conveyance with an uneven tail reaching out toward more positive esteems. Kurtosis measure describes the relative peakedness or levelness of a conveyance compared with the normal distribution. Positive kurtosis indicates a relatively peaked distribution whereas negative kutosis indicates flatness of data. ADF test is used to check the stationary of data if data is homoskedastic then GARCH model will not be applied on that data whereas if data is heteroskedastic then GARCH model could be applied.

3.5 Correlation Matrix

This test is used to check the relationship between given variables. The range of correlation is -1 to +1. But it is not a reliable technique because of some limitations.

3.6 Unit root test

Unit root test is used to check the stationary of the data. It must be necessary that the data should be stationery. Augmented Dickey fuller (ADF) is used to check the stationary of data. Its value must b negative. This test formed by Dickey and fuller (1979).

3.7 GARCH (1,1) model

GARCH (1,1) model is used to check the volatility spillover between financial stock markets. There are a number of test contain in ARCH family. It is used on that data which face heteroscedasticity and autocorrelation problems. Arch (1) model is used to detect heteroscedasticity and autocorrelation problems. In this study GARCH 1,1 model is used to developed volatility series for the conventional and Islamic stock market.

Chapter 4

Results & Discussion

In the following chapter, this study analyzes the data by using different statistical tools. It has two sections. The first section presents results which includes descriptive statistics, GARCH and Quantile regression analyses. The second section is includes the discussion.

Table 4.1 Descriptive statistic

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	ADF	ARCH
REU	0.000162	0.01171	-0.31327	10.12854	6298.663	-1.01546	0.04645
RGCC	9.19E-05	9.19E-05	-1.56141	34.77153	125359.4	-0.90462	0.135087
RKSE	0.000559	0.008867	-0.39218	9.400207	5114.078	-0.77923	0.231329
RKU	-0.00018	0.009194	-2.00765	43.83597	207095	-1.01374	0.107127
RTUR	0.000359	0.012859	-0.30993	8.170704	3335.81	-1.01374	0.139482
RUK	0.000195	0.008911	-0.09901	8.140126	3254.593	-1.00261	0.145941
RUS	0.000422	0.042065	-0.60687	1274.645	1.99E+08	-3.05086	0.499474
RW	0.000208	0.009507	-0.06408	9.92707	5904.088	-0.87352	0.052457

This table presents the descriptive statistic of monthly returns. It shows in column one to five the mean %, Std. dev. %, Skewness, Kurtosis, Jarque-beta and ADF Statistic for Unit root test. The REU average monthly return is 0.000162 with 0.011 standard deviation. The RGCC average monthly return is 9.19E-05 with 9.19E-05 standard deviation. The RKSE average monthly return is 0.000559 with 0.008867 standard deviation. The RKU average monthly return is -0.00018 with 0.008911 standard deviation. The RUS average monthly return is 0.000422 with 0.042065 standard deviation. The RW average monthly return is 0.000208 with 0.009507 standard deviation. The RTUR average monthly return is 0.000359 with 0.012859 standard deviation. Negative skewness shows a conveyance with a deviated tail reaching out toward more negative esteems. Kurtosis measure portrays the relative peakedness or levelness of a dispersion contrasted and the typical circulation. Positive kurtosis

indicates a relatively peaked distribution. The ADF statistics rejected the null hypothesis at 10%, 5% and 1% levels. As the data is heteroskedastic so the GARCH model can be applied on that data.

This table 4.2(A,B) presents variance equation of GARCH model: $h_t = \omega + \delta \varepsilon_{t-1}^2 + \lambda h_{t-1}$. The coefficients are significant at 10%, 5% and 1% (*, **, ***) level. It is noted that the coefficient of all markets is significant at 1% confidence level. And the risk premier is measured by $(g + \lambda)$ ranges between 0.9- 1. There is long run persistence of volatility and the results shows significant volatility spillover.

Table 4.2(A) GARCH (1,1) of conventional stock markets

	REU	RGCC	RKSE	RKU
Ω	9.39E-07	2.95E-07	2.61E-06	3.89E-07
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
G	0.046931	0.051719	0.071881	0.039136
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
λ	0.945802	0.946324	0.891921	0.95517
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
(g + λ)	0.99273	0.99804	0.9638	0.99431

Table 4.2(B) GARCH (1,1) of conventional stock markets

	RTUR	RUK	RUS	RW
Ω	4.65E-13	9.32E-07	0.001562	5.57E-07
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
G	2.17E-01	0.06112	0.106687	0.035265
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
λ	7.30E-01	0.92702	-0.00594	0.95735
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
(g + λ)	0.94764	0.98814	0.10075	0.99262

Table 4.3 Descriptive statistic Islamic stock markets

	Mean	Std.Dev.	Skewness	Kurtosis	Jarque-Bera	ADF	ARCH
REUISL	0.0001	0.0110	-0.1058	8.9770	4399.63	-1.03477	5.1029
RGCCISL	-1.06E-05	0.0082	-1.4425	38.3248	15450.8	-0.9053	10.557
RKMI30	0.0003	0.0141	-0.2453	237.472	6762215	-1.1264	8.2553
RKUISL	-0.0001	0.0088	-1.5058	39.3194	16336.4	-0.8553	10.6371
RTURISL	0.0002	0.01	-0.6127	9.4109	5240.02	-1.0150	9.9112
RUKISL	9.63E-05	0.0115	-0.1657	8.4773	3703.61	-1.0077	7.5672
RUSISL	0.00026	0.00829	-0.15532	9.23684	479.094	-1.06473	15.483
RWISL	0.0002	0.0092	-0.0862	12.1573	1031.15	-0.8749	5.3476

This table presents the descriptive statistic of monthly returns of Islamic markets. It shows in column one to five the mean %, the std. dev. %, the Skewness, the Kurtosis, the Jarque-beta and ADF Statistic for Unit root test. The REUISL average monthly return is 0.0001 with standard deviation 0.0110. The RGCCISL average monthly return is -1.06E-05 with standard deviation 0.0082. The RKMI30 average monthly return is 0.0003 with standard deviation 0.0141. The RKUISL average monthly return is -0.0001 with standard deviation 0.0088. The RTURISL average monthly return is 0.0002 with standard deviation 0.01. The RUKISL average monthly return is 9.63E-05 with standard deviation 0.0115. The RUSISL average monthly return is 0.00026 with standard deviation 0.0082. The RWISL average monthly return is 0.0002 with standard deviation 0.0095. Negative skewness shows a conveyance with a deviated tail reaching out toward more negative esteems. Kurtosis measure portrays the relative peakedness or levelness of a dispersion contrasted and the typical circulation. Positive kurtosis indicates a relatively peaked distribution. The ADF statistics rejected the null hypothesis at 10%, 5% and 1% levels. The heteroscedasticity test is significant so GARCH model can be applied on these data series.

In Table 4.4 GARCH (1,1) is used to measure interdependence for stock markets. GARCH(1,1) model is the most applicable for forecasting volatility given the presence of ARCH consequence in returns series (Ramlall, 2010; Nikkinen et al. 2008; Charles and Darne, 2006; Bollerslev et al., 1994). This table presents variance

equation of GARCH model: $h_t = \omega + \delta \varepsilon_{t-1}^2 + \lambda h_{t-1}$. The coefficients are substantial at 10%, 5% and 1% (*, **, ***) level. It is noted that Parameters of the conditional variance equation are positive and statistically significant at 1% confidence level, and the risk premier is measured by $(g + \lambda)$ ranges between 0.9- 1.

There is long run persistence of volatility and the results shows significant volatility spillover.

Table 4.4 GARCH (1,1) of Islamic stock markets

	REUISL	RGCCISL	RKSEISL	RKUISL
Ω	6.33E-07	2.60E-07	1.62E-06	8.93E-07
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
G	0.039273	0.065436	0.174501	0.090899
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Λ	0.954806	0.938298	0.862224	0.903087
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
$(g + \lambda)$	0.99408	1.00373	1.03673	0.99399
	RTURISL	RUKISL	RUSISL	RWISL
Ω	3.97E-06	5.85E-07	1.28E-06	6.42E-07
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
G	0.065386	0.038389	0.085561	0.048415
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Λ	0.895353	9.57E-01	0.895993	0.943547
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
$(g + \lambda)$	0.96074	0.99522	0.98155	0.99196

Quantile Regression Analysis from Conventional To Islamic Stock Markets

Table 4.5 presents quantile regression estimation for conventional and Islamic market according to model, where dependent variable is A1 and independent variables are all Islamic countries

Table 4.5
Dependent Variable A1

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-9.32E-07	0.7901	-5.27E-06	0.0000	-1.02E-05	0.0001
B1	0.8926***	0.0000	0.9585***	0.0000	0.8069***	0.0000
B2	0.0151***	0.0000	0.0187***	0.0003	-0.0028	0.5542
B3	-0.0045	0.7739	0.0016***	0.0000	0.0001	0.7420
B4	-0.0511***	0.0000	-0.0083	0.3474	-0.0463***	0.0000
B5	0.0118***	0.0949	0.0275***	0.0001	0.0887***	0.0024
B6	0.0993	0.1432	0.1661***	0.0000	0.5561***	0.0000
B7	0.0250	0.4060	0.0014	0.8163	0.0714	0.3736
B8	-0.0904***	0.0748	-0.0224***	0.0022	-0.0633***	0.0000
R²	0.7264	0.0000	0.8352	0.0000	0.8907	0.0000

Following table presents the quantile regression analyses of Islamic and Conventional stock markets, It shows the estimation result of the quantile regression model. we can assume that the model is able to define and asses in an proper manner, the interdependence of volatility series. Where A1 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. Staricks *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. In this table the coefficient of B1, B5 and B8 stock markets are significant at low volatility (0.05), mean (0.5) movement and high volatility (0.95) level. B2 at low volatility (0.05) and mean volatility (0.5) movement level and B3 coefficient is significant at a mean volatility level (0.5). B4 coefficients are significant at low

volatility (0.05) and high volatility (0.95) level. B6 coefficient is significant at mean volatility(0.5) movement and high volatility (0.95) level.

Table 4.6 shows quantile regression estimation for the conventional and Islamic stock markets, dependent variable is A2 and Islamic stock market considered independent variables.

Table 4.6
Dependent Variable A2

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	5.84E-07	0.4148	1.27E-06	0.0014	8.58E-07	0.7771
B1	-0.0367***	0.0000	-0.0014	0.8377	0.0486	0.2631
B2	0.2538***	0.0000	0.7768***	0.0000	1.0881***	0.0000
B3	0.0010***	0.0000	0.0003***	0.0000	-0.0003	0.6803
B4	0.1215***	0.0000	0.0267***	0.0481	-0.0128	0.2382
B5	0.0104***	0.0000	0.0067***	0.0001	0.0701***	0.0501
B6	0.0483***	0.0000	-0.0038	0.3896	-0.0561***	0.0127
B7	0.0153***	0.0593	0.0288***	0.0000	0.0699***	0.0011
B8	0.0214***	0.0000	0.0273***	0.0001	-0.0040	0.8183
R²	0.3853	6.70E-05	0.7749	6.70E-05	0.9101	6.70E-05

Following table presents the Quantile regression analyses of conventional and Islamic stock. Where A2 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. Certainly, the exogenous variables related with quantile (0.05, 0.5 and 0.95) are usually high. Coefficient of B1 is significant at low volatility (0.05) level and B2, B5 and B7 stock markets are significant at low volatility (0.05), mean (0.5) movement and high volatility (0.95) level. B3 coefficient is significant at low volatility (0.05), mean volatility (0.5) level. B4 and B8 at low volatility (0.05), mean volatility (0.5) level. B6 coefficient is significant at low level (0.05) and high volatility (0.95) level. The results show strong interdependence in term of volatility. Table 4.7 presents quantile regression

estimation for the conventional and Islamic market where A3 is dependent variable and Islamic markets are independent variables.

Table 4.7

Dependent Variable:A3

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	2.82E-05	0.0000	2.02E-05	0.0000	6.89E-05	0.0000
B1	-0.1081***	0.0000	0.0547	0.1471	0.3407	0.3994
B2	0.0063	0.1250	0.0229***	0.0100	0.0905	0.8668
B3	0.0036***	0.0000	0.0053***	0.0001	0.0562	0.7677
B4	0.0762***	0.0000	0.1780***	0.0000	0.2125	0.4115
B5	-0.0120	0.3090	0.0847***	0.0000	0.0018	0.9732
B6	0.0982***	0.0000	-0.0234	0.4031	-0.2399	0.1925
B7	-0.0103	0.5931	0.0727***	0.0000	0.2075	0.2114
B8	0.0264	0.2507	0.1391***	0.0000	0.1780	0.3989
R²	0.0818	7.64E-05	0.2786	7.64E-05	0.5583	7.64E-05

Following table presents the Quantile regression analyses of Islamic and Conventional stock markets. Where A3 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. *, **, *** shows that the coefficient is significant at 10%, 5% and 1% confidence level. Estimation result of the quantile show, we can find that the model can depict and evaluate in a proper way, the relationship of unpredictability arrangement. Indeed, the exogenous variables associated with quantile (0.05, 0.5 et 0.95) is generally high. In this table the coefficient of B1 and B6 stock markets are significant at low volatility (0.05) level. B2, B5, B7 and B8 are significant at mean volatility (0.5) movement and B3 and B4 coefficients are significant at low volatility (0.05) and mean volatility (0.5) movement level. The results shows that there is strong interdependence between financial markets. This table 4.8 presents quantile regression estimation for Islamic and conventional markets according to the empirical model where dependent variable is A4.

Table 4.8**Dependent Variable:A4**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	3.11E-06	0.0267	1.96E-06	0.0029	-6.20E-06	0.0975
B1	0.0606***	0.0053	0.0316***	0.0743	-0.0645	0.7258
B2	0.0371***	0.0000	0.1553***	0.0000	0.0977***	0.0978
B3	0.0027***	0.0000	0.0028***	0.0000	-0.0012***	0.0007
B4	0.4828***	0.0000	0.6838***	0.0000	1.0113***	0.0000
B5	-0.0049	0.4877	-0.0093***	0.0196	-0.0409***	0.0000
B6	-0.0119	0.2803	0.0260***	0.0670	0.1591	0.2735
B7	-0.0642***	0.0136	-0.0060	0.5060	0.2660***	0.0000
B8	0.0098***	0.0001	0.0195	0.4069	0.3122***	0.0138
R²	0.2907		0.6366		0.8632	

Following table presents the Quantile regression analyses of Islamic and Conventional stock markets. Where A4 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. In this table the coefficient of B1 stock markets are significant at low volatility (0.05), mean (0.5) movement level. *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. The results show strong interdependence between conventional markets and their Islamic counter parts. B2, B3 and B4 at low volatility (0.05) and mean volatility (0.5) movement and B5 coefficient is significant at a mean volatility (0.5) movement and high volatility (0.95) level. B6 coefficient is significant at a mean level (0.95). B7 and B8 coefficient is significant at a low level (0.05) and high volatility (0.95) level.

Table 4.9 presents quantile regression estimation for Islamic and conventional markets according to the model where dependent variable is A5.

Table 4.9**Dependent Variable: A5**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-7.56E-06	0.0011	3.95E-05	0.0000	0.0004	0.0000
B1	0.1833***	0.0000	1.4039***	0.0000	3.5466***	0.0000
B2	-0.0546***	0.0000	-0.2470***	0.0000	-0.5018***	0.0000
B3	0.0027***	0.0000	-0.0008	0.4679	-0.0088***	0.0000
B4	0.0918***	0.0002	0.3997***	0.0000	0.7596***	0.0000
B5	0.0165	0.5933	0.1431***	0.0000	-0.2949	0.2189
B6	-0.0857***	0.0001	-0.9865***	0.0000	-2.3403***	0.0000
B7	-0.0816***	0.0102	-0.4240***	0.0000	-0.7623***	0.0000
B8	0.0326	0.5633	0.0954	0.0543	-0.3102***	0.0008
R²	0.0249	0.0001	0.1297	0.0001	0.1133	0.0001

Following table presents the Quantile regression analyses of Islamic and Conventional stock markets. Where A5 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. The conventional stock markets and Islamic stock market shows the asymmetric co-movement, the co-movement demonstrating that the dependence increases through high volatility market and vice versa. B1, B2, B4, B6 and B7 stock markets are significant at low volatility (0.05), mean (0.5) movement and high volatility (0.95) level. B3 coefficient is significant at low volatility (0.05) and high volatility (0.95) level and B5 coefficient is significant at a mean volatility level (0.5). B8 coefficient is significant at high volatility (0.95) level.

Table 4.10 presents quantile regression estimation for the conventional and Islamic market where A6 is dependent variable and Islamic markets are independent variables.

Table 4.10

Dependent Variable: A6

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	2.28E-06	0.1574	-1.21E-06	0.096	-5.36E-06	0.0000
B1	-0.0494	0.5276	-0.0353***	0.0598	0.0038	0.9592
B2	0.0111***	0.0029	0.0382***	0.0001	0.1045***	0.0083
B3	-0.0015	0.8986	-0.0005***	0.0046	-0.0019***	0.0000
B4	-0.0191***	0.0034	-0.0492***	0.0000	-0.0892***	0.0000
B5	0.0286***	0.0047	0.0529***	0.0000	0.0700***	0.0000
B6	0.2395***	0.0000	0.3398***	0.0000	0.5191***	0.0000
B7	0.2059***	0.0000	0.3503***	0.0000	0.4950***	0.0000
B8	0.1279***	0.0000	0.0995***	0.0000	0.0839***	0.0000
R²	0.527		0.6304		0.7850	

Following table presents the Quantile regression analyses of Islamic and Conventional stock markets. The results show strong interdependence between conventional and Islamic markets. A6 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. B1 coefficient is significant at a mean level (0.5). Low volatility, mean volatility and high volatility level Islamic markets B2, B4, B6, B7 and B8 are significantly effect on dependent variable. B3 coefficients are significant at a mean volatility level (0.95) and high volatility (0.95) level. Table 4.11 presents quantile regression estimation model for determine the interdependence between conventional and Islamic stock market where dependent variable is A7

Table 4.11**Dependent Variable: A7**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	0.0016	0.0000	0.0016	0.0000	0.0015	0.0000
B1	-0.0006	0.5145	0.0059	0.5063	0.0326	0.7963
B2	-0.0001	0.7464	-0.0009	0.4554	-0.0042	0.8240
B3	0.0000	0.6752	-0.0001	0.8153	-0.0015***	0.0011
B4	0.0002	0.6274	0.0000	0.9953	0.0246	0.5518
B5	-0.0005	0.1912	0.0013	0.5528	0.0182	0.4588
B6	0.0001	0.8621	-0.0047	0.3858	-0.0143	0.8012
B7	-0.0005	0.4230	0.0490***	0.0009	0.9677***	0.0000
B8	0.0002	0.6751	-0.0007	0.6841	0.0567	0.5768
R²	0.0000		0.0012		0.0174	

Following table presents the Quantile regression analyses of Islamic and Conventional stock markets. Where A7 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. The results indicate interdependence in term of volatility between conventional and Islamic markets. The co-movement between them demonstrating that the interdependence rise during high volatility market and vice versa. B3 stock markets are significant at high volatility (0.95) level. B7 coefficients are significant at a mean volatility level (0.5) and high volatility (0.95) level. Table 4.12 presents quantile regression estimation for Islamic and conventional markets according to the empirical model where dependent variable is A8.

Table 4.12**Dependent Variable: A8**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-3.17E-06	0.2965	4.01E-06	0	5.14E-06	0.0707
B1	0.3222***	0.0000	0.0326	0.2602	-0.1012	0.3910
B2	0.0262***	0.0000	0.0013	0.5092	0.1222	0.1927
B3	0.0022***	0.0000	0.0012***	0.0000	-0.0009***	0.0064
B4	0.0245***	0.0010	0.0204***	0.0001	-0.0637***	0.0124
B5	0.0297***	0.0000	0.0068***	0.0104	0.0224	0.6459
B6	-0.0288***	0.4000	0.0961***	0.0011	0.1195	0.1421
B7	0.0647***	0.0004	0.0875***	0.0000	0.0275	0.5154
B8	0.2223***	0.0000	0.6972***	0.0000	1.1558***	0.0000
R²	0.5114***	0.0000	0.7393***	0.0000	0.8782***	0.0000

Following table presents the Quantile regression analyses of Islamic and Conventional stock markets. Where A8 is considered dependent and B1, B2, B3, B4, B5, B6, B7 and B8 are considered independent stock markets. The results of above table show strong interdependence from conventional markets to Islamic markets. This interdependence is generally recorded in stability period. *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. In this table the coefficient of B1 and B2 stock markets are significant at low (0.05) level. B3, B4 and B8 coefficients are significant at low volatility (0.05) and mean volatility (0.5) movement and high volatility (0.95) level. B5 coefficient is significant at low volatility (0.05) and high volatility level (0.95). B6 and B7 coefficient is significant at low volatility (0.05) and mean volatility (0.5) movement level.

Quantile Regression Analysis From Islamic To Conventional Stock Markets:

Table 4.13 presents quantile regression estimation model for determine the interdependence between Islamic and conventional stock market where dependent variable is B1 and conventional stock market is independent variable.

Table 4.13

Dependent Variable: B1

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	1.55E-06	0.1131	3.68E-06	0.0000	1.40E-06	0.3223
A1	0.5009***	0.0000	0.8208***	0.0000	0.9305***	0.0000
A2	-0.0788***	0.0000	-0.0252***	0.0000	-0.0562***	0.0000
A3	0.0035	0.8448	-0.0307***	0.0000	0.0038	0.5492
A4	0.1000***	0.0000	-0.0060	0.2370	0.0568***	0.0003
A5	0.0114***	0.0000	0.0070***	0.0005	0.0118	0.0679
A6	0.0639***	0.0003	-0.0255	0.0936	-0.1851***	0.0000
A7	0.0000	0.8929	0.0000***	0.0045	0.0000***	0.0005
A8	0.2152***	0.0000	0.1305***	0.0000	0.3160***	0.0000
R²	0.6898		0.8327		0.9203	

. The results shows that the coefficient of A1, A2 and A8 stock markets are significant at low volatility (0.05), mean (0.5) movement and high volatility (0.95) level ,which recognize a resilient interdependence between Islamic stock B1 and three conventional stock markets. Whereas, A3 coefficient is only significant at mean volatility (0.5) level. A4 and A6 coefficient shows the significance at low volatility (0.05) and high volatility (0.95) level. A5 and A7 coefficient are significant at mean (0.5) movement and high volatility (0.95) level. Table 4.14 report the estimation results for the quantile regression analysis of Islamic and conventional stock market.

Table 4.14**Dependent Variable: B2**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-4.54E-07	0.4864	-2.24E-07	0.5613	1.06E-05	0.0001
A1	0.0157	0.1224	0.0149***	0.0033	-0.0144	0.4663
A2	0.8642***	0.0000	1.2331***	0.0000	1.5418***	0.0000
A3	-0.0597***	0.0002	-0.0408***	0.0000	-0.0726***	0.0001
A4	0.0417	0.0682	-0.0428***	0.0082	-0.0471***	0.0119
A5	0.0003	0.9100	-0.0018	0.1018	0.0062	0.0621
A6	0.0368	0.1127	-0.0382***	0.0001	-0.0369	0.2451
A7	0.0007***	0.0000	0.0006***	0.0000	0.0005***	0.0000
A8	-0.1174***	0.0000	-0.0309***	0.0000	-0.0146	0.4758
R²	0.6039		0.7772		0.8395	

The Quantile regression results shows in table 4.14 indicates the significant volatility transmission from Islamic B2 to the conventional markets. The coefficient of A2, A3 and A7 stock markets are significant at all three quantiles (0.05, 0.5 , 0.95) level, the estimation suggest that explanatory power of three exogenous variables(A2, A3 and A7) associated with each quantile is high. The results indicates a weak interdependence between B2 and A1, A6 stock markets, as their coefficients are only significant at mean (0.5) movement level. The coefficients of A4 gives the information of significant volatility spillover at average (0.5) and upper quantile (0.95), whereas coefficient of A8 stock markets shows significant results at lower (0.05) and mean (0.5) movement dependence level. Table 4.15 presents quantile regression estimation for Islamic and conventional markets according to the model where dependent variable is B3.

Table 4.15**Dependent Variable: B3**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-4.48E-07	0.8865	-5.37E-05	0	-9.35E-05	0.0964
A1	-0.0185	0.5077	-0.0953	0.0554	0.9758***	0.0311
A2	-0.1494***	0.0000	-0.2125***	0.0000	0.1437	0.4893
A3	0.2942***	0.0000	1.4539***	0.0000	1.4320	0.0794
A4	0.3104***	0.0000	0.5920***	0.0000	-0.3852	0.2227
A5	0.0095***	0.0022	0.0060	0.2976	-0.1555***	0.0000
A6	-0.2310***	0.0078	-0.0200	0.8451	-4.3383***	0.0000
A7	0.0002***	0.0000	0.0002***	0.0000	-0.0001	0.4959
A8	0.3446***	0.0002	0.6990***	0.0000	8.8509***	0.0000
R²	0.0755		0.1988		0.2922	

The result reported in table 4.15 represents the volatility transmission from Islamic stock market B3 to all conventional economies chosen in our sample. As the results indicates the strong spillover in term of volatility between B3 and A2, A3, A4 and A7 conventional stock markets, the coefficients are shows the significant dependence at low volatility (0.05) and mean volatility (0.5) quantile levels. The coefficient of A1 stock markets are significant at high volatility (0.95) level. A5 and A6 coefficient reports significance volatility interdependence at low volatility (0.05) and high (0.95) level. A strong level of spillover is shown between B3 and A8 stock markets co movement, the coefficients are significant at all three quantile levels.

Table 4.16 represents the volatility transmission from Islamic stock market B3 to all conventional economies.

Table 4.16**Dependent Variable: B4**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	4.84E-06	0.0000	-4.35E-06	0.0009	-6.13E-06	0.0457
A1	0.0010	0.9190	0.0020	0.8294	-0.0178	0.3940
A2	0.0642***	0.0000	0.0865***	0.0103	0.2362***	0.0006
A3	-0.0219	0.2806	0.0349***	0.0077	0.0482	0.3539
A4	0.4167***	0.0000	0.9132***	0.0000	1.4878***	0.0000
A5	0.0011	0.2340	0.0111***	0.0000	0.0276	0.0211
A6	0.0485***	0.0194	-0.0072	0.7126	0.0794	0.2550
A7	5.26E-05***	0.0000	1.18E-05	0.5107	-0.00011***	0.0000
A8	-0.0866***	0.0000	-0.0333***	0.0186	-0.0946***	0.0001
R²	0.3206		0.5883		0.8489	

Table 4.16 is based on estimation results related to Islamic market B4 volatility effect on the conventional stock markets . the coefficient of A2, A4 and A8 stock markets shows the high volatility transmission of B4 stocks returns, the significance dependence is at low volatility (0.05), mean (0.5) movement and high volatility (0.95) level. The coefficient of A3 and A5 stock markets are significant at mean (0.5) movement level. A6 coefficient is significant at stock markets are significant at low volatility (0.05) level. A7 stock market returns indicates significant transmission at low (0.05) and high volatility (0.95) quantile levels. While the volatility diffusion of B4 shows no significance on conventional stock A1

Table 4.17**Dependent Variable: B5**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	4.33E-05	0.0000	5.49E-05	0.0000	0.0001	0.0000
A1	-0.0071	0.7231	-0.0387	0.0502	-0.1138	0.4327
A2	0.0386***	0.0009	-0.0114	0.3937	-0.1869***	0.0000
A3	0.0095	0.5763	0.0343	0.0946	0.3079	0.2324
A4	-0.0195	0.1699	0.0648***	0.0000	0.0552	0.4430
A5	0.0045	0.3125	0.0097***	0.0001	0.0686	0.3779
A6	0.0029	0.9275	0.0601***	0.0379	0.7240***	0.0356
A7	0.0000	0.7087	-0.0001***	0.0000	-0.0004***	0.0000
A8	0.1500***	0.0000	0.2696***	0.0000	0.0202	0.9257
R²	0.1038		0.1656		0.1358	

Table 4.17 presents quantile regression estimation model for determine the interdependence between Islamic and conventional stock market where B5 is dependent variable. The Islamic market B5 volatility effect on volatility of whole sample of conventional markets is presented in table 4.17. The results indicate no case of interdependence between B4 and conventional markets on all quantiles. The coefficient of A2 stock markets are significant at low volatility (0.05) and high volatility (0.95) level. A4 and A5 coefficients are significant at mean volatility (0.5) level. A6 and A7 coefficients are significant mean volatility (0.5) movement and high volatility (0.95) level. A8 stock markets are significant at low volatility (0.05), mean volatility (0.5) level. Whereas the estimation shows no significant dependence with A1 and A3 conventional stock market. Table 4.18 presents quantile regression estimation for Islamic and conventional markets according to the model where dependent variable is B6

Table 4.18**Dependent Variable: B6**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	4.06E-06	0.0002	1.18E-05	0.0000	4.05E-05	0.0000
A1	0.3850***	0.0000	0.7249***	0.0000	0.8880***	0.0000
A2	-0.0831***	0.0000	-0.0359***	0.0000	-0.1114***	0.0000
A3	-0.0194	0.4201	-0.0720***	0.0000	-0.1137***	0.0000
A4	0.1984***	0.0000	0.0836***	0.0000	0.1548***	0.0000
A5	-0.0027	0.3312	-0.0046	0.1222	0.0044	0.7002
A6	0.2345***	0.0000	0.2179***	0.0000	0.1276***	0.0013
A7	4.21E-05***	0.0000	-1.40E-05	0.2309	-0.00011***	0.0000
A8	0.1733***	0.0000	0.0594	0.2344	0.0308	0.6142
R²	0.6248		0.7562		0.8503	

Following table presents the Quantile regression analyses of Islamic and Conventional stock markets. Where B6 is considered as dependent variable and A1, A2, A3, A4, A5, A6, A7 and A8 conventional markets are taken as exogenous factors. Above reported results indicates that the volatility transmission is strongly influencing the volatility of A1, A2, A4 and A6 conventional stock markets, their coefficients are significant at low volatility (0.05), mean volatility (0.5) movement and high volatility (0.95) level. A3 coefficient is significant at stock markets are significant at mean volatility (0.5) movement and high volatility (0.95) level. A7 coefficient is significant at low volatility (0.05) and high volatility (0.95) level. A8 coefficient are significant at low volatility (0.05) and high volatility (0.95) level.

The estimations reported in table 4.19 is related to the volatility influence of Islamic market B7 on the 8 conventional stock market returns

Table 4.19**Dependent Variable: B7**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	1.27E-06	0.1964	2.33E-06	0.0666	-1.28E-07	0.9577
A1	-0.0084	0.5296	0.0138	0.5451	-0.1259	0.0294
A2	0.0225***	0.0002	0.0234***	0.0172	-0.0819***	0.0002
A3	0.0237	0.2396	-0.0030	0.8188	-0.0635***	0.0291
A4	0.0480***	0.0003	0.0112	0.3226	0.0411	0.3258
A5	-0.0021	0.4176	-0.0049***	0.0145	-0.0092	0.3621
A6	0.2607***	0.0000	0.5892***	0.0000	1.5176***	0.0000
A7	7.19E-05***	0.0000	4.94E-05***	0.0002	1.20E-05	0.3407
A8	0.0717***	0.0013	0.1256***	0.0000	0.3270***	0.0078
R²	0.6248		0.7562		0.8503	

To check the Volatility co-movement from Islamic market from B7 to conventional economies above quantile regression is estimates ,Where B7 is considered dependent variable and A1, A2, A3, A4, A5, A6, A7 and A8 are considered independent factor. The coefficient of A2, A6 and A8 stock markets are indicates significant volatility co movement at all three low (0.05), mean (0.5) and high (0.95) quantile levels. A3 coefficient is significant and negative at upper (0.95) level. A4 coefficient is significant at low volatility (0.05) level. A5 coefficient are significant at mean (0.5) movement level. A7coefficient is significant at low volatility (0.05), mean volatility (0.5) movement level.

Table 4.20**Dependent Variable: B8**

Variable	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-2.08E-06	0.0077	-4.22E-06	0.0000	-3.97E-06	0.0680
A1	0.0457***	0.0000	0.0108	0.3735	-0.0736***	0.0002
A2	-0.0352	0.1029	-0.0011	0.8350	-0.0151	0.6887
A3	-0.0060	0.5490	-0.0102	0.1989	-0.0158	0.5033
A4	0.0523***	0.0000	-4.50E-05	0.9953	0.0770***	0.0099
A5	0.0049***	0.0000	0.0123***	0.0000	0.0094	0.4917
A6	-0.0265	0.0915	-0.0196	0.4029	0.0062	0.9070
A7	3.56E-05***	0.0000	-2.44E-06	0.8283	-2.71E-05	0.1155
A8	0.6687***	0.0000	0.9515***	0.0000	1.3248***	0.0000
R²	0.6253		0.7289		0.7429	

The estimations reported in table 4.20 is related to the volatility influence of Islamic market B8 on the 8 conventional stock market returns. Staricks *, **, *** indicates that the coefficient is significant at 10%, 5% and 1% confidence level. In this table a positive and strong interdependence in term of volatility is evident for only A8 stock market, the coefficients of A8 are significant at all quantile levels. The coefficient of A2 and A4 shows the significance at low volatility (0.05) and high volatility (0.95) level. A5 stock markets coefficients are significant at low volatility (0.05) and mean volatility (0.5) movement level. A7 coefficient is significant at low volatility (0.05) level. A8 stock markets are significant at low volatility (0.05), mean volatility (0.5) movement and high volatility (0.95) level. Whereas the coefficient of A2 A3 and A6 shows no significance at any level.

4.2 Discussion

In this study GARCH (1,1) model $h_t = \omega + \delta \varepsilon_{t-1}^2 + \lambda h_{t-1}$ is used to estimate the volatility series of each stock market. According to many researchers GARCH model is better to estimate the volatility spillover among stock markets with the existence of ARCH effect (Bollerslev et al., 1994, Nikkinen ., 2008).

Through the use of Quantile approach ,study financial markets interdependencies regarding volatility, consequences of past studies which utilized distinctive systems keeping in mind the end goal to judge the presence of unidirectional and once in a while bidirectional unpredictability overflows between markets (Luchtenberg and Vu, 2015; Gilenko and Fedorova, 2014; Bekiros, 2014; Ben Rejeb, 2016; Mukherjee and Mishra, 2010; Darrat and Kasch-Haroutounian et Price, 2001; Forbes and Rigobon, 2001, 2002; and so forth...).

It is essential that by reference to the financial literature identified with use of the quantile regression strategy, continued by figure seven quantile, from (0.05) to (0.95). Be that as it may we simply announced in tables the consequences of major quantile (0.05, 0.5 and 0.95) which narrate, most much of the time, the greatest of data. In reality, these quantile permit us considering extraordinary circumstance to financial markets, individually low volatility, mean volatility, and high volatility.

According to Buchinsky (1995), the standard error which are obtained using the pairs boot stepping procedure. This allows determining the nature of co-movement. The study confirms the previous findings that there is financial interdependence between these markets. Aymen Ben Rejeb (2016) concluded that conventional markets and Islamic markets have strong interdependence and great impact regarding volatility spillover. This approach is used for interdependence in term of volatility , it confirm the result of previous studies where they used distinctive methodology in order to check the volatility spillover between financial markets, Gilenko and Fedorova, (2014).

Chapter 5

Conclusion

5.1 Conclusion

Conventional and Islamic instruments could benefit to the investment in Global capital markets. To invest in various indices in the most efficient and easiest way to improve return, findings of most of the investor suggest that because to invest in Islamic stock having low risk. There is a uncertainty on Islamic indices to perform better than or equal to conventional asset market because of low potential of diversification, smaller size of investment alternatives as compared to conventional market and higher cost of Islamic yielding portfolio range which recommend that these investment underperform as compared to conventional one. (Ho, 2014).

Due to rapid growth of investment in Islamic finance the transmission of volatilities also present in Dow Jones Index and in emerging Islamic index and in Islamic countries. Our study had examined this transmission of volatilities among Dow Jones conventional and Islamic index including Europe, Gulf corporation council (GCC), Pakistan (KSE) , Kuwait (KU), Turkey (TUR), United Kingdom (UK), United States (USA) and World emerging markets (W) by using standard GARCH model with Quartile regression analysis to know about the significance of trends among Islamic and conventional stock market and interdependence among these markets. The data has taken from December, 2008 till December 2016.

The heteroscedasticity test is significant so GARCH model can be applied on these data series. The results show significant interdependence among both stock markets and there is long run determination of volatility among stock markets.

*, **, *** indicates that the coefficients were significant at 10%, 5% and 1% confidence level. By using quartile regression three trends low volatility, mean volatility and high volatility trends significance were checked.

The result shows that there is interdependence present among conventional and Islamic stock markets. European conventional stock market have significant volatility spillover towards Islamic stock market of Europe, Turkey and world emerging markets because the volatility spillover is at absolute level (all three quartile are significant) towards these three Islamic stock markets. Secondly, Gulf corporation

council conventional stock market have significant volatility spillover towards Islamic stock markets of gulf corporation council, Turkey and USA at absolute level. Third, Pakistan conventional stock market has significant volatility spillover towards Islamic stock markets of Pakistan and Koyat at high volatility and mean volatility level.

Koyat conventional stock market has significant volatility spillover towards Islamic stock markets of gulf corporation council, Pakistan, Turkey at absolute level. Turkey conventional stock market have significant volatility spillover towards Islamic stock markets of Europe, gulf corporation council, Koyat, UK and USA at absolute level. UK conventional stock market have significant volatility spillover towards Islamic stock markets of gulf corporation council, Koyat, Turkey, UK, USA and world emerging market at absolute level. USA conventional stock market has significant volatility spillover towards Islamic stock markets of USA at mean and low level and in Pakistan Islamic stock market its volatility is significant at low volatility level only. In last World emerging conventional stock market have significant volatility towards Islamic stock markets of Pakistan, Kuwait and World emerging market at absolute level.

Results are also significant for the volatility spillover from Islamic to conventional stock markets. European Islamic stock market has significant volatility spillover towards conventional market of Europe, Gulf corporation council and world emerging markets at absolute level. Second, Gulf corporation council Islamic stock market has significant volatility spillover towards conventional market of Gulf corporation council, Pakistan and USA at absolute level. Third, Pakistani Islamic stock market has significant volatility spillover towards conventional market of world emerging markets at absolute level. Fourth, Koyat Islamic stock market has significant volatility spillover towards conventional market of Europe, Gulf corporation council and world emerging markets at absolute level. Turkey Islamic stock market has significant volatility spillover towards conventional market of Koyat and Turkey at mean volatility level only and at UK and USA conventional market mean volatility and low volatility level. The volatility spillover from Turkey Islamic stock market is not much strong like other Islamic markets. UK Islamic stock market has strong and significant volatility spillover towards conventional market of Europe, Gulf corporation council, Koyat and UK at absolute level. USA Islamic stock market has significant volatility spillover towards conventional market of Gulf corporation council, UK and world

emerging markets at absolute level. In last world emerging Islamic stock market has significant volatility spillover towards conventional market of only its own world emerging market at absolute level.

5.2 Recommendations of study

This study is helpful for investors, economic policy makers and academia. Investors can formulate effective approaches against volatilities spillover of conventional and Islamic stock markets. Investors would able to manage effective portfolios in the selected countries of our study to enhance their investment stock returns. For economic policy makers, they help to understand about the information of returns and volatility spillover of Islamic and conventional stock markets so that they make policy easily to avoid contagious of spillover, So that new Policies may be formulated and implemented to manage the volatilities of stock markets. . For academia purpose this study is also helpful to the researchers to have insight about the volatility spillover in Islamic stock market indices and extend literature in the field of this research domain.

5.3 Limitation of study

This study limited on Eight Dow Jones Conventional and Islamic stock markets (Europe, gulf cooperation council, Pakistan, Koyat, Turkey, UK, USA and world emerging market) only, Moreover, Other countries have not included and the time period from 2008 to 2016 (only 8 years) due to shortage of time. The different financial crises periods are ignored. In future large number of countries from other European and Asian region may include and also check the crises period impact on volatility spillover among Islamic and conventional stock markets.

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